INFECTIOUS DISEASE DETECTION AND SURVEILLANCE PROJECT

Annual Report, Fiscal Year 2022

Truenat training in Zimbabwe. Photo by IDDS.

Bacteriology training in Senegal. Photo by IDDS.

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A Message from IDDS Leadership

The United States Agency for International Development (USAID) Infectious Disease Detection and Surveillance (IDDS) project continues to address challenges ranging from tuberculosis to global health security, including COVID-19 and other priority zoonotic diseases such as Ebola virus disease. IDDS is one of USAID's leading initiatives to tackle the increasing threat that infectious diseases pose to partner countries, the United States, and the world.

Fiscal year 2022 is the fourth year of the project. This year, we not only present new evidence of the project's impact, but also envision what we plan to achieve before the project ends in 2024. IDDS has continued to strengthen health systems in Africa and Asia to detect, track, and rapidly respond to infectious diseases and drug-resistant bacterial infections. The project rolled out new tools and techniques to improve the ability of countries' health systems and workers to detect tuberculosis quickly and accurately. IDDS also bolstered laboratory networks and specimen referral systems for the safe and efficient collection, transportation, and processing of biological samples—aiding effective and timely identification and treatment of diseases.

We encourage you to read on to learn more about IDDS' achievements in the past fiscal year. We thank USAID and the American people for the opportunity to sustain this project and its outcomes, and our partners and other stakeholders for the collaboration that improves and saves lives.

Lisa Nichols
IDDS Project Director

Ochiawunma Akwiwu-Ibe
IDDS Deputy Project Director

INTRODUCTION

GLOBAL HEALTH AND THE THREAT OF INFECTIOUS DISEASES

The threat of infectious diseases continues, and outbreaks have increased in frequency and severity since the start of the 21st century. This increase is due in large part to global travel and trade, population growth, climate change, and increased contact between humans and animals. There has also been a rise in antimicrobial resistance (AMR), with approximately 700,000 people dying each year from drug-resistant infections.

Strong diagnostic and surveillance systems are essential for the provision of quality health care. They detect infectious diseases before they spread and ensure that health officials and others have the information required to take decisive action. However, many low- and middle-income countries (LMICs) lack the capacity to detect and respond to both known and new infectious diseases, including regions at high risk for diseases with pandemic potential and AMR. Laboratory systems and diagnostic testing capacity are frequently overlooked and underfunded in health systems in LMICs.

"We are simultaneously investing in the global health security architecture to prevent, detect, and respond to infectious disease outbreaks and pandemics, while also helping health systems recover from what they have just undergone and continue to undergo in many parts of the world with COVID."

—USAID Administrator Samantha Power, National Press Club, Washington, DC, June 7, 2022

ABOUT IDDS

Established in May 2018, the Infectious Disease Detection and Surveillance (IDDS) project operates in LMICs where there are significant gaps in health systems' ability to detect, track, and rapidly respond to infectious diseases and drug-resistant infections that pose a major threat to public health and global health security. IDDS is funded by the United States Agency for International Development (USAID).

IDDS is led by ICF and a consortium of organizations with extensive expertise in infectious diseases, disease detection and surveillance, and health information systems: FHI 360, PATH, the Mérieux Foundation, the African Society for Laboratory Medicine, Abt Associates, Gryphon Scientific, Metabiota, and the Association of Public Health Laboratories.

Country teams, led primarily by host-country nationals, collaborate closely with ministries of health and a wide range of local partners to ensure that the project's efforts are aligned with country priorities and tailored to local needs.

Truenat training in Cambodia. Photo by Cindy Liu for IDDS.

IDDS training on waste management during the Ebola outbreak in DRC, September 2022. Photo by IDDS.

WHAT WE DO AND WHERE

IDDS operates in 24 countries in Africa and Asia, where the project focuses on developing the capacity of laboratories to provide safe testing and accurate, quick results—and to effectively communicate those results to health care providers, public health officials, and other key decision makers.
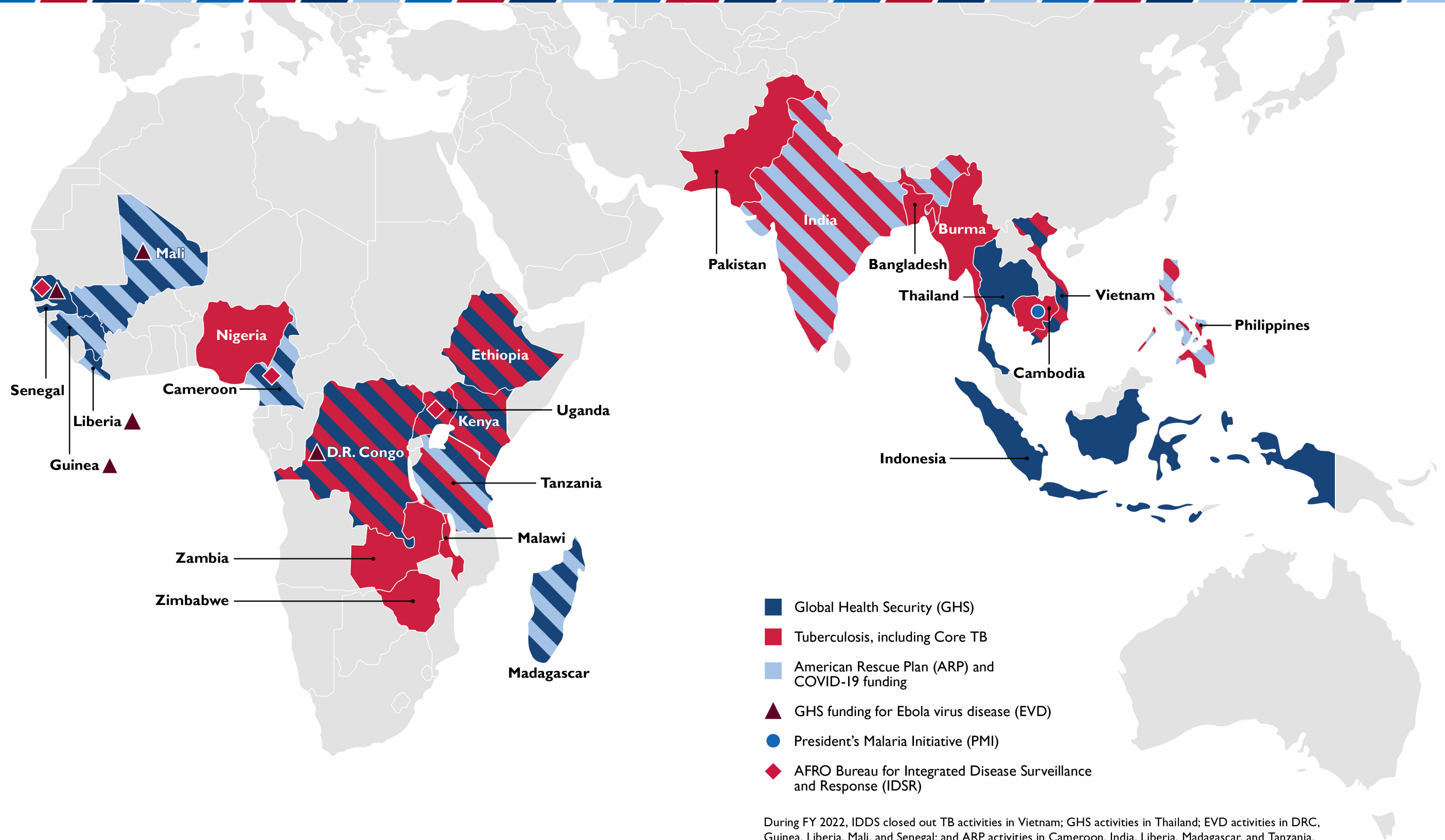
Zoonotic diseases—caused by germs spread from animals to humans — account for three-quarters of new or emerging infectious diseases in people.

Taking a "One Health" approach that recognizes the interconnection between people, animals, and our shared environment, IDDS also works to develop the capacity of animal health systems to detect and report diseases that could become threats to humans, and to foster collaboration and data sharing between the animal and human health sectors.

IDDS prioritizes testing for diseases and drug-resistant pathogens that have the potential to spread quickly, devastate health, and disrupt economies. Priority diseases include tuberculosis (TB)—the world's deadliest infectious disease prior to coronavirus disease 2019 (COVID-19), causing approximately 1.5 million deaths each year—as well as Ebola virus disease (EVD), COVID-19, and other potentially deadly infectious diseases.

USAID INFECTIOUS DISEASE DETECTION AND SURVEILLANCE (IDDS) PROJECT

WHERE WE WORK, FY 2022

Mali

Senegal

Liberia

Guinea

Nigeria

Cameroon

D.R. Congo

Zambia

Zimbabwe

Ethiopia

Uganda

Kenya

Tanzania

Malawi

Madagascar

Pakistan

India

Bangladesh

Burma

Thailand

Vietnam

Cambodia

Philippines

Indonesia

Legend:

- Global Health Security (GHS)
- Tuberculosis, including Core TB
- American Rescue Plan (ARP) and COVID-19 funding
- ▲ GHS funding for Ebola virus disease (EVD)
- ● President's Malaria Initiative (PMI)
- ◆ AFRO Bureau for Integrated Disease Surveillance and Response (IDSR)

During FY 2022, IDDS closed out TB activities in Vietnam; GHS activities in Thailand; EVD activities in DRC, Guinea, Liberia, Mali, and Senegal; and ARP activities in Cameroon, India, Liberia, Madagascar, and Tanzania.
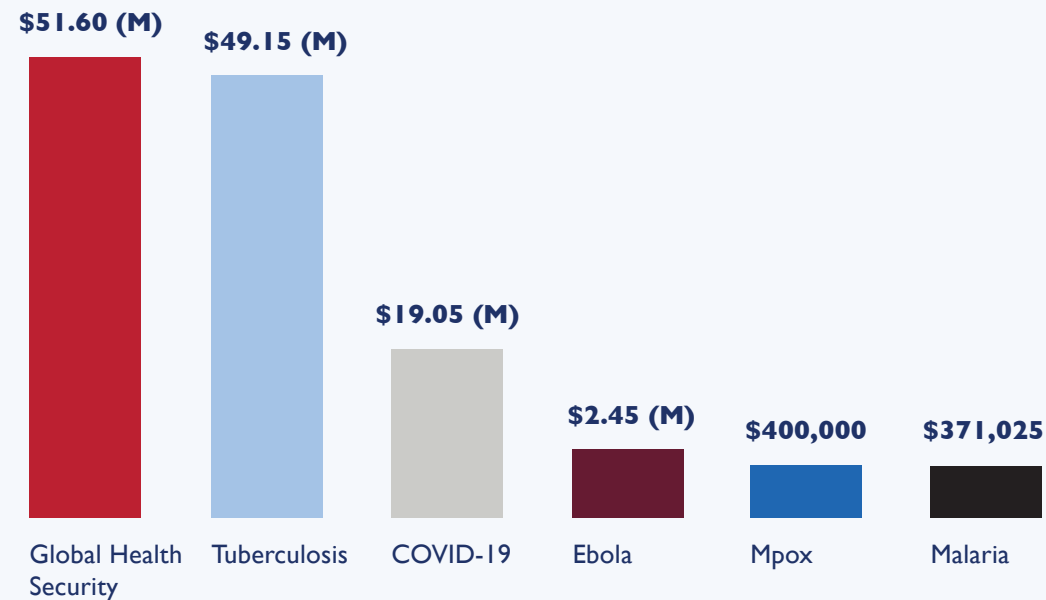
FUNDING

IDDS is a $135 million project that can take in funds from multiple sources and pivot quickly as countries' needs change.

In fiscal year (FY) 2022, IDDS received a variety of USAID funding: USAID Global Health Security (GHS) funds for general activities and EVD response; USAID Washington, USAID mission, and President's Emergency Plan for AIDS Relief funds for TB activities; USAID emergency response funds for COVID-19; American Rescue Plan Act (ARP) funds for COVID-19 response; USAID Africa Bureau funds for Integrated Disease Surveillance and Response (IDSR) activities; and President's Malaria Initiative funds for activities in Cambodia.

IDDS FUNDING

FY 2022

Category	Amount
Global Health Security	$51.60 (M)
Tuberculosis	$49.15 (M)
COVID-19	$19.05 (M)
Ebola	$2.45 (M)
Mpox	$400,000
Malaria	$371,025

IDDS BY THE NUMBERS FY 2022

5,204
People trained to improve laboratory capacity

1,024
People trained to improve disease surveillance

450+
Laboratories with improved diagnostic capacity

9
Laboratories newly able to detect antimicrobial resistance for TB or other priority pathogens through culture testing

26
Districts with improved community-based surveillance

2
Countries newly reporting to GLASS with IDDS support

21
Laboratories in five countries contributing AMR data to GLASS

35
National surveillance bulletins produced

35
Multi-sectoral data sharing meetings supported

250
SOPs, plans, and guidelines developed

DELIVERING RESULTS

INFORMING DECISIONS

Analyzing networks and forecasting needs

Why it matters: Around the world, far too many people lack access to laboratory tests, either because the diagnostic services are unavailable or because their location is not well aligned with where patients live or seek health care. Poor infrastructure for transporting specimens for testing and a lack of laboratory equipment are compounded by weak supply chains for the materials that are needed to perform the tests. Designing better diagnostic networks requires analysis of the existing testing capacity, gaps, and opportunities for improvement—and we are delivering this information across the countries where we work so that decisionmakers can optimize the placement of new machines and services to best reach the patients who urgently need them. The ability to provide treatment and health care services based on laboratory test results depends on these efforts to inform expansion of laboratory services.

Global Health Security

We assessed laboratory network capacity in **Cameroon**, **Ethiopia**, **Mali**, and **Senegal**, and assessed veterinary laboratory capacity in **Tanzania**. These analyses provided critical information to guide subsequent technical assistance, training curricula development, and supportive supervision. In **Mali**, our assessment led to recommendations for site-specific corrective actions to improve equipment maintenance and repair. Our geospatial analysis experts also delivered key insights for **Guinea**, where we mapped more than 60 laboratories to support the response to EVD.

Our analyses also helped inform the ongoing COVID-19 response throughout 2022. We reviewed the findings of an assessment conducted at eight laboratories to determine their capacity for COVID-19 testing as part of the national strategy to decentralize COVID-19 testing across **Tanzania**. After the review, the National Public Health Laboratory (NPHL) selected three laboratories to target for expanding COVID-19 polymerase chain reaction (PCR) testing, based on our estimation of their capacity for biological specimen collection, packing, and transport; sufficient specimen storage facilities; adequate staffing; and quality management. In **Liberia**, we provided technical assistance to NPHL to assess and forecast the inventory of COVID-19 diagnostic commodities and plan for distribution and redistribution of COVID-19 rapid diagnostic tests (RDTs) that were nearing expiry.

Tuberculosis

Following guidance from the World Health Organization (WHO), countries are expanding use of rapid molecular tests for the initial TB diagnosis, instead of smear microscopy. Countries need to understand their current supply of rapid tests and where that testing capacity will have the greatest benefits for patients—and IDDS equips them with this knowledge. We implemented laboratory network spatial analysis (LNSA)—a methodology that combines geospatial analysis with population and disease data—to determine current capacity and identify areas in greatest need of access to rapid molecular diagnostics. During FY 2022, we supported these analyses to inform placement of instruments in **Burma**, the **Democratic Republic of the Congo (DRC)**, **Ethiopia**, **Kenya**, **Malawi**, the **Philippines**, **Tanzania**, and **Zambia**, and began planning for analyses in **Uganda** and **Zimbabwe**. Our findings are already informing decisions to expand access to testing. For instance, in **Burma**, our LNSA identified 12 sites where new GeneXpert® (GX) machines will be added to improve diagnostic network coverage, including in the private sector.

We adapted the TB-NET Tool (a scoring system to review TB diagnostic networks against 10 core competencies) and integrated pediatric and drug-resistant TB (DR-TB) checklists to allow the TB diagnostic network assessment (DNA) to assess more of the diagnostic network and implemented IDDS' flagship DNA in **Ethiopia** using these tools. We also worked with stakeholders in **Malawi** and **Cambodia** to support a self-assessment of their diagnostic networks, an important step to understanding diagnostic network strengthening needs in these countries.

Generating data to inform policies and plans

Why it matters: Beyond our efforts to assess national capacity for diagnosing diseases, we are working to build the evidence base for national efforts to modernize disease surveillance through regulations and strategic planning. This involves gathering data from community and regional sources, cleaning and analyzing data, and reporting data into national health information systems to enable national monitoring of disease trends and drug resistance, which informs program planning and strategic decisions.

Global Health Security

In **Uganda**, we supported the AMR National Coordination Center in compiling and analyzing 2021 national AMR surveillance data from both the animal and human health sectors, which led to the country's first-ever national AMR report. In **Vietnam**, we provided technical support to five provinces to complete needs assessments for the extension of the Vietnam Animal Health Information System to the district level.

We supported the development of national laboratory and strategic plans in three countries: **DRC**, **Liberia**, and **Madagascar**. We supported **Tanzania**'s implementation of the National AMR Surveillance Framework in animal health surveillance sites by assessing laboratory capacity to detect and report AMR in two veterinary laboratories in Dodoma and Iringa regions. In **Indonesia**, we implemented new Four-Way Linking guidelines with a specific focus on tracking and reporting cases of leptospirosis. In collaboration with partners in **Cameroon**, we reviewed the National Strategy for COVID-19 Genomic Surveillance and developed the data flowchart for tracing COVID-19 specimens from collection sites to NPHL for genomic sequencing.

Tuberculosis

In **India**, we convened more than 70 stakeholders for cross-sectoral meetings to review and update the country's National Action Plan (NAP) for AMR. Our technical and managerial support in organizing the national experts' consultation for the human health component of the NAP-AMR process resulted in strategic inputs collated for development of the NAP-AMR 2.0, including its draft operational plan and monitoring and evaluation framework for the strategic priorities.

Sharing our knowledge

Why it matters: IDDS is committed to deploying its expertise and research capabilities to further scientific knowledge and understanding of infectious disease prevention and control. Building on our 4 years of experience supporting more than 20 countries, IDDS thought leaders contributed to webinars, academic conferences, scientific papers, and public health communications, further sharing our experience across countries and regions.

Global Health Security

In **Cameroon**, we supported the organization of the first International Microbiology Day meeting in Yaoundé, which was convened during World Antimicrobial Awareness Week (November 2021). We also facilitated international surveillance training that included topics relevant to the issue of disease transmission between countries, including safe specimen collection and transport, implementation of guidelines and procedures for the prevention of COVID-19 spread, and response to public health emergency events occurring at national entry points. In June 2022, IDDS experts attended the Global Health Security Conference in Singapore and shared four posters and four oral presentations. In **Indonesia**, we conducted a national webinar on foot and mouth disease; conducted a webinar for the G20 One Health Side Event on a One Health approach for prevention, preparedness, and response strategy and capacity; and conducted a three-day

webinar/virtual workshop on leptospirosis surveillance and control using a One Health approach.

With our technical support, the Regional Public Health Laboratory (RPHL) Network in **Thailand** facilitated its 14th video conference in October 2021 for 20 participants from Brunei, Burma, Singapore, the Philippines, Nepal, and Thailand. In June 2022, we held a [webinar](#) about the expansion of laboratory diagnostic services to district and regional settings, drawing 201 registrants and 103 attendees.

Tuberculosis

Four IDDS country teams from **Bangladesh**, **India**, **Vietnam**, and **Zimbabwe** presented five posters and one satellite session at the 52nd Annual Union World Conference on Lung Health in October 2021. We also continued our contributions to furthering TB research, with the development of TB research protocols across seven countries: **Bangladesh**, **Burma**, **Cambodia**, **India**, **Tanzania**, **Vietnam**, and **Zimbabwe**. We held two webinars covering the topics of [diagnosing TB in children](#) and performing [geospatial analysis](#) to improve access to TB diagnostics. The webinars drew hundreds of attendees during their live broadcast, and hundreds more have viewed them through our [YouTube channel](#). We have also published videos developed by the IDDS team in **Burma** on use of the GX platform and taking digital chest X-rays (CXRs) on the IDDS YouTube channel and translated them into English and French for sharing globally.

We participated in global health days and events such as the Step Up to End TB Summit 2022 on World TB Day in **India** to showcase contributions to the National Tuberculosis Program (NTP) along with a wide range of national and international stakeholders.

OPTIMIZING RESOURCES

Fostering local partnerships

Why it matters: Together with our local partners in each country, we have a shared responsibility to determine how to sustain IDDS' results. As we reflect on four years of implementation and impact, we look to the future and consider how IDDS has built the capacity of local governments and organizations (public, private, and civil society) to continue to improve disease detection and surveillance systems. One important aspect of this capacity building is our creation of country-led forums for experts to collaborate and share lessons learned. These forums are crucial to fostering multi-sectoral collaboration, ensuring that everyone has a seat at the table and that decisions are informed by the breadth of multi-sectoral expertise. Another key area is forecasting costs so that existing financing and new investments may be utilized—across sectors and partnerships—to continue improvements to diagnostic and surveillance networks.

Global Health Security

In **Thailand**, we strengthened regional linkages through financial and logistical support to the RPHL Network and convened stakeholders from 11 countries to share experiences and resources on infectious disease detection. As COVID-19 spread, the Network proved instrumental to international learning and problem solving. We transitioned management and coordination of the Network to **Thailand**'s Department of Medical Sciences to allow for its sustainability through in-country leadership. In **DRC**, **Guinea**, and **Vietnam**, we analyzed costs and facilitated financial planning for laboratory networks and specimen referral systems to inform decisions to sustain these important programs. In **Liberia**, we secured stakeholder buy-in by the National Diagnostic Division (NDD) technical team and provided technical assistance to expand its leadership role across the diagnostic network. In **Madagascar**, we supported the establishment of a disease surveillance and response steering committee to develop a national-level AMR surveillance protocol and coordinate and harmonize data across vertical diagnostic and surveillance programs.

Tuberculosis

Through a participatory approach in **Bangladesh**, we supported NTP to complete costing of the TB Laboratory Strategic Plan (2021–2025), a milestone that will enable NTP to plan for resource mobilization and implementation. We also worked with NTP to shift routine diagnostic activities from the National TB Reference Laboratory (NTRL) to the regional level, helping decentralize these services and expand access. We supported a similar laboratory strategic plan in **Zimbabwe**, and we facilitated a TB diagnostic working group in **Tanzania**—efforts that will ensure local leadership of improvements to TB diagnostic networks in these countries. Our work to connect global suppliers of TB diagnostics and connectivity, like Cepheid, Molbio Diagnostics, and SystemOne, with local distribution and equipment maintenance partners built bridges to ensure that TB diagnostic solutions are not only introduced effectively, but also locally managed and maintained.

Working across sectors

Why it matters: Problems like AMR, TB morbidity and mortality, and emerging pandemic threats are multi-factorial, requiring large-scale solutions. They require that stakeholders from different academic disciplines and across the public, private, and civil society sectors align their efforts in pursuit of a shared goal. By breaking down silos and incentivizing cooperation, our work to foster multi-sectoral collaboration offers potential gains in efficiency, new opportunities to take pilots to scale, and deeper engagement of end users in the solutions that aim to benefit them.

Global Health Security

In **Indonesia**'s Demak districts, we hosted a pilot to implement Four-Way Linking guidelines, a framework that helps countries to strengthen their collection, analysis, and sharing of national data to facilitate risk assessment and risk communication between human and animal health sectors at the national and local levels. We also provided technical inputs to the Coordinating Ministry of Human Development and Culture for a national regulation on cross-sectoral management of zoonotic diseases, and we supported a One Health working group for the G20 forum chaired by Indonesia in 2022.

Our work to institutionalize a One Health approach creates the conditions for collaboration across human health, environmental health, and animal health sectors to monitor infectious disease outbreaks and prevent the emergence and spread of AMR. For example, in **Tanzania**, we hosted a visit to improve AMR data sharing and use across organizations and sponsored a joint session for two technical working groups (TWGs) on AMR surveillance and antimicrobial stewardship at the national level. In **Mali**, we supported the national One Health platform by providing technical and financial support to the *Institut National de Santé Publique* (INSP, or National Institute of Public Health) to convene One Health committee meetings, which provide a forum for discussing strategies to strengthen community laboratory systems, study AMR in the health care setting, and implement quality control across sectors.

Tuberculosis

In **India**, we launched the "One-Stop TB/DR-TB Diagnostic Solution model" in Hisar district of Haryana state to engage private laboratories in the TB diagnostic network. The new model is generating evidence that private sector laboratories are able to reduce turnaround times for TB test results and improve the rate of drug susceptibility testing (DST), which is expected to improve the rate of patients that initiate the correct treatment regimen.

In **Burma**, we secured a commitment from a private hospital association to transport specimens through the private sector, which is essential to strengthen coverage of the private sector diagnostic network. After the specimen referral system (SRS) is implemented, the new organizational linkages are likely to improve equity, quality, and timeliness of diagnosis for patients with DR-TB. In addition, we provided private sector hospitals in Burma with new tools that will improve capacity to quickly and accurately detect TB infections, including rapid molecular tests and software for computer-aided detection (CAD) of TB that uses artificial intelligence (AI) to read X-rays. In **Zimbabwe**, we provided financial and technical support to develop the government-led TB-HIV Public Private-Partnership framework. This framework outlines cross-sectoral strategies for formulating policies, strategies, and agreements for collaborating toward achieving universal access to TB-HIV prevention, diagnostics, treatment, and care services.

EXPANDING ACCESS

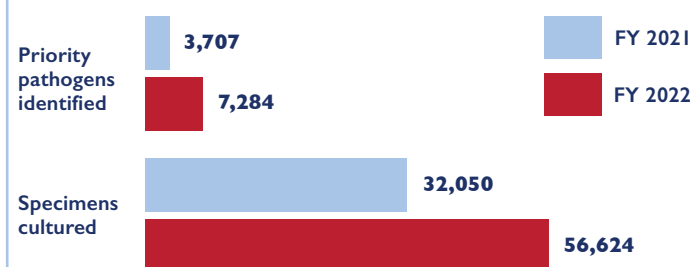*Strengthening laboratory systems to decentralize access to diagnostic services*

Why it matters: Confirming a clinical diagnosis with laboratory results informs health care providers and allows clinicians and health workers to rapidly employ the most effective treatment and prevention methods, which stop the disease from spreading and save lives.

Global Health Security

We made major strides to expand access to bacteriological testing in 2022. From **Cameroon**'s largest poultry-producing zone, where we supported the National Veterinary Laboratory of Douala to operationalize the bacteriology unit, to **Liberia**, where we developed diagnostic capacity for culture and antimicrobial susceptibility testing (AST) in three county hospital laboratories, we are expanding testing beyond centrally located reference laboratories to communities where access is lacking.

Over the life of the project, IDDS has introduced bacteriology and AST in 31 laboratories serving 21,854,075 people. IDDS has also strengthened capacity for bacteriology testing in 9 additional sub-national laboratories, which has resulted in increased testing and detection of priority pathogens.

Bacteriology testing at IDDS-supported laboratories

Priority pathogens identified: 3,707 (FY 2021); 7,284 (FY 2022)

Specimens cultured: 32,050 (FY 2021); 56,624 (FY 2022)

Tuberculosis

In **Bangladesh**, **Burma**, **DRC, Malawi**, **Mozambique**, and **Vietnam**, we improved diagnosis of childhood TB by implementing stool specimen collection and processing —an important method for identifying children with TB, because most young children are unable to produce sputum specimens. We developed standard operating procedures (SOPs) and trained laboratory workers to use the simple one-step process for stool specimen processing with GX machines.

Strengthening event-based and community-based surveillance systems

Why it matters: Countries need data that move faster than diseases. Integrating event- and community-based surveillance into national health information systems offers real-time monitoring and data that can trigger effective measures to detect and contain outbreaks before they become life-threatening epidemics.

Global Health Security

In **Mali**, we expanded community-based surveillance (CBS) to 2 new health districts, training 173 community health workers and contributing to higher capacity for early detection and reporting of events and diseases of public health importance. The newly trained community health workers reported more than 350 events of public health importance in the first 6 months of the new CBS system. In **Vietnam**, we provided coaching on recording and classifying event-based surveillance (EBS) signals and events to improve accuracy and coverage. We also worked with the Epidemiological Surveillance TWG and the Directorate of Prevention in **Senegal** to modify and roll out an SMS-based early warning system module for EVD and other hemorrhagic fevers. This module was integrated into the system that was established for the COVID-19 pandemic.

Our work to roll out the latest IDSR guidelines in **Cameroon** and **Senegal** also involves strengthening EBS and CBS. Using a train-the-trainer approach in **Senegal**, we engaged 59 head nurses from 3 health districts of the Tambacounda medical region, advancing their technical knowledge of IDSR guidance on AMR; EBS; CBS; and human, animal, and laboratory surveillance.

> "With the adaptation and implementation of the third edition of the IDSR technical guidelines, there is potential for disease surveillance in Tambacounda to be greatly improved."
>
> —Dr. Cheikh Gadiaga, Tambacounda health district chief medical officer

Improving specimen referral systems

Why it matters: In many countries, specimens with time-limited viability must be transported from remote areas to central laboratories for testing, and the systems for delivering the specimens are fractured or pose biosafety and biosecurity risks. Moreover, many SRSs need to be updated and adjusted to incorporate new capacity for decentralized testing. Improving the efficiency and

effectiveness of specimen transport systems accelerates referral of confirmed cases to treatment, prevents resources from being wasted when specimen integrity is compromised during delivery, and reduces biosecurity risks.

Global Health Security

In **Guinea**, we piloted an integrated and sustainable SRS that reduced costs and turnaround (from 7 to 10 days down to 24 hours) from collection of the specimen to the delivery at the reference laboratory. During the pilot of the new SRS, all 246 specimens were received at the proper temperature, and only 1 was rejected at the reference laboratory for insufficient volume.

In **Vietnam**, we completed a pilot of an integrated SRS in three provinces for both human and animal health, using a private courier company that ensures biosafety and biosecurity during specimen transport. We provided spill kits made from locally sourced materials to all referral sites. The pilot SRS freed laboratory staff to perform diagnostic work instead of relying on these workers for specimen transport, having the added downstream benefit of increasing diagnostic capacity.

Tuberculosis

In **Bangladesh**, we participated in a workshop to update the SOPs for the SRS. In **Burma**, we developed software architecture for an innovative web-based SRS mobile application, which was shared with WHO to ensure its interoperability with other applications and with private sector TB service providers to enhance utilization and sustainability of the initiative.

As part of our new "one-stop" model launched in Hisar district in **India**, we re-evaluated the SRS routes that had been developed with Google Maps and designated X-ray facilities as potential specimen collection sites. This will ensure more comprehensive TB screening and streamline the SRS to improve patients' experience of diagnostic care.

Deploying new tools

Why it matters: Recent innovations in diagnostics and digital health technologies offer significant advantages, such as faster turnaround time for test results and suitability for use in remote areas without access to stable power. Countries with a high burden of infectious diseases need access to these new tools—and critically, training on how to use and maintain them—so that they can improve patient outcomes and save lives.

Global Health Security

In **Kenya**, we supported the Bungoma County Referral Hospital and Hass Scientific to negotiate and finalize a contract to place a VITEK 2 system to automate bacterial identification and AST. We trained laboratory personnel

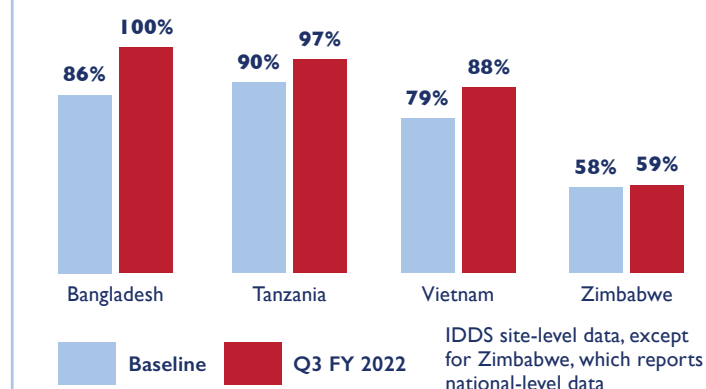to use VITEK 2 to process specimens, conduct quality assurance, and maintain the equipment.

Tuberculosis

In line with WHO's recommendation that molecular testing replace smear microscopy for the initial diagnosis of TB, we provided Truenat® technology (278 machines have been installed across 9 countries) and trained 625 laboratory technicians and NTP staff to use it in **Bangladesh**, **Cambodia**, **DRC**, **Kenya**, **Nigeria**, the **Philippines, Uganda**, and **Vietnam**. This is part of the introducing New Tools Project (iNTP), a collaboration between USAID and the United Nations' Stop TB Partnership. We trained Truenat "super-users": end users who receive extra Truenat training to become experts who can pass on their knowledge and troubleshooting skills to others. During a pilot in **Zimbabwe** in early 2022, we trained 15 participants through technical and hands-on sessions, identifying lessons to inform rollout to other countries. After seeing the benefits in **Zimbabwe**, we rolled out the Truenat super-user training to five additional countries: **Bangladesh**, **Cambodia**, **DRC**, **Kenya**, and **Uganda**. A total of 98 super-users have been trained by the project.
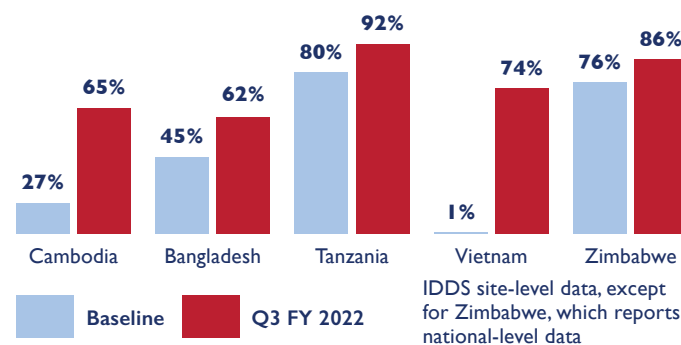
CXRs remain a key tool for diagnosing TB, and we are expanding access by rolling out ultra-portable machines that can take CXRs outside of typical X-ray rooms, as well as CAD-AI software for reading X-ray results. Our training on ultra-portable X-ray machines in **Cambodia**, **DRC**, **Nigeria**, **Uganda**, and **Vietnam** resulted in 154 people newly trained to screen patients for pulmonary TB, and we monitored four provinces in **Vietnam** that received CAD-AI software to observe the medical examinations and ensure the quality of AI-assisted diagnosis.

Through the deployment of new tools and optimizing the diagnostic network, IDDS helped increase the percent of presumptive TB patients tested with a WHO-recommended RDT and TB cases that are bacteriologically confirmed.

Percent of new and relapsed bacteriologically-confirmed pulmonary TB cases

Bangladesh: 86% (Baseline); 100% (Q3 FY 2022)
Tanzania: 90% (Baseline); 97% (Q3 FY 2022)
Vietnam: 79% (Baseline); 88% (Q3 FY 2022)
Zimbabwe: 58% (Baseline); 59% (Q3 FY 2022)

IDDS site-level data, except for Zimbabwe, which reports national-level data

Percent of presumptive TB patients tested with a WHO-recommended RDT

	Cambodia	Bangladesh	Tanzania	Vietnam	Zimbabwe
Baseline	27%	45%	80%	1%	76%
Q3 FY 2022	65%	62%	92%	74%	86%

IDDS site-level data, except for Zimbabwe, which reports national-level data

IMPROVING QUALITY

Updating government guidelines and procedures to conform to international standards

Why it matters: The International Health Regulations (IHR) set minimum standards for surveillance and reporting of infectious diseases and require that countries adapt their governance strategies to meet these standards. Monitoring and evaluation systems, such as the Joint External Evaluation process, assess countries' capacity to detect, report, and respond to events of global public health significance. In the countries we support, we are working to help countries update their laws, regulations, and organizational policies to comply with IHR and improve their Joint External Evaluation scores.

In 2018, the United Nations High-Level Meeting on TB set ambitious global goals for improving TB diagnosis and care, including targets to treat 40 million people with TB and 3.5 million children with TB by 2022. We are contributing to these targets through our work to update TB strategic plans and SOPs.

Global Health Security

In total, we developed or revised 187 SOPs, plans, and guidelines in FY 2022, across 10 countries. These plans and policies do not just sit on the shelf—they are vital documents that guide everyday work from the laboratory bench to the community health clinic, and, in many cases, they represent a key step toward attaining accreditation in alignment with international standards. Our work to translate these materials into local languages, inform health care workers of regulatory requirements, and set up supportive systems to ensure that policies are being followed demonstrates the project's dedication to following through on all phases of the policy process, including the commitment to transfer knowledge to all levels of the health system during implementation and evaluation.

We also provided key inputs to national and international policymaking processes. For example, in **Indonesia**, we supported the Coordinating Ministry of Human Development and Culture to draft the Coordinating Ministry Regulation on Zoonosis. The new policy will strengthen cross-sectoral coordination on surveillance, risk analysis, and early response to outbreaks with pandemic potential.

Tuberculosis

Across our portfolio of TB countries, we assisted national TB programs in updating strategic plans and SOPs to improve the quality of TB testing. For example, in **Tanzania,** we finalized an operational plan for the TB laboratory network that will enable the zonal laboratories to expand their accredited scope of work to include culture and line probe assay (LPA) tests, enhancing the overall quality and capacity of TB testing in accordance with the goals and targets of the National TB Strategic Plan. In **Zimbabwe**, our national TB testing manual improved access to SOPs for TB testing throughout all levels of the laboratory network. Our work to develop SOPs in **Bangladesh** for LPA, culture, DST, and GX testing of extra-pulmonary TB (EPTB) contributed to standardizing diagnostic tests across the network while improving quality of tests. And in **Malawi** and **Zimbabwe**, we revised each country's algorithm for diagnosing TB. Malawi's revised algorithm is now being used to inform revision of national guidelines, ensuring that our efforts to improve detection of DR-TB are integrated into the national diagnostic network. This will enable the country to test for isoniazid and fluoroquinolone resistance and expand DR-TB testing in the country to allow detection of patients with pre-extensively drug-resistant TB.

Empowering networks through quality management

Why it matters: As the technology at a laboratory improves and the services it provides expand, it is vital to closely monitor the quality of its testing services to ensure the accuracy and timeliness of results and improve clinicians' and patients' confidence in utilizing newer laboratory diagnostics and services. Quality management systems (QMSs) establish and control work processes to ensure consistent and accurate laboratory results, while laboratory accreditation independently verifies results and ensures they conform to national and international standards. We also work to flag underperforming laboratories and identify paths for corrective action and quality improvement.

Global Health Security

With our technical assistance package, **Liberia**'s Ministry of Health (MoH) is building a national QMS, which will support national and regional laboratories across the country. We trained seven in-country Stepwise Laboratory Improvement Process Towards Accreditation (SLIPTA) auditors who
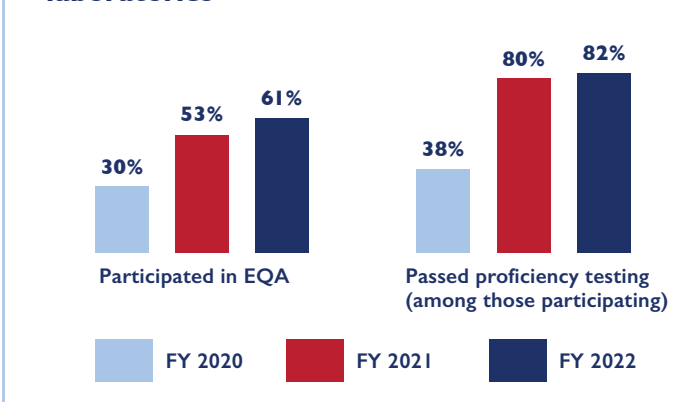
will play a vital role in evaluating the progress of QMS implementation and ensuring compliance at national and subnational levels, and we provided on-site mentorship on QMS to eight laboratories enrolled in the Strengthening Laboratory Management Toward Accreditation program.

In **Kenya**, we provided technical assistance to two laboratories (Nyeri County Hospital Laboratory and Malisini Sub-County Hospital Laboratory) to include bacteriology tests (gram stain, culture, and antimicrobial susceptibility tests) in their scope of work assessed for accreditation. After receiving our training and mentorship on bench skills and quality management, both laboratories achieved accreditation from the Kenya Accreditation Service, contributing to the national network's diagnostic capacity and ability to monitor for AMR.

IDDS-supported laboratories participating in QMS activities (GHS)

	Cameroon	Ethiopia	Guinea	Kenya	Liberia	Madagascar	Mali	Senegal	Tanzania	Uganda	TOTAL
Baseline	4	5	0	1	3	0	0	0	4	0	17
Q4 FY 2022	9	5	3	5	9	6	2	2	4	5	50

Proficiency testing at IDDS-supported laboratories

	Participated in EQA	Passed proficiency testing (among those participating)
FY 2020	30%	38%
FY 2021	53%	80%
FY 2022	61%	82%

Tuberculosis

We are building capacity for accurate diagnosis of TB through our work to expand external quality assessment (EQA) in **Bangladesh**, **Tanzania**, and **Vietnam**. We subcontracted with the Bangladesh Rural Advancement Committee and the Damien Foundation to select 80 GX sites for EQA activities and adapted and translated the GX EQA SOPs to the local context.

We also supported quality control and EQA in all countries where we provided new Truenat technology and training. To achieve quality control for Truenat testing, we worked with SmartSpot Quality, an established *Mycobacterium tuberculosis* (MTB) EQA provider in Africa, to develop EQA training materials, and provided EQA panels to six countries: **Bangladesh**, **Cambodia**, **DRC**, **Kenya**, **Uganda**, and **Zimbabwe**. Early results from **Zimbabwe** already demonstrate the impact, with 16 of the 20 laboratories (80 percent) successfully reporting EQA results in the first cycle, and half achieving perfect (100 percent) or acceptable (>91 percent) scores.

In **India**, we introduced a revised supervisory, monitoring, and evaluation package that the Central TB Division (CTD) will use to supervise every level of the diagnostic network and developed a grading tool that CTD will use to rank the national reference laboratories (NRLs) and intermediate reference laboratories and provide feedback on performance and opportunities for quality improvement. In **Pakistan**, we are supporting one national and three regional TB reference laboratories to move toward receiving accreditation for diagnostic services. We are doing this through weekly training sessions on 12 essential QMS topics, and by reviewing, revising, and adapting essential documents such as technical and management SOPs, a quality manual, a biosafety manual, and a client handbook that are required for accreditation.

Improving surveillance

Why it matters: To support countries in tracking infections that are resistant to antibiotics, we are equipping health workers with the tools they need—especially training. To turn the tide against AMR, workers need to know how to track and prevent deadly infections in the community, health care settings, and the laboratory. Policymakers and health workers across these settings play an important role in detecting deadly superbugs, ensuring responsible use of antibiotics, and properly handling materials that may contain drug-resistant bacteria, such as laboratory waste that may pose a biohazard.

Global Health Security

We partnered with **Kenya**'s National Antimicrobial Stewardship Interagency Committee secretariat to identify training needs and design an AMR surveillance curriculum with 12 modules that can be tailored for clinicians, policymakers, veterinary professionals, laboratory technicians, nurses, and other health professionals. The online course has been completed by 180 learners and is now certified by 6 professional organizations for continuing education, and we have worked with course managers to support the learners as they engage with the virtual platform.

In **Tanzania**, our training, technical assistance, and funding for supplies at four laboratories allowed uninterrupted testing for AMR among key pathogens throughout FY 2022, contributing to the country's GHS core capacities and fulfilling a national strategic priority.

Jeremiah Mumo of the Health Information Systems program under Kenya's MoH addressed professional organizations, saying,

"These courses are cross-cutting…the innovation will help members renew their practicing licenses as well as keep updated with new knowledge and skills."

Launching digital solutions

Why it matters: Public health officials and other decisionmakers need real-time information from modern, digital reporting systems that can connect to diagnostic equipment, aggregate information from many sources, and automate data synthesis and visualization. Digital solutions for diagnostic connectivity and disease reporting provide opportunities for monitoring laboratory performance, identifying and containing outbreaks, managing inventory to forecast supply needs, and improving network efficiency across sectors.

Global Health Security

We provided training and mentorship in four countries (**Cameroon**, **Ethiopia**, **Kenya**, and **Liberia**) to implement or improve the use of WHONET, a free WHO desktop application for the management and analysis of microbiology laboratory data that has a particular focus on AMR surveillance. In total, 140 people were trained or mentored on WHONET.

"WHONET allows trained users to better manage AMR data and helps them monitor the evolution of known resistance patterns and the appearance of atypical patterns."

—Helene Tiomo, deputy head of the bacteriology laboratory at National Veterinary Laboratory in Yaoundé, Cameroon

In **Vietnam**, we trained animal health staff in 41 districts across 4 provinces on how to use the Vietnam Animal Health Information System (VAHIS) to report outbreaks so that districts could directly enter data and improve timeliness of reporting. In **Senegal**, we trained 30 medical officers, surveillance officers, and data managers to use District Health Information Software, version 2 (DHIS 2), including for AMR surveillance.

We also organized a workshop in **Tanzania** to support data cleaning and coding for upload into the electronic logistics management information system so that microbiology commodities are appropriately coded, grouped by utility, and available for order by users at the facility level.

Tuberculosis

In **Mozambique**, **Tanzania**, and **Zimbabwe**, we installed and configured a new platform (Aspect) to provide connectivity between newer technologies such as Truenat and existing reporting systems like GxAlert, so that real-time TB results reporting can be used for patient management and TB program improvement. The new connectivity solution allows monitoring of indicators such as drug-resistant infections, so that the program can reduce the spread of resistant TB strains. We also signed a blanket purchase agreement with SystemOne (Aspect's manufacturer) to deploy the platform to additional countries in FY 2023 and review the usage and design of dashboards for collection and review of and response to TB diagnostic data.

In **Cambodia**, we developed and implemented an SMS notification system called DataToCare (DTC). We trained laboratory technicians across 20 GX sites to use DTC to remotely monitor performance of GX utilization and cartridge stock, so that supplies can be reallocated to avoid shortages and prevent waste.

IDDS training on waste management during the Ebola outbreak in DRC, September 2022. Photo by IDDS.

CONTAINING OUTBREAKS

Facilitating specimen transport and referral

Why it matters: During an active response to an infectious disease outbreak, specimen transport is paramount to achieving rapid test results and delivering the information that officials need to contain the spread. Moving specimens from collection sites to laboratories for testing must be done quickly, all while maintaining specimen integrity, preventing breaking or spillage, and complying with international law when crossing national borders.

Global Health Security

In response to the EVD outbreak in **Guinea**, we provided supplies for specimen collection, packaging, and transport, and in **DRC**, we transported EVD specimens from collection sites to a central laboratory, the *Institut National de Recherche Biomédicale* in Goma (INRB, or National Biomedical Research Institute), for testing with GX.

Throughout 2022, we continued to support the COVID-19 response by collecting and transporting 16,961 specimens in the **Philippines**. We continued our efforts to transport 2,154 specimens for genomic sequencing in **Cameroon** and the **Philippines**, allowing these countries to track how the virus and its variants were evolving. Our mobile swabbers collected 11,536 specimens in the **Philippines**.

Training emergency response workers

Why it matters: An emergency response is only as effective as the people who are deployed to communities where an outbreak occurs. Our experts train and mentor health care workers on how to detect and collect specimens, conduct testing, and use molecular tools to diagnose COVID-19 and EVD.

Global Health Security

In **Mali**, we provided essential reagents and laboratory supplies to INSP and provided supportive supervision on data collection and reporting. We also supported 2 on-site coaching sessions in Kangaba to 17 technical directors at the referral health center and 52 community health workers. We also continued to support a pilot program in **Guinea** of the specimen transport, referral, and tracking system for EVD.

Throughout 2022, we provided technical assistance, training, and ongoing mentorship to assist laboratory networks across seven countries to respond to the COVID-19 pandemic. In **Liberia**, we supported three county laboratories for antigen RDTs and followed up with continuous mentorship and technical assistance on updating the laboratory testing strategy. In **Guinea**, we led two training sessions on COVID-19 detection using GX and RDTs, specimen collection, biosafety, and quality

management. In **Tanzania**, we led training on supply chain management for laboratory staff from five COVID-19 testing laboratories, ensuring uninterrupted COVID-19 testing, and assessed diagnostic specimen management practices to ensure the quality of COVID-19 test results.

In anticipation of a massive flow of inbound travelers to **Cameroon** for the 2022 African Cup of Nations, and given the emergence of the Omicron variant, we co-organized training for 42 participants (11 female) on cross-border surveillance, safe specimen collection and transport, guidelines and procedures for prevention, and response to public health emergencies, including the COVID-19 pandemic at the entry points.

Mobilizing crucial supplies and equipment

Why it matters: Part of any public health response to an infectious disease outbreak involves procuring supplies for health workers and laboratories to perform the tests that allow treatment of the disease—and containment of the outbreak. The COVID-19 pandemic created severe shortages and upended global supply chains for health commodities. We continue to offer our expertise not only to meet immediate needs for supplies, but also to optimize logistics for future supply chain resiliency.

Global Health Security

To improve testing capacity for EVD in **DRC**, we delivered 500 GX EVD cartridges, which were used to respond to an EVD outbreak in October 2021. We also conducted a supportive supervision visit to confirm that specimens were being tested on the same day they arrived at the laboratory. To sustain improved testing capacity for EVD, we concluded activities by delivering RDT kits and pipette tips, which can be used for cadaveric surveillance as needed in the future. We also supplied reverse transcription (RT)-PCR test kits and essential reagents for Marburg disease and Lassa fever in **Guinea**.

We continued to support procurement needs for essential COVID-19 supplies across eight countries. In **Cameroon**, **Guinea**, **India**, **Liberia**, **Madagascar**, **Mali**, the **Philippines**, and **Tanzania**, we delivered COVID-19 testing supplies, reagents, and consumables, such as PCR plates, cryovials, nucleic acid extraction reagents, and RDT kits, supporting COVID-19 testing and reporting at reference laboratories in these countries.

ONE HEALTH

One Health is an integrated approach to disease detection that recognizes the interdependence between people, animals (both wild and livestock), and our shared environment. As awareness of the dangers of zoonotic diseases—those that jump from animals to people such as EVD and COVID-19—has grown, so too has momentum for coordinating efforts among sectors. However, collaboration between the animal and human health sectors and formal systems to detect, track, and respond to zoonotic disease outbreaks before they spread to humans are still lacking in many countries.

The One Health approach is foundational to our GHS efforts—and in our fourth year of project implementation, we are seeing the results of our efforts to improve coordination among the human, animal, and environmental health sectors paying off. After creating guidelines and strategic plans for One Health activities across many of the countries in our portfolio, coordinated surveillance of priority pathogens between the human and animal health sectors is now the norm in many of the areas in which we work.

In **Uganda**, we have now trained two district One Health teams on the implementation of coordinated surveillance for zoonotic diseases and operationalized the country's One Health Strategic Plan. Musa Sekamatte, the national One Health coordinator said, "With this implementation plan in place, we can now move the One Health concept from national-level meetings to actual One Health practice at a community level."

To support collaboration and implementation of a One Health approach at the community level, we assembled and trained District One Health Teams (DOHTs) in **Uganda**'s Mbale and Kazo districts, which have experienced several outbreaks of zoonotic disease in the last five years. Prior to the launch of the DOHTs, many of the human health officials had never spoken to veterinary officials in the districts. Now, the DOHTs meet monthly to share data and strategize to prepare for a future outbreak. When there is an active outbreak, the DOHTs meet weekly to share new developments, coordinate their response, and prevent the outbreak from spreading.

In **Indonesia**, we worked with the One Health Laboratory Network, the MoH's Center for Human Resource Training, and the Eijkman Institute to finalize and implement a training curriculum for the PREDICT Laboratory Protocol. PREDICT—a project of USAID's Emerging Pandemic Threats program—has developed basic laboratory procedures and provided training to more than 2,500 staff in developing countries. We trained 23 people (18 female) across 4 public health laboratories in Batam, Ambon, Makassar, and Manado.

"The training is very valuable, impactful, and responded to our needs."

—Salli Hattu, laboratory officer in Ambon

A One Health approach can be instrumental in improving detection of AMR, which occurs when pathogens become resistant to the medicines we use to treat them. In **Cameroon**, we assisted NPHL in operationalizing SOPs and conducting a joint supervision of the seven sentinel bacteriology laboratories engaged in a pilot AMR surveillance program for priority pathogens in human and animal health to ensure the harmonization of procedures for AMR detection.

Although zoonotic diseases can be challenging to address, there are opportunities to intervene before local outbreaks become global pandemics. To contain outbreaks, the human and animal health sectors must be able to work together, and act quickly based on the available evidence across all levels of government. We look forward to continuing our work to bring transformative systems change that allows for a coordinated, multi-sectoral approach to disease detection and surveillance.

> We helped Indonesia implement a One Health system strengthening approach to sustainably improve surveillance and detection of emerging infectious diseases with epidemic and pandemic potential. Read the poster from the 2022 USAID Health Systems Strengthening Case Competition: Strengthening Interoperable Data Systems for Health Security in Indonesia

IDDS SHARES ITS EXPERIENCE AT THE GLOBAL HEALTH SECURITY CONFERENCE

The Global Health Security Conference 2022 took place June 28–July 1 in Singapore, and IDDS was a major part of USAID's presence at the event. The conference attracted world leaders as well as public health experts from across the globe. Addressing the meeting,

U.S. Secretary of State Antony Blinken said,

"COVID-19 has made people in every part of the world understand, on a personal level, how their health is bound up with that of other individuals and nations. That awareness, and the fierce urgency to make sure history does not repeat itself, gives us a unique chance to break the cycle of pandemic panic and neglect."

Dr. Doudou Diop of IDDS (right) with Dr. Jane Ruth Aceng, **Uganda**'s minister of health. Photo by IDDS.

Our presentations at the conference covered AMR, One Health, and integrated SRSs, with posters and oral presentations highlighting our work in **Cameroon**, **Guinea**, **Kenya**, and **Uganda**.

Derrick Mimbe of IDDS provided a video of his presentation on Mapping the National Laboratory Diagnostics Capacity across all Health Sectors for Improved Detection of Priority Zoonoses in Uganda.

It was also an important opportunity for our staff to meet and discuss global health with a very diverse group of technical experts and senior public officials from around the world, including Dr. Doudou Diop of IDDS (see above) with Dr. Jane Ruth Aceng, Uganda's minister of health.

Former Australian Prime Minister Malcolm Turnbull captured the importance of the meeting, saying, "We now have three certainties in life: death, taxes, and pandemics."

IDDS presentations at GHS 2022

Oral presentations:
- Development of an AMR curriculum in Kenya
- Cameroon's experience using WHO benchmarks for IHR capacities to build AMR surveillance systems
- Building regional laboratory capacity for AMR surveillance in Guinea
- Addressing SRS in Africa during COVID-19

Posters:
- Evaluation of health facility-based surveillance in response to COVID-19 in eastern Uganda
- Mapping the laboratory capacity for improved detection of zoonoses in Uganda
- Strengthening AMR diagnostic networks through SRS in Kenya
- Strengthening AMR diagnostic capacity at Murang'a County Referral Hospital in Kenya

COMMUNICATING OUR IMPACT

We increased the visibility of the project and expanded its reach through a variety of communications channels. During FY 2022, we published blogs on BMJ Global Health, Agrilinks, and New Security Beat, among others.

In March 2022, we created a LinkedIn page, which had 684 followers at the end of the fiscal year. We increased our followers on Twitter from fewer than 50 to 184.

Our followers on Twitter and LinkedIn include global health stakeholders encompassing government agencies, multilateral institutions, non-governmental organizations, USAID projects, academia, and private sector entities. Our posts on LinkedIn and Twitter regularly receive hundreds of views and are shared widely.

Our YouTube channel has 118 subscribers. The three videos of the webinar series we began during FY 2022 received 640 views. IDDS News, our quarterly e-newsletter, has nearly 300 subscribers.

LOOKING AHEAD

With another year and a half of implementation (until May 2024), we must take advantage of this time to develop and hand over blueprints for success in each of the countries where we work, so that the crucial efforts to strengthen the architecture of global health security and tackle the age-long menace of TB can continue to be locally led. This global, collaborative effort takes time and resources—but it is a cost-effective investment in our future.

Staying flexible and resilient throughout numerous outbreaks of infectious disease has driven home the importance of this work. These new outbreaks have also drawn unprecedented attention to the urgency of securing country capacity for preventing, detecting, and responding to infectious disease threats. At the same time, the COVID-19 pandemic has laid bare the urgency of ending TB even as progress toward meeting the United Nations High-Level Meeting on TB targets has stalled. Seizing this moment has never been more important, especially as we stand side by side with country partners who are ready to take charge of investments in their diagnostic and surveillance networks.

A healthier, safer, and more secure global community is within reach. We must redouble our efforts to build local expertise, institutionalize laboratory processes and procedures to raise the quality of services, and improve access to testing around the world by bringing it closer to communities. New infectious diseases are inevitable, but they need not become global pandemics.

MENTORSHIP BOOSTS LABORATORY QUALITY AND LEADS THE WAY TO ACCREDITATION

There is nothing quite like individual coaching to help you perfect a skill, whether it is on the sports field or the bacteriology bench in a public health laboratory. The individual coaching that William Walker has given has not only improved the quality of diagnostic services, but also established bacteriology testing—vital for the diagnosis of infectious diseases and for the detection of drug-resistant bacteria—at three county hospital laboratories in Liberia.

> "This mentorship by William has exposed me to the world of microbiology. I can now confidently identify pathogenic bacteria and inform clinicians on the right treatment to give their patients. Thanks to IDDS for supporting him in building our skills."
>
> —Emmanuel Sonkarlay, a laboratory technician at G.W. Harley Hospital's laboratory in Liberia

The microbiology team at Kenya's Murang'a County Referral Hospital preparing to analyze quality control strains supplied by IDDS. Photo by IDDS.

Expanding the capacity of regional laboratories to work on bacteriology is a key part of the work of USAID's Infectious Disease Detection and Surveillance (IDDS) project in Liberia, as well as in Kenya and Senegal. Not only do the new services help patients who previously would not have been able to get laboratory tests, but they also are a key step for laboratories to achieve international accreditation and improve national monitoring of key pathogens. In Kenya, IDDS provided training and mentorship on bench skills to technicians at the Nyeri County Hospital Laboratory and Malindi Sub-County Hospital Laboratory to include bacteriology work in an assessment accreditation. Both laboratories achieved accreditation from the Kenya Accreditation Service in 2022, further bolstering the country's diagnostic capacity and ability to monitor for antimicrobial resistance (AMR).

Walker has seen firsthand how patients can benefit from bacteriology testing in Liberia. "IDDS has provided us with the skills and services that enable us to provide services to our patients and help them to recover from situations like chronic wound infections, chronic urinary tract infections, and many others which we were treating empirically before," he said. "We are able to provide the correct antibiotics and reduce AMR in our population following guidance provided through the laboratory results."

After attending an IDDS-led microbiology training on March 15–26, 2021, he started his new role as national bacteriology trainer in April 2021, based at Phebe Hospital in Bong County, Liberia, developing other technicians' skills in bacteriology testing and antimicrobial susceptibility testing (AST), a method of measuring bacteria's response to antibiotics. Walker provided on-site mentorship on a quarterly basis, provided hands-on support, and helped the technicians process specimens. He also provided remote mentorship whenever it was needed. The results of Walker's training have been impressive—not only has bacteriology testing started at the three hospital laboratories, but crucially, it is also being used on an ongoing basis. The number of specimens sent to the laboratories has steadily increased, with a total of 257 specimens processed between October 2021 and August 2022.

For laboratory services to be utilized, clinicians need to become aware of them and trust that the results will be high quality. "I have been able to move knowledge into practice," said Dr. Siedoh Freeman, G.W. Harley Hospital medical director. "In other places we don't have the opportunity of doing culture and sensitivity [testing], we just use antibiotics as we think, but since I came to Nimba [county], at least I am able to benefit from doing culture and sensitivity [testing] for my patients. I am able to identify the right antibiotic for my patients and reduce both hospital stay and cost to patients."

Sometimes the missing link is standardization across the laboratory network, which helps improve trust in the quality of the services and harmonize data for national monitoring. In Senegal, nine IDDS-supported laboratories were either not performing bacteriology tests or were performing the tests without any standard procedures when IDDS started work. Standard operating procedures (SOPs) are crucial to maintaining the consistency, accuracy, and quality of laboratory work. IDDS supported Senegal's Ministry of Health Directorate of Laboratories to create 54 SOPs for performing AST.

Two of these regional laboratories are newly supported by IDDS: Social and Hygiene Institute of Medina and Mbour Health Center. Staff from both sites attended a three-day SOP training workshop, which included practical working group sessions, in June 2022 at the National Public Health Laboratory in Dakar.

One trainee from Mbour Health Center said:

"IDDS' support is really appreciated because we did not have any SOPs for bacteriology testing, and these SOPs will greatly promote the improvement of our quality management system where SOPs are a requirement for any testing process accomplished in the laboratory."

It is not only bacteriology testing that benefits from one-on-one mentorship and quality improvement. As IDDS rolls out new technologies for TB testing, such as Truenat®, which is a rapid molecular diagnostic test, end users are also benefitting from IDDS-trained mentors. IDDS developed the concept of training Truenat "super-users": end users who receive extra Truenat training to become experts who can pass on their troubleshooting skills to others. IDDS has trained a total of 98 super-users across Cambodia, the Democratic Republic of the Congo (DRC), Kenya, Uganda, and Zimbabwe.

In Zimbabwe, newly trained super-users provided support to local Truenat end users across 20 participating sites, including participation in an external quality assessment (EQA); 80 percent of the sites successfully reported EQA results in the first cycle. In DRC, 11 newly trained super-users quickly intervened and successfully resolved 6 out of 9 Truenat device failures through in-person and remote technical support.

From William Walker's work in Liberia to Truenat super-users across Asia and Africa, IDDS is investing in the capacity of the local public health workforce to introduce quality management systems, standardize procedures, and advance their laboratories toward achieving international accreditation.

PEDIATRIC TB: A NEW POTENTIALLY LIFESAVING TESTING TECHNIQUE

Tuberculosis (TB) kills thousands of children every year in the Democratic Republic of the Congo (DRC), and yet many cases are being missed: 15,660 cases in children in 2020 were not diagnosed in the country, according to the World Health Organization (WHO). WHO estimates that children should represent about 20 percent of cases in a high-burden TB country like DRC, but currently children make up only 11 percent of diagnosed patients.
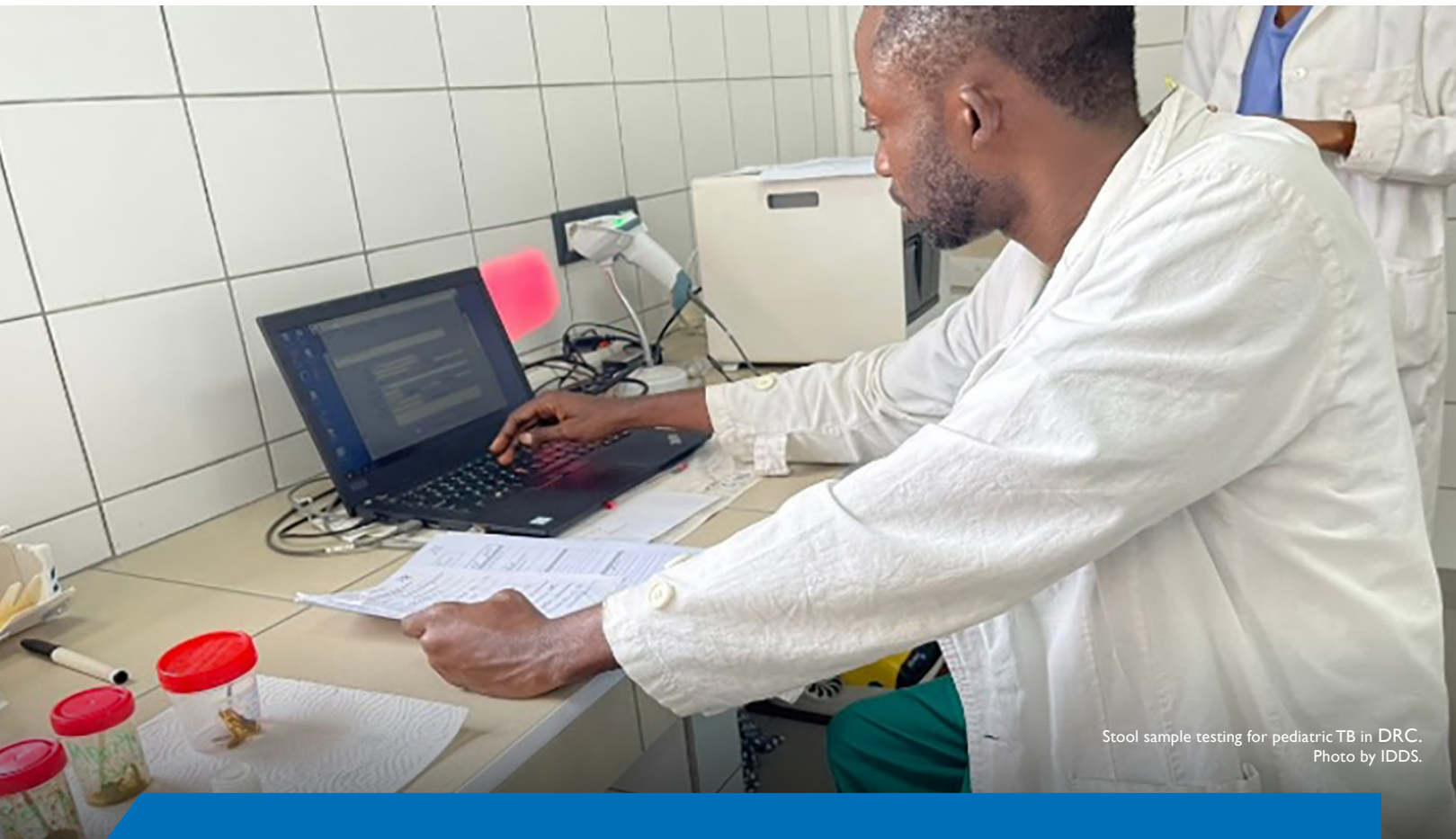
Stool sample testing for pediatric TB in DRC.
Photo by IDDS.

"We saw an opportunity to identify pulmonary TB in a highly vulnerable and too-often ignored population and wanted to prove that we could find TB in children using an easy to collect and process specimen. Testing stool requires no invasive procedures or specialized equipment."

—Moe Moore, TB strategic lead for IDDS

Access to TB testing is one problem in high-burden TB countries (see Bringing TB Testing to the Patients) and another is the method of testing. Patients are expected to cough up sputum (not saliva from the mouth, sputum comes from the respiratory tract), something that young children especially find very difficult to do. Because of this, TB diagnosis in children relies heavily on clinical diagnosis without bacteriological confirmation, leading to delayed or missed diagnoses or even overdiagnosis.

However, when children with pulmonary TB cough and swallow their sputum, the genetic material of TB bacteria survives the digestive process and can be detected in stool samples. The collection of a stool sample is not invasive and can be easily collected at a clinic or in the home. In April 2022, WHO endorsed stool samples as an alternative specimen for pulmonary TB diagnosis in children (when the TB bacteria affects the lungs, it is known as pulmonary TB, and when the infection is outside the lungs—which is less common—it is called extrapulmonary TB).

USAID's Infectious Disease Detection and Surveillance (IDDS) project saw an opportunity to radically improve the process of TB diagnosis in children. IDDS, together with the host national TB control programs (NTPs), launched pilots to assess the feasibility and potential of using stool samples for pediatric pulmonary TB diagnosis in DRC in July 2022 and an earlier pilot in Vietnam, which started in June 2020.

During the pilot in DRC from July to September 2022, 601 stool samples from children presumed to have TB were tested with the new stool sample method, resulting in 90 positive results (15 percent), including patients with drug-resistant TB.

As part of the IDDS assessment of the pilot, staff carried out appraisal interviews, and community beneficiaries and clinicians said that "stool testing saves our children." They stressed how much relief this technique brings to parents who have a child with presumed TB. This accurate, bacteriologically confirmed diagnosis can be obtained simply and leads to fast and correct treatment. Health care workers trained by IDDS appreciated the new technique and recognized that it is as simple and easy as sputum analysis. Samples can be collected in a health care facility or at a child's home and processed by any laboratory technician familiar with the GeneXpert® instrument.

The director of DRC's NTP, Professor Michel Kaswa Kayomo, said, "I'm very satisfied with the pilot phasis of the introduction of stool Xpert study for pediatric TB diagnosis." The NTP is now planning to scale up and integrate the technique into the routine of TB diagnostics across DRC.

In Vietnam, with IDDS support, stool-based testing accounted for 37 percent of all pediatric TB diagnosis testing in 2021, and over 2022, IDDS continued supporting Vietnam's NTP to strengthen stool testing to diagnose TB in children in five provinces. The NTP has recommended continuing to carry out stool-based diagnostic tests for TB in children, with priority given to children under five.

Next, IDDS will expand access to stool testing in Malawi. The project recently trained 114 laboratory technicians on the simple one-step process for stool testing and obtained approval from the National Health Research Committee for a study protocol to assess the impact of introducing stool-based GeneXpert MTB/rifampicin (RIF) Ultra as an alternative diagnostic across nine study sites. In Zimbabwe, stool-based testing will be paired with TB preventive therapies for children in contact with persons with TB. In households with a person with active TB, all children will be screened for TB using stool-based testing; children who test positive for TB will be enrolled in the appropriate regimen, and children who test negative will be given preventive therapies, ensuring that children receive the right treatment. Children living with HIV will also be screened for TB through stool-based testing.

PRIVATE SECTOR PARTNERSHIP: A NEW ALLY EXPANDS TB TESTING AND PIONEERS A ONE-STOP SOLUTION

India struggles with the world's highest burden of tuberculosis (TB), and expanding access to testing is vital to countering the spread of the disease, including drug-resistant strains. India's National Tuberculosis Elimination Program (NTEP) has made progress in providing a complete diagnostic assessment of potential TB patients through more than 80 public sector laboratories for the detection of drug-resistant TB (DR-TB). Despite these efforts, nearly 50 percent (Government of India TB Report, 2020) of estimated multidrug-resistant TB patients remain undiagnosed in India.

In addition to a shortage of TB testing in India, there is a delay in starting appropriate TB treatment for patients, and some patients require a revision in treatment regimens after they have started. The testing process demands multiple journeys by patients (e.g., visits to doctors, trips to specimen collection centers), leading to delays and sometimes requiring hospital admissions and the loss of income.

Thyrocare runner carrying sputum specimens in a biological sample bag. Photo by IDDS.

Recognizing that testing is needed to serve people more effectively, NTEP began to explore partnership options with private laboratories. Inspired by this creative approach, USAID's Infectious Disease Detection and Surveillance (IDDS) project came up with the idea of the "One-Stop TB/DR-TB Diagnostic Solution" model: engaging private diagnostic laboratories for quality-assured diagnosis. The new model is intended to provide complete diagnostic assessment of identified presumptive TB patients and diagnosed TB patients, enabling swift initiation of correct treatment regimens for drug-sensitive TB and DR-TB strains. "Why do patients need to move between sites to be screened? This doesn't happen for other diseases, so why not also replicate this model for TB?" said Dr. Umesh Alavadi, a USAID project management specialist in the Division of Tuberculosis and Infectious Diseases.

IDDS launched the one-stop model in Hisar district of Haryana state on May 14, 2022, together with the state NTEP team and Central TB Division, which is part of the Ministry of Health and Family Welfare. Hisar district is a prime candidate for improving access to TB diagnostic services because most patients have to travel an average distance of 10–15 kilometers (6–9 miles) from a partially functioning or non-functioning designated microscopy center, the most peripheral type of laboratory (serving around 100,000 people), to a facility TB unit or district TB center that offers diagnostic services, including drug resistance testing. Patient dissatisfaction and diagnostic delays were all too common given these challenges.

In 2021, 76 percent of the TB diagnoses in Hisar district used sputum microscopy, and 24 percent used much faster molecular tests like GeneXpert® or Truenat®. Testing for drug-resistant patterns among TB patients was not conducted at the state reference laboratory of Haryana over the last year due to operational reasons, hampering DR-TB case detection.

An NTEP-certified private sector laboratory, Thyrocare Technologies, was contracted to expand the TB diagnostic care in Hisar, with the aim of providing end-to-end services: from one-time specimen collection to delivering the test results within the stipulated turnaround times (GeneXpert: 2–4 days, direct line probe assay: 3–6 days, liquid culture and drug susceptibility testing: 22–48 days).

Under the new model, the entire Hisar district is covered, including rural and urban areas. Both public and private clinics screen the presumptive TB patient, refer them to specimen collection points, and enter patient details in NTEP's patient management system, called Ni-kshay. Chest X-ray services are offered to potential patients through facilities engaged locally by the private laboratory. Reports are communicated to the patient, program staff, and the referring physician. Patients' test results are also entered into in the Ni-kshay web portal within the stipulated turnaround time. The model provides specimen transportation services, so that patients do not have to travel to distant testing laboratories. Specimens are collected from the public and private health facilities by private "laboratory runners" using a defined route map. These specimens are then transported in cool chain from the point of collection to Thyrocare's facility in Gurugram, Haryana, adjoining New Delhi, for testing with GeneXpert. Specimens that test positive on GeneXpert, including specimens to be tested for DR-TB, are flown to Thyrocare's main laboratory outside Mumbai for full drug susceptibility testing. Test reports are sent to program staff, the referring physician, and updated in the Ni-kshay portal within the stipulated turnaround times. The diagnosed TB patient is then guided by NTEP supervisory staff to the referring physician to begin the appropriate treatment.

A senior TB laboratory supervisor who has been working in the Hisar District TB Center since 2004 explained how the new model is working: "Initially, GeneXpert test reports were received and communicated to the patient in 5–15 days on average, and for sequential testing, the samples of only severely ill patients were sent to a private lab in Delhi. We were receiving the results of first-line line probe assay test[ing] in around 2–3 months. This is taking only 4–5 days through implementation of this model. We are highly thankful to the IDDS team and the district efforts for this noble and humanitarian work."

Thanks to the new model, the proportion of TB diagnoses that have been confirmed with a laboratory test (for more accurate diagnosis) has risen from 44 percent in 2021 to 84 percent in August 2022. Hisar now ranks second for universal drug susceptibility testing (for the detection of rifampicin resistance) in Haryana state, up from tenth prior to the implementation of the new model.

The new model demonstrates the role that private sector laboratories can play in TB diagnostics to help promptly initiate the appropriate treatment for TB patients. The potential benefits of—and learnings from—the new model include improved feasibility, impact, and cost savings—not only for India, but also for other countries facing similar challenges in expanding TB diagnostic services.

> "The work in Hisar has the potential to change Hisar, India, and even the world."
>
> —Dr. Rajesh Raju, state TB officer in Haryana

ADDING SPEED AND SAFETY TO SPECIMEN REFERRAL

"I pick up the specimen at Faranah from the laboratory personnel, follow the correct procedures, and within 24 hours I have arrived in Conakry with the sample. Then I pick up the empty cooler box from the specimen referral agent in Conakry after he has delivered the samples to the laboratories, and then I return ready for the next trip," said one of the drivers on the Faranah-Conakry specimen referral route in Guinea.

According to Dr. Alpha Barry, the director of Santé Plus, a non-governmental organization working on a study that Georgetown University is conducting in Nzérékoré and Dalaba in the region of Mamou,

"I realize in the field that the specimen referral system that IDDS has developed is very effective and has improved sample transport in Guinea. On my way back I met one of the drivers who was trained by your team and he was also very proud to be a part of the team that is keeping disease outbreaks in the country under control."

Ms. Thuy (in white blouse) during an IDDS technical support trip at Dinh Hoa Medical Center in September 2022. Photo by IDDS.

Specimen referral is a vital part of every country's health system: getting specimens from people and animals to a laboratory to test for what can be dangerous viruses and bacteria. The pandemic threw a spotlight on specimen referral systems as health authorities struggled to control the spread of COVID-19, often revealing urgently needed reform.

In Guinea—a country that had to deal with Ebola virus disease outbreaks at the same time as the pandemic—specimens must be retrieved from far-flung parts of the country to be tested at laboratories in the capital, Conakry. Because this can take up to 10 days, during which time specimens can become spoiled or lost, Guinea's Ministry of Health, together with USAID's Infectious Disease Detection and Surveillance (IDDS) project, began to examine options to reduce transit time and specimen losses while keeping the system cost-effective.

IDDS began work on a pilot specimen referral system in 2021 that covers the health districts of Faranah, Kindia, and Mamou. Home to a collective population of around 2 million, these districts are hard to reach from the capital city of Conakry because of their poor road conditions and distances—Kindia is a 111-kilometer drive from Conakry, about 70 miles, and Faranah is 470 kilometers away, or nearly 300 miles. The new system would include an electronic specimen tracking system and use taxis for transportation. It would also cover both human and animal health specimens.

In November 2021, IDDS organized a training workshop bringing together health workers from the Ministry of Health and the Ministry of Livestock, as well as representatives from transport unions. The main objective was to train the referral agents in the safe packaging and transport of specimens, as well as the electronic tracking system. The tracking system uses an app that tracks the GPS location and temperature of samples. Biosafety and security are of critical importance. The specimens are packed using a triple packaging device and placed in a cooler in the vehicle. When the specimens reach Conakry, a courier on a motorbike collects the cooler box and the documentation, following the biosafety and security measures (such as wearing personal protective equipment) and delivers the specimens to the reference laboratories.

After the pilot started operation, the results were dramatic. From December 2021 to March 2022, 69 trips were made to Conakry, with a total of 246 specimens from the 3 regions. All specimens were delivered within 24 hours (as required by standard operating procedures). All specimens were received at the required temperature. Only one specimen was rejected at the laboratory (for insufficient volume), representing a rejection rate of only 0.4 percent.

After seeing the positive impact as well as cost savings, Guinea's Ministry of Health has added another health district, Nzérékoré, a 600+ mile drive from Conakry, to expand and continue the pilot. The inclusion of public transport unions and drivers has been key to reducing transportation costs.

And it is not only Guinea that is benefitting from IDDS' expertise in innovative solutions for improving specimen referral. In Vietnam's Dinh Hoa District Medical Center, the whole specimen referral system had depended on one laboratory staff member, Loc Thi Thuy, prior to IDDS support. During the COVID-19 pandemic, Thuy collected specimens all day in Dinh Hoa, and in the evening she had to transport the samples to the provincial capital four hours away, Thai Nguyen City, for testing. She usually arrived home around midnight and had to wake up early the next morning to begin collecting specimens again.

IDDS works with Thai Nguyen province to improve the specimen referral system for both the human and animal health sectors. In June 2022, IDDS launched a pilot system by contracting a local shipping and delivery services company to design specialized specimen transport services for three provinces, including Thai Nguyen. Nhat Tin Logistics provided customized transport conditions, routes, and procedures. IDDS organized training for the courier company's drivers, warehouse staff, and other relevant personnel (89 in total) on specimen packaging, transport requirements, and incident handling.

During an IDDS technical support trip to Dinh Hoa in September 2022, Thuy explained the benefits of the new contract with the private courier company: "IDDS' specimen referral system helps me a lot. I do not need to travel to Thai Nguyen City and back every time I want to have some tests done at Thai Nguyen Center for Disease Control. All I need to do now is packing and calling the Nhat Tin Logistics and they will pick up the box containing the specimens at my [district medical center]."

COMMUNITY SURVEILLANCE: STOPPING DISEASE OUTBREAKS BEFORE THEY SPREAD

"All disease outbreaks begin and end at the community level. Actions at the global level do not matter if they are not actionable at the community level," said Margaret Asongwed, surveillance focal point for Kumba South Health District in Cameroon. "Community surveillance is all about finding the outbreak spark, before it ignites, and the disease outbreak spreads."

Community-based surveillance (CBS) is as simple a concept as it is important. Community members are trained to recognize different diseases or events that may be a sign of an outbreak. For example, many children are absent from school all at once, someone gets sick with an unexplained illness, or someone is bitten by a suspected rabid dog. A CBS-trained community member reports this to the health authorities, usually by sending an SMS with the code of the different diseases and events under surveillance. The authorities investigate and take action as needed.

Yacouba Kone works as a community health worker in the town of Niamala in southern Mali and received CBS training from USAID's Infectious Disease Detection and Surveillance (IDDS) project in June and July 2022. Kone recently used his new skills to identify a case of acute flaccid paralysis, which can be a sign of dangerous viral outbreaks and can often be identified by floppy limbs.

> "The training and follow-up visits allowed me to understand how to detect suspected cases of diseases that could be a threat to my community. CBS is a very important activity."
>
> —Yacouba Kone, community health worker in Niamala, Mali

Since 2020, IDDS has been working with Mali's General Directorate of Health and Public Hygiene to expand CBS across the country. Following a successful pilot phase in Kadiolo health district, IDDS supported the General Directorate to produce a plan for national expansion to Mali's 75 health districts. IDDS expanded CBS to Kati and Kangaba health districts in 2021, and Sikasso and Kolondièba in 2022. Kone was one of 238 personnel (155 female) from Sikasso and Kolondièba (173 community health workers, 57 community health center directors, and 8 referral health center staff) who were trained and received equipment and tools for data reporting in June and July 2022.

Results from rollout in the first 3 districts (Kadiolo, Kati, and Kangaba) during July–December 2021 show that the newly-trained community health workers reported more than 350 events of public health importance. Their reports led to detection of 16 cases of measles and a case of yellow fever in the first 6 months of the new CBS system.

Niamala community health worker, Yacouba Kone (left), detected a suspected case of acute flaccid paralysis. Photo by IDDS.

The World Health Organization's Integrated Disease Surveillance and Response (IDSR) guidelines support CBS by providing instructions for incorporating community members into public health surveillance—for instance, by deploying volunteers. The volunteers report any unusual health event and help health workers with outbreak investigation and contact tracing. IDDS is helping roll out the updated IDSR guidelines (third edition) in Cameroon and Senegal.

In Senegal, IDDS is using a train-the-trainer approach, engaging the head nurses from three health districts of the Tambacounda medical region, advancing their technical knowledge of IDSR guidance on CBS as well as human, animal, and laboratory surveillance.

According to Dr. Bayal Cisse, Tambacounda regional medical officer: "IDDS is the lead partner of the medical region on epidemiological surveillance. The project is already supporting the seven health districts of the region in improving the quality of data reports on priority diseases. Now it has provided support to implement the latest edition of the IDSR through the training of nurses. This kind of training will help us to continuously strengthen the surveillance system."

IDDS trained 59 head nurses (26 female) for 2 weeks in November 2021, hosting sessions facilitated by the Senegal Ministry of Health's Directorate of Prevention. IDDS trained staff from three districts in east Senegal: Koumpentoum, Maka Colibantang, and Tambacounda. By the end of the training, nurses' scores on a test of their technical knowledge had increased five-fold, compared with their pre-training test scores. They will in turn train the staff members of their health posts, such as assistant nurses and midwives, who are still using the outdated second edition IDSR guidelines. "With the adaptation and implementation of the third edition of the IDSR technical guidelines, there is potential for disease surveillance in Tambacounda to be greatly improved," said Dr. Cheikh Gadiaga, Tambacounda Health District chief medical officer. In August 2022, Cameroon was suffering ongoing outbreaks of cholera and mpox. Together with the Ministry of Health, IDDS organized IDSR skills training on August 16–21 for 41 health workers (14 female) from the southwest region's health districts using these outbreaks as context. The training program consisted of 10 modules with practical exercises and introduced new concepts such as CBS.

IDDS surveillance specialist (left) handing over CBS equipment and tools to national level representative and Sikasso health district team. Photo by IDDS.

BRINGING TB TESTING TO THE PATIENTS

"The [Truelab] machine is a very easy machine to use," said Clement Mapuranga, a laboratory microscopist at Madziwa Clinic in Zimbabwe. "Even a novice microscopist can be taught how to use it without any difficulties." USAID's Infectious Disease Detection and Surveillance (IDDS) project introduced the Truenat® chip-based test (run on the Truelab® device) at the clinic in May 2022, where it is bringing accurate and fast testing for tuberculosis (TB) to this rural area of northern Zimbabwe.

> "Most patients are flocking to this place because of the introduction of this [Truelab] machine."
>
> —Clement Mapuranga, a laboratory microscopist at Madziwa Clinic in Zimbabwe

Truenat training in Cambodia.
Photo by Cindy Liu for IDDS.

Zimbabwe suffers from one of the world's highest burdens of TB, with 193 people per 100,000 infected in 2020, according to the World Health Organization. But testing for TB by Truenat rose 24 percent between January and September 2022 across the 20 sites where IDDS installed the technology. To end the TB epidemic, not only in Zimbabwe but also other high-burden countries, it is vital to make reliable testing easily accessible for those at risk.

"As a resource-limited country, we are very much excited that this technology can be spread down to the lower level, to the community level," said Tanaka Sakubani, national TB laboratories coordinator, Zimbabwe Ministry of Health and Child Care. "Our patients and population also benefit from this great intervention of TB diagnostics."

In addition to piloting the Truenat rollout in Zimbabwe, IDDS is launching the Truenat technology and training laboratory technicians to use it in Bangladesh, Cambodia, the Democratic Republic of the Congo (DRC), India, Kenya, Nigeria, the Philippines, Uganda, and Vietnam. This is part of the introducing New Tools Project (iNTP), a collaboration between USAID and the Stop TB Partnership. TB is the world's largest killer infectious disease after COVID-19, and iNTP aims to greatly reduce its impact in high-burden countries by making fast, accurate testing available at local clinics to increase detection and treatment.

"To defeat TB, we need accessible diagnosis," said Dr. Lucica Ditiu, Stop TB Partnership executive director. "In resource-challenged countries, we can't expect people to travel long distances for a TB test when they have other vulnerabilities and their symptoms may be a cough and fever, and we know the challenges faced in specimen referral. Therefore, people turn to their local clinics, which is where we are bringing Truenat."

Truenat and the Truelab platform, which were developed in India by Molbio Diagnostics, are well suited to small, community clinics. Truelab machines are portable, have back-up battery power, and can be used at temperatures of up to 40° Celsius/104° Fahrenheit. "With rapid molecular diagnostics like Truenat accessible in the neighborhood, you are not only getting people tested and treated early, but you are reducing community infection with early diagnosis and with fewer people remaining untreated for TB," said Dr. Suvanand Sahu, Stop TB Partnership deputy executive director.

It is not enough to simply deliver the technology and expect that laboratories and health care workers will be able to use it to improve TB testing in their communities. Even with initial training and remote technical support, Truenat users can still face problems that range from unknown error messages to maintenance and repairs. Recognizing these obstacles, IDDS came up with the idea of training Truenat "super-users": end users who receive extra Truenat training to become experts who can pass on their troubleshooting skills to others.

During a pilot in Zimbabwe in early 2022, IDDS trained 15 participants through technical and hands-on sessions, identifying lessons to inform rollout to other countries. After seeing the benefits in Zimbabwe, IDDS rolled out the Truenat super-user training to four more countries between

April and June 2022: Cambodia, DRC, Kenya, and Uganda, and to Bangladesh over April to September 2022.

During the training in DRC, the super-users were taught how to assist Truenat end users in the field when faced with common technical problems during installation or other issues. After the training, the super-users began providing local support to Truenat end users in their home provinces, including participating in an external quality assessment. "We are in the process of adopting this new Truelab machine, to overcome the difficulties encountered here in the city of Mbuji-Mayi with recurring failures of existing machines," said super-user Alphonse Lufulwabo, head of the provincial TB laboratory in Mbuji-Mayi, Kasai-Oriental province, DRC. "This training as a super-user will greatly help us to support the sites and solve the challenges encountered in the field."

IDDS will train super-users in three other countries later in 2022–2023: Vietnam, Nigeria, and the Philippines. In Cambodia, IDDS will repackage Truenat training materials, including job aids.

> "We have served so many patients since the day we received the machine. They are having their treatment right now and most of them have recovered."
>
> —Peter Chipaka, a laboratory microscopist at Madziwa Clinic in Zimbabwe

Truenat technology delivery in the Philippines.
Photo by IDDS.

Table 1: Project outputs related to strengthening diagnostic networks for FY 2022 and the countries that contributed to these outputs (covers GHS, EVD, and ARP funding)

GHS: Gaps in diagnostic networks identified and essential components supported

	TOTAL	Testing Procedures	Equipment Maintenance	Commodity Management	QMS	Specimen Referral	Biosafety	Other Diagnostic Topics
People trained	3,003	239	156	12	365	1,428	119	684
SOPs, plans, and guidelines developed or revised	180	42	8	3	10	22	94	1
TWG* meetings held	94	9	4	3	9	50	4	15
Supervisory visits conducted	74	31	12	0	7	24	0	0
Pilots conducted	4	0	0	0	0	4	0	0
Assessment reports completed	5	3	0	0	0	1	0	1
People mentored	505	291	0	0	109	61	5	39
Countries†								
Cameroon		●				●		
DRC		●	●			●	●	●
Ethiopia		●	●			●		
Guinea		●				●		●
Indonesia		●						
Kenya		●			●			●
Liberia		●	●	●	●		●	●
Madagascar			●		●			●
Mali		●	●	●	●			●
Philippines						●	●	●
Senegal		●						
Tanzania		●		●	●	●		●
Uganda		●	●	●	●		●	
Vietnam						●		

*TWG=technical working group.
†Countries listed are those that contributed to specific outputs in FY 2022.

Table 2: Project outputs related to strengthening surveillance systems for FY 2022 and the countries that contributed to these outputs (covers GHS, EVD, and ARP funding)

GHS: Gaps in core functions of surveillance systems identified and essential activities supported

	TOTAL	Interoperability	Electronic Reporting	Data Quality	Data Analysis and Use	Other Surveillance Topic
People trained	1,024	0	348	177	120	379
SOPs, plans, and guidelines developed or revised	7	0	2	0	1	4
TWG* meetings held	79	7	11	12	39	10
Supervisory visits conducted	262	0	224	19	4	15
Pilots conducted	4	0	3	0	1	0
People mentored	92	0	26	54	12	0
Countries†						
Cameroon			●	●	●	●
DRC						●
Ethiopia			●			
Guinea				●		
Indonesia		●		●	●	●
Kenya				●		
Madagascar			●			
Mali			●		●	●
Senegal			●	●		
Tanzania				●	●	●
Uganda			●		●	●
Vietnam			●	●		

*TWG=technical working group.
†Countries listed are those that contributed to specific outputs in FY 2022.

Table 3: Project outputs related to strengthening TB diagnostic networks for FY 2022 and the countries that contributed to these outputs

TB: Gaps in diagnostic networks identified and essential components supported

	TOTAL	New Diagnostic Tools	Pediatric TB Testing	Other Testing Skills and Procedures	Equipment Maintenance	QMS	Diagnostic Connectivity Solutions	Biosafety	TB DNA	Laboratory Diagnostic Data Analyses	Private Sector Engagement	Specimen Referral	Other Diagnostic Network Topics
People trained	2,201	1,028	162	28	32	296	369	97	63	0	0	0	126
SOPs, plans, and guidelines developed or revised	63	5	3	22	11	3	0	18	0	0	0	0	1
TWG* meetings held	26	8	2	1	0	1	0	0	0	0	0	2	12
Supervisory visits conducted	294	92	0	7	0	80	80	0	0	0	4	0	31
Pilots conducted	6	2	2	0	0	1	1	0	0	0	0	0	0
Assessment reports completed	21	5	0	2	1	0	0	0	2	4	1	0	6
People mentored	28	0	0	28	0	0	0	0	0	0	0	0	0
Countries†													
Bangladesh		●		●	●			●					●
Burma		●		●									●
Cambodia		●	●				●					●	●
Core TB‡									●	●			●
DRC				●	●			●					●
India		●		●		●					●		●
Malawi			●									●	
Pakistan				●		●							
Tanzania				●		●							●
Vietnam		●	●			●				●			
Zimbabwe		●		●		●	●	●					●

*TWG=technical working group.
†Countries listed are those that contributed to specific outputs in FY 2022.
‡Activities implemented with funding from USAID/Washington in Bangladesh, Burma, Cambodia, DRC, Ethiopia, India, Kenya, Malawi, Nigeria, Pakistan, the Philippines, Tanzania, Uganda, Vietnam, Zambia, and Zimbabwe. For more information, please see the Core TB highlights on page 85.

/// BANGLADESH

Context

In Bangladesh, IDDS seeks to strengthen the TB diagnostic network and systems, establish a functional network of GX instruments, and introduce new technologies and tools to improve TB diagnosis.

"This training will usher in a new era for NTP to boost early detection of TB at the remote areas of the country."

—Dr. Md. Khurshid Alam, line director of the National TB Control Program, speaking at a three-day training of trainers for Truenat implementation

Annual Highlights

Diagnostic

- IDDS increased access to TB diagnostics in remote areas by introducing Truenat technology at 21 of 38 selected peripheral microscopy laboratories, training 12 mentors (5 female) to train others to use the new technology, and directly training 41 medical technologists (11 female) who will use Truenat. In the first two months (August and September 2022) after introducing Truenat, 307 TB cases, including 2 RIF-resistant cases, were detected by testing 4,304 presumptive TB patients. Truenat will empower these sites to increase TB case detection and inform the next phase of expansion of the new technology.

- IDDS built capacity for regulating the TB diagnostic network by providing technical support to develop a costed national TB Laboratory Strategic Plan (2021–2025) through a participatory process involving senior NTP and other TB implementing partner staff. The plan will empower NTP to mobilize domestic and global resources to implement the laboratory strategy in alignment with its mission to end TB.

- IDDS improved diagnostic coverage by expanding LPA and EPTB testing to three regional laboratories (Shyamoli, Khulna, and Rajshai). To standardize diagnostic testing and improve quality across the laboratory network, IDDS trained 65 (24 female) microbiologists on SOPs that are being finalized for LPA, liquid culture, DST, GX testing of EPTB specimens, and stool testing for detection of TB among children.

Challenges

- Shortages of laboratory supplies (reagents for LPA and liquid culture) and delays in obtaining customs clearance (for these supplies as well as GX EQA panels for 80 GX sites) affected diagnostic performance and delayed IDDS' activities. IDDS requested an expedited process for the laboratory supplies and reached an agreement with the Vietnam NRL to provide new GX panels for 50 GX sites, and NTP also received new funds for processing future customs clearances.

- Activities were delayed because of changes in NTP decisions, but IDDS met with NTP to expedite decisions and adapt activities. For example, after a procedural delay by NTP slowed the delivery of Truenat equipment to supported sites, IDDS received NTP approval for site refurbishments to take place during the period of delay.

PARTNERS AND COLLABORATORS

- Ministry of Health and Family Welfare
- Bangladesh Rural Advancement Committee
- Damien Foundation
- Institute of Epidemiology, Disease Control, and Research
- National Tuberculosis Control Program

What We Learned

- "Early wins" and proof of impact are often needed to achieve NTP buy-in of project activities. NTP's initial guardedness about Truenat implementation, for instance, has now shifted to enthusiasm: NTP recently decided to procure about 150 instruments to continue expanding access to molecular TB at the peripheral level.

- Quality improvement involves many moving pieces that need to be coordinated simultaneously: a timely supply of reagents, close monitoring and supervision, data collection and analysis, and provision of feedback all inform improvements in the field.

- Customs clearance by NTP is a challenging process. To prevent delays, IDDS staff must ensure accuracy of all information mentioned in relevant shipping documents and involve NTP staff at every step.

Outcome Data

Bangladesh: Number of Culture, Phenotypic DST Tests Performed at IDDS Sites
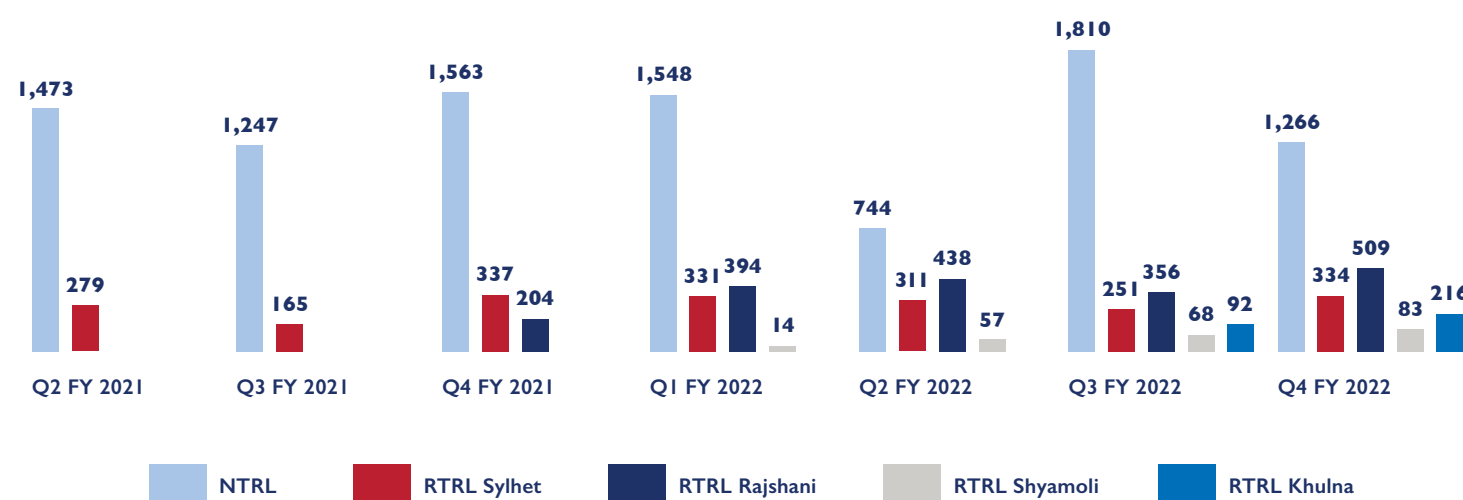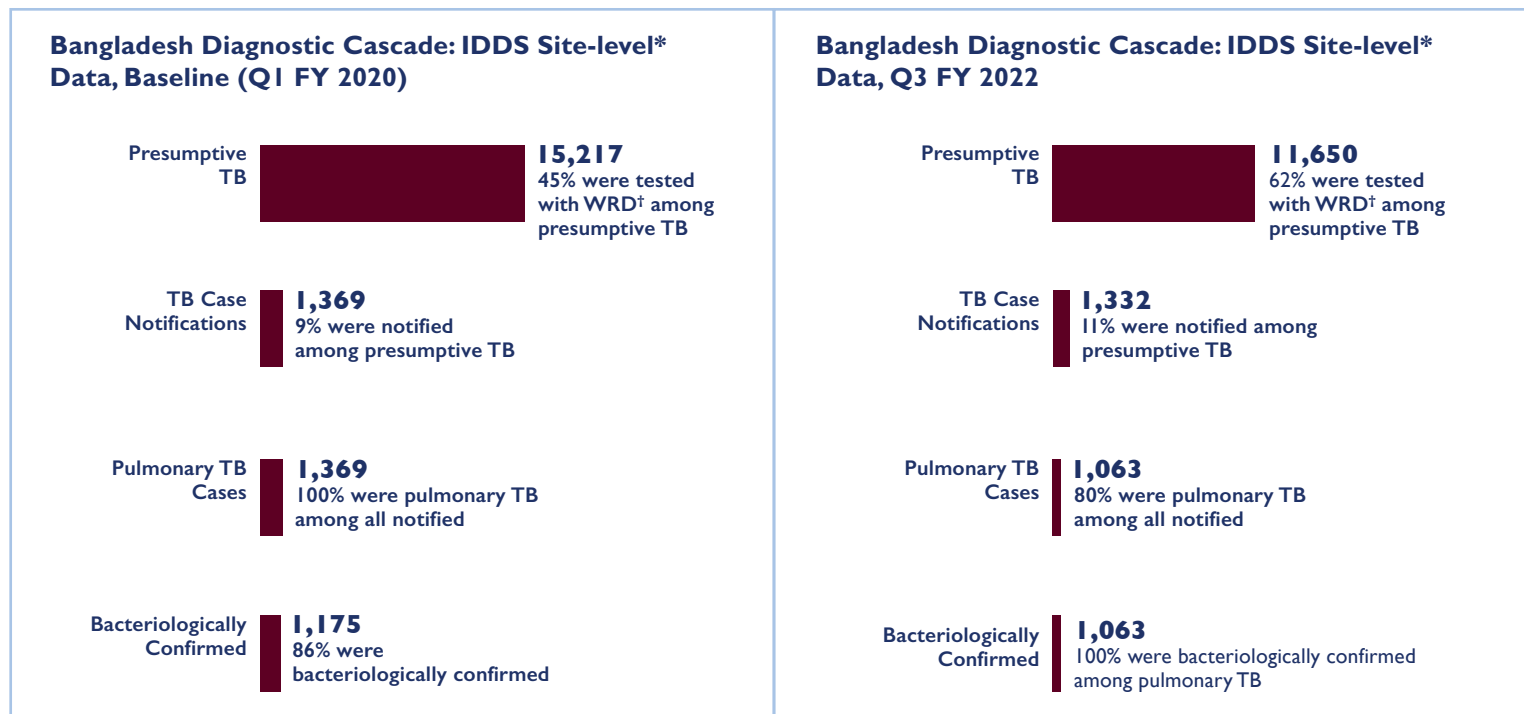

Bangladesh: Number of RIF-resistant Patients Tested by Second-line LPA at IDDS Sites
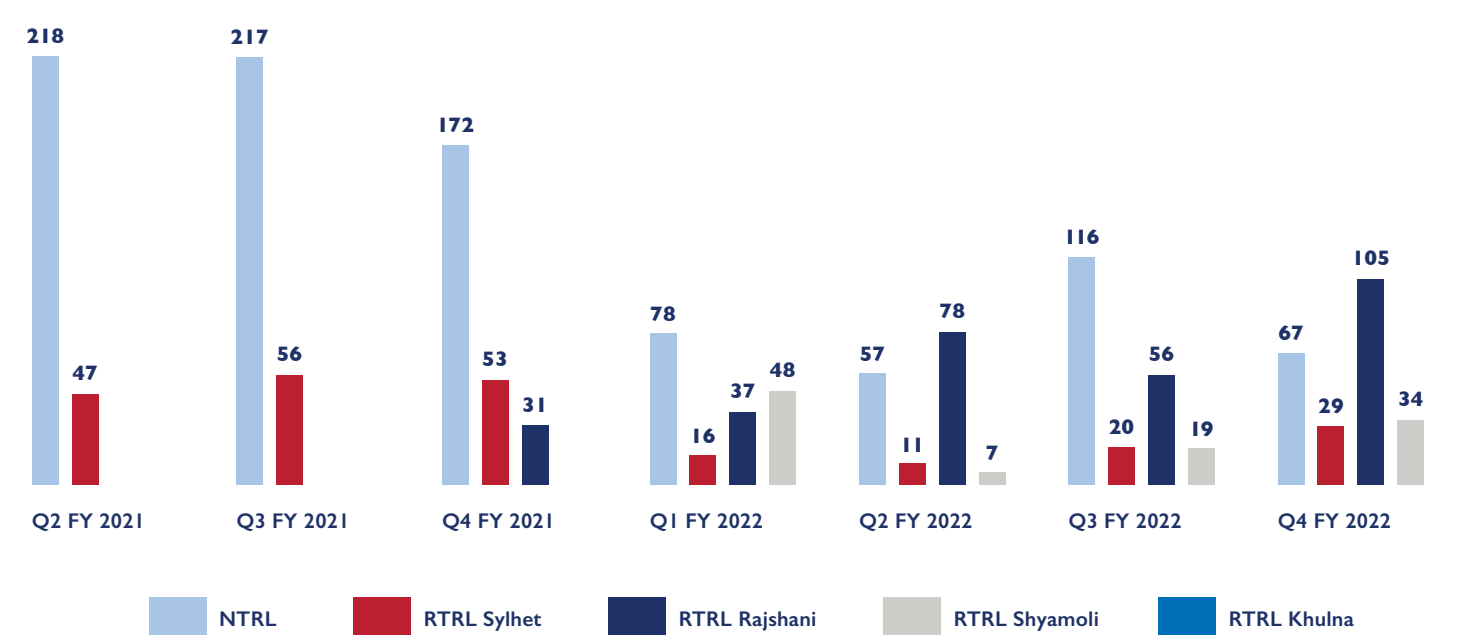
The culture and LPA capacity built by IDDS at regional TB reference laboratories (RTRLs) has resulted in increased testing over time at these sites and a reduced testing volume at NTRL.

Outcome Data
Outcome data are provided through Q3 FY 2022.

Bangladesh Diagnostic Cascade: IDDS Site-level* Data, Baseline (Q1 FY 2020)

Presumptive TB
15,217
45% were tested with WRD† among presumptive TB

TB Case Notifications
1,369
9% were notified among presumptive TB

Pulmonary TB Cases
1,369
100% were pulmonary TB among all notified

Bacteriologically Confirmed
1,175
86% were bacteriologically confirmed

Bangladesh Diagnostic Cascade: IDDS Site-level* Data, Q3 FY 2022

Presumptive TB
11,650
62% were tested with WRD† among presumptive TB

TB Case Notifications
1,332
11% were notified among presumptive TB

Pulmonary TB Cases
1,063
80% were pulmonary TB among all notified

Bacteriologically Confirmed
1,063
100% were bacteriologically confirmed among pulmonary TB

*Bangladesh IDDS sites: One national and four regional laboratories.
†WRD: WHO-recommended RDTs.

IDDS' interventions contributed to an increase in testing with WHO-recommended rapid diagnostics in IDDS-supported laboratories in Bangladesh from 45 percent at the baseline to 62 percent during the third quarter (Q3) of FY 2022. There was also an increase in bacteriological confirmation from 86 percent at the baseline to 100 percent. The decrease in pulmonary TB cases from 100 percent at the baseline to 80 percent can be attributed to the increase in detection of EPTB cases in Q3 FY 2022, which is one of the objectives of the IDDS TB program in Bangladesh.

Output Data

211 People trained

15 Supportive supervision visits

3 TWG meetings held

New diagnostic tool-Truenat (53)
Pediatric TB (37)
TB testing (28)
Equipment maintenance (28)
TB diagnostic connectivity solutions (30)
EQA for GX (15)
TB training for TB and leprosy control assistants (20)

TB testing (4)
GX assessment (8)
Reporting system (3)

Strengthening laboratory network (2)
Other (1)

5 Assessments conducted

5 Laboratories with improved diagnostic capacity

Laboratory upgrade feasibility (1)
Site readiness for Truenat (3)
Equipment installation (1)

BURMA

Context

IDDS provides technical assistance to expand access to rapid, reliable, safe, and integrated molecular diagnostics for TB to all persons who access the diagnostic network in Burma. IDDS focuses on increasing detection of TB and DR-TB through expanded and strengthened diagnostic services, microbiological confirmation, and engagement of the private sector.

"We found that by expanding 12 GeneXpert machines in the existing diagnostic network, 10 percent more of the population will be covered within 5-kilometer distance from the nearest facility."

—IDDS program specialist Soe Htut Aung, explaining the results of the LNSA in Burma during an IDDS webinar

Annual Highlights

Diagnostic

- To improve quality diagnosis and management of TB across population segments, IDDS led planning for the establishment of the private-sector diagnostic network, which will use WHO-recommended RDTs.
- IDDS laid the groundwork for more timely TB diagnosis by analyzing sustainable options for strengthening the specimen transport mechanism (including in the private sector), advancing progress toward an adequate, reliable, and faster transport system.
- IDDS expanded clinician and patient access to TB diagnostics by providing ultra-portable X-ray, CAD-AI, and Truenat technology to partner organizations, including in the private sector.
- IDDS built capacity for CXR screening in the private sector by developing a training curriculum, materials, and practical training videos in Burmese and English, which were used to train 39 participants (10 female) from 10 organizations and 5 private hospitals.

PARTNERS AND COLLABORATORS
- Ministry of Health
- National Tuberculosis Program
- National Tuberculosis Reference Laboratory
- Myanmar Private Hospital Association

Challenges

- Implementation of some activities was delayed due to strict rules and coordination policies imposed at the central level. Comprehensive support from the technical and program backstop is needed to ensure quality and sustainability of continued technical assistance for essential TB diagnostic services.
- Unpredictable changes in policy and programmatic limitations affected the development and approval of implementation plans by NTP, NTRL, and partner organizations. IDDS is ensuring that approvals from NTP are received and that foreign currency transactions for procurements are secured through licensed banks to enable project implementation.
- The coup d'état of February 1, 2021, quickly shut down all access to government facilities and staff, and most TB services and Internet communications were severely restricted. IDDS staff continue to work from home, and the project is working with the USAID mission to propose a work plan revision that reflects a meaningful and sustainable avenue for private sector engagement in TB diagnosis.
- The lack of a central coordinating mechanism for TB activities and regular disruption of communication channels are significant barriers. Persistent challenges in coordinating with NTP, NTRL, and even among TB implementing partners have delayed IDDS activities, but IDDS has worked tirelessly with USAID, partners, and a newly hired coordination consultant to mediate, revise activities as necessary, and ensure progress and sustainability.

What We Learned

- Creative solutions are the antidote to unpredictable political changes that can disrupt project implementation. IDDS kept project activities on track despite the nationwide political, organizational, and governmental changes and challenges, thanks to continued collaboration with technical and implementing partners. For instance, the creation of a joint support diagnostic group engages implementing partners to fill the gap left by the country's central coordinating mechanism in strengthening diagnostic services.

- The diagnostic technologies and laboratory training video clips for TB diagnosis—developed by IDDS to replace the hands-on-training of laboratory technicians—helped maintain the quality of TB diagnosis during COVID-19 restrictions.

- During the political crisis, the capacity of the public sector (the major player in TB services in Burma) was disrupted. This points to the need to build the capacity of the private sector to ensure continuity of TB diagnostic services, even during unpredictable and highly volatile political contexts.

Output Data

81
People trained

Chest X-ray procedures (39)
Biosafety (42)

5
SOPs, plans, and guidelines developed

New diagnostic tool - Truenat and CAD (2)
Biosafety (1)
DR-TB testing (1)
LMIS (1)

12
Laboratories with improved diagnostic capacity

CAMBODIA

Context

IDDS is supporting the National Center for Tuberculosis and Leprosy Control (CENAT) to expand and improve the quality of the TB diagnostic network in line with national priorities. IDDS is also working with CENAT and the Community Mobilization Initiatives to End Tuberculosis (COMMIT) project in 10 underserved operational districts to develop, implement, and expand TB interventions.

"The X-ray machines we hand over today will help find missing TB cases in the community and will improve health for the most vulnerable Cambodians."

—Erin Nicholson, USAID Cambodia's acting mission director

Annual Highlights

Diagnostic

- To expand access to rapid TB diagnosis, IDDS equipped 15 sites with Truenat technology and trained 21 super-users (3 female) and 77 end users (9 female) on the new technology. IDDS also conducted a joint supportive supervision visit with CENAT and COMMIT to ensure proficiency at 14 health centers that are implementing Truenat for TB and DR-TB detection.

- To improve detection of TB among children, IDDS, in collaboration with CENAT, customized the Simple One-step Process for Stool Testing method, algorithm, and implementation plan for pediatric TB diagnosis using GX Ultra.

- To build capacity for national monitoring, IDDS, in collaboration with CENAT, provided training and technical support to expand DTC connectivity to 20 GX sites, reducing the turnaround time for TB diagnostic results from 7 days to 24 hours at supported sites. In Cambodia, 30 of 88 GX sites (34 percent) have now been connected to DTC. IDDS conducted training on the proper use of DTC for 225 data managers (36 female) from CENAT, IDDS staff, COMMIT staff, and all laboratory technicians in the supported operational districts. IDDS also identified 18 DTC super users (1 female) from CENAT, IDDS, and COMMIT and trained them on the use of DTC, software installation, troubleshooting, and how to conduct further training for the end users as necessary.
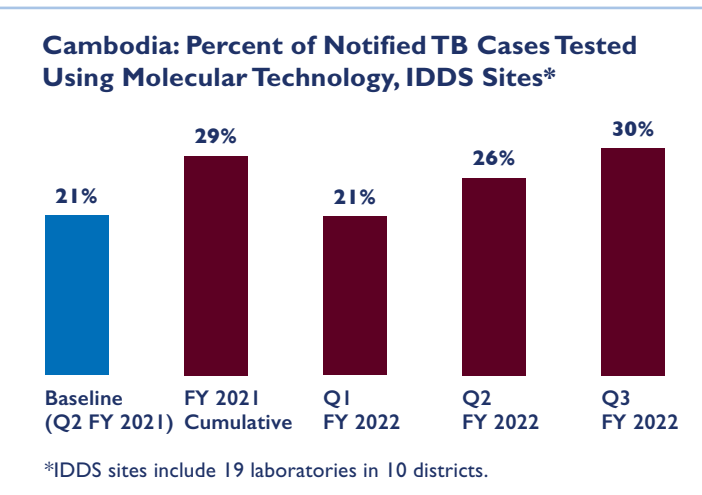
Challenges

- Truenat procurement and implementation were delayed due to the product registration status in Cambodia.

- Lack of a local Molbio service engineer delayed troubleshooting and Truenat instrument repair, interrupting TB diagnostic testing services. The availability of newly trained super-users is expected to help mitigate this issue.

What We Learned

- Close coordination with CENAT is critical to ensure buy-in for introducing new and innovative technologies for TB case finding and management and to avoid lengthy delays in initiating activity implementation.

Outcome Data

Outcome data are provided through Q3 FY 2022.

Cambodia: Percent of Notified TB Cases Tested Using Molecular Technology, IDDS Sites*

Baseline (Q2 FY 2021)	FY 2021 Cumulative	Q1 FY 2022	Q2 FY 2022	Q3 FY 2022
21%	29%	21%	26%	30%

*IDDS sites include 19 laboratories in 10 districts.

PARTNERS AND COLLABORATORS

- Ministry of Health
- Community Mobilization Initiatives to End Tuberculosis
- Global Fund to Fight AIDS, Tuberculosis and Malaria
- National Center for Tuberculosis and Leprosy Control
- National Tuberculosis Reference Laboratory

Output Data

411
People trained

TB diagnostic connectivity solution (243)
New diagnostic tool-Truenat (168)

2
Pilots conducted

TB diagnostic connectivity solution (1)
New diagnostic tool-Truenat (1)

66
Supportive supervision visits

New diagnostic tool-Truenat (56)
TB diagnostic connectivity solution (10)

1
Assessment completed

TB testing - TB and diabetes bidirectional screening

10
Districts with improved diagnostic capacity

/// CAMBODIA

Context

IDDS is contributing to efforts to end malaria in Cambodia by working with the National Center for Parasitology, Entomology and Malaria Control (CNM) to better understand laboratory and diagnostic practices that may limit the diagnostic network from performing efficiently and effectively. IDDS participated in the implementation of the Cambodia Midterm Malaria Program Review (MTR), a national exercise during which in-country stakeholders travel to the field with CNM and together compile the results and develop priority recommendations for improvement.

Annual Highlights

Diagnostic

- IDDS submitted a concept note to CNM describing the proposed malaria DNA.
- During the MTR, IDDS participated in a desk review with CNM; provided inputs on several reports that focused on malaria surveillance, testing of suspected malaria cases, and procurement and distribution of malaria commodities; and developed a set of actionable recommendations to prioritize within the scope of laboratory capacity building.

Truenat training in Cambodia. Photo by Cindy Liu for IDDS.

Challenges

- Due to shifting national priorities, CNM advised against conducting another assessment. IDDS partnered with WHO to implement the MTR to reduce assessment fatigue and provided a summary of recommendations and observations in the report.

What We Learned

- Collaboration and clear communication with the mission, government stakeholders, and in-country partners is essential for successful implementation of activities.

PARTNERS AND COLLABORATORS

- National Center for Parasitology, Entomology and Malaria Control

/// CAMEROON

Context

IDDS is working in Cameroon to enhance detection of priority AMR pathogens, improve quality of diagnostic testing, strengthen One Health AMR surveillance, and support the COVID-19 diagnostic network through procurement of laboratory supplies and technical assistance.

"WHONET allows trained users to better manage AMR data and helps them monitor the evolution of known resistance patterns and the appearance of atypical patterns."

—Helene Tiomo, deputy head of the bacteriology laboratory at National Veterinary Laboratory in Yaoundé

Annual Highlights—GHS

Diagnostic

- IDDS supported the detection of priority AMR pathogens at 10 surveillance sites, by equipping these sites with essential supplies and providing 18 mentoring sessions for 152 laboratory staff (94 female), with an emphasis on continuous quality improvement for antibiograms.
- IDDS expanded access to diagnostics for bacterial animal health diseases through its support to the National Veterinary Laboratory of Douala to operationalize the bacteriology unit of the laboratory. The newly available bacteriology services will enable integration of the site into the national AMR surveillance network.

Surveillance

- To improve the quality of data reporting, IDDS trained 75 laboratory staff (55 female) to report AMR results through WHONET, held quarterly workshops to review data quality, and supported the AMR National Coordination Center in compiling and analyzing data (across sectors) for the country's first AMR Surveillance Report. With IDDS support, Cameroon AMR data were submitted for the first time to the Global Antimicrobial Resistance Surveillance System (GLASS).

Challenges

- NPHL staff in charge of coordinating AMR activities were unavailable due to competing priorities related to COVID-19. This delayed the implementation of many planned activities. IDDS continues to communicate with NPHL and other partners to adjust scheduled activities based on staff availability.

PARTNERS AND COLLABORATORS

- Ministry of Public Health
- Ministry of Livestock, Fisheries and Animal Industries
- Food and Agriculture Organization of the United Nations
- USAID Medicines, Technologies, and Pharmaceutical Services Program

- Laboratory facilities paused testing due to commodity stockouts and increasing prices caused by the war in Ukraine. There is a need to strengthen the laboratory logistics system, connect stakeholders to alternate suppliers, and establish a central mechanism to monitor all procurements to avoid shortages.

What We Learned

- Close collaboration with government partners, Global Health Security Agenda implementing partners, and the USAID Cameroon mission is important for the successful implementation of activities.
- Co-funding activities with other partner projects in the country helps save costs and avoid duplication of effort for greater impact.
- Involving hospital leadership for endorsement of activities leads to greater sustainability.

Annual Highlights—ARP

Diagnostic

- IDDS helped inform Cameroon's pandemic response by supporting the transport of 1,190 specimens from peripheral-level sites to NPHL for genomic sequencing.
- IDDS informed and activated Cameroon's public health response by developing a data flow chart for tracing COVID-19 specimens and creating recommendations for policy action (strengthening epidemiological surveillance to detect new cases and clusters in a community and ensuring that all whole-genome sequencing platforms are functional at reference laboratories).
- IDDS invested in the local public health workforce by training 42 medical staff (11 female) from air and land entry points on cross-border surveillance for COVID-19 at national entry points and by deploying 17 laboratory technicians to support testing capacity at 8 reference laboratories.

- To improve the quality of COVID-19 diagnostics, IDDS provided financial support for 10 visits to 10 laboratories, during which NPHL supervisors assessed laboratory performance and provided on-site mentorship to 28 people (21 female) to develop corrective action plans.
- IDDS equipped NPHL with 20 pieces of diagnostic equipment (e.g., PCR heating plates), 102,210 auxiliary COVID-19 diagnostic commodities (e.g., PCR plates and swabs), and 316,490 essential laboratory supplies and equipment (e.g., -86° C freezers, pipette tips, cryotubes, and cryoboxes).

Challenges

- Validation of the national genomic surveillance report drafted with IDDS support is still pending.

Output Data

117
People trained

Electronic reporting systems (57)
Data analysis and use (5)
Data quality (13)
Other surveillance/COVID-19 (42)

1
Plan developed

QMS and EQA

17
Supportive supervision visits

Testing and commodity management (7)
Testing and COVID-19 genomic sequencing (10)

16
TWG meetings held

Electronic reporting systems (2)
Data analysis and use (3)
Data quality (7)
Other surveillance/COVID-19 and AMR (4)

2
Pilots conducted

Electronic reporting systems

180
People mentored

Testing and QMS

1,190
Specimens transported

COVID-19 genome sequencing

2
Laboratories accredited with IDDS support

10
Laboratories with improved diagnostic capacity

Outcome Data

Cameroon: Number of Specimens with Positive Culture for Priority Pathogens at IDDS Sites and Number of Specimens Received for Bacterial Culture at IDDS Sites

	Q3 FY 2019 (baseline)	Q4 FY 2020	Q1 FY 2021	Q2 FY 2021	Q3 FY 2021	Q4 FY 2021	Q1 FY 2022	Q2 FY 2022	Q3 FY 2022	Q4 FY 2022
# specimens received for bacterial culture	3,225	3,824	5,703	5,755	5,468	5,821	5,830	5,935		4,536
# specimens with positive culture for priority pathogens	260	307	299	422	595	439	407	475	458	

— # specimens with positive culture for priority pathogens
— # specimens received for bacterial culture
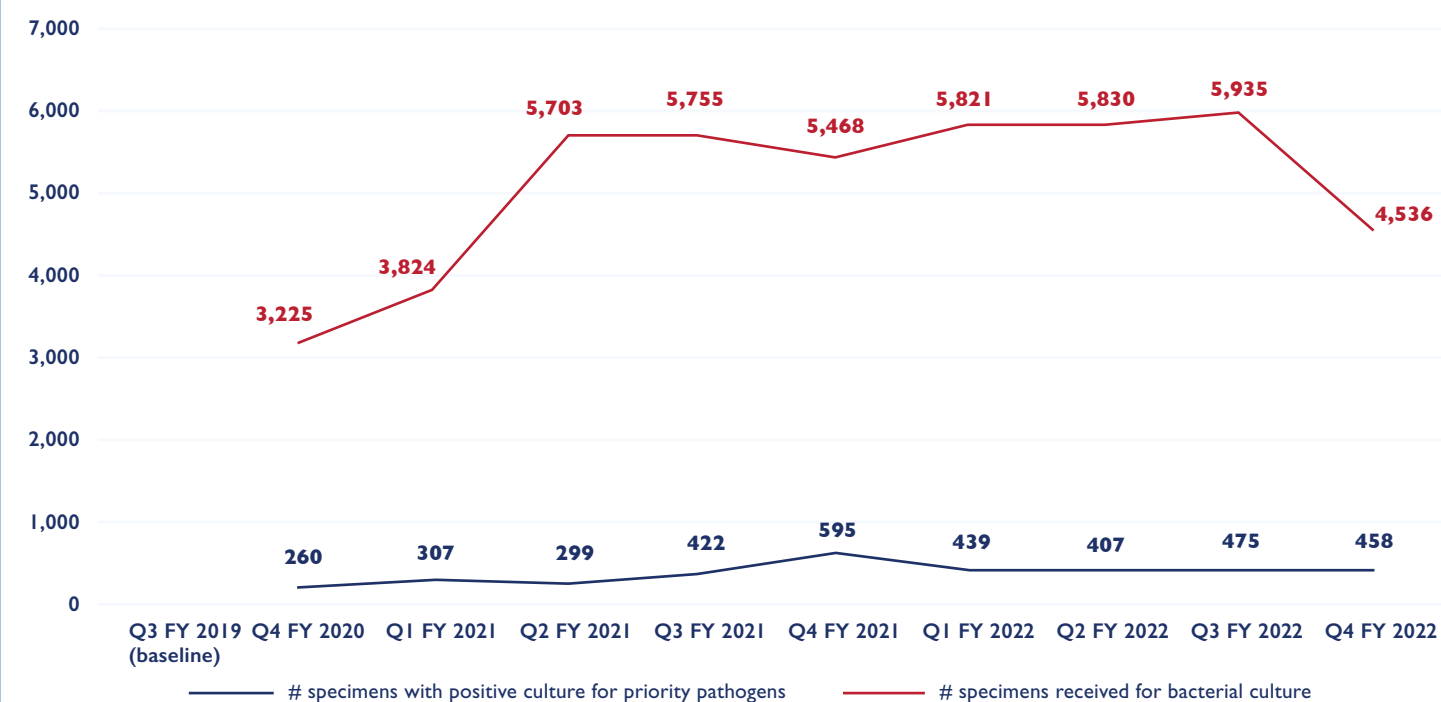
Bacteriology training in Cameroon. Photo by IDDS.

/// DRC

Context

In DRC, IDDS is supporting NTP and NTRL in collaboration with the Global Fund to Fight AIDS, Tuberculosis and Malaria and other TB implementing partners. IDDS helps NTP and NTRL mitigate the impact of COVID-19 on TB services by focusing on multi-disease testing platforms. IDDS activities focus on upgrading the DRC NTRL, improving service delivery in three TB reference laboratories, and improving TB diagnostic services at provincial TB reference laboratories.

"We are in the process of adapting this new Truenat machine, to overcome the difficulties encountered here in the city of Mbuji-Mayi with recurring failures of existing machines. This training as a super-user will greatly help us to support the sites and solve the challenges encountered on the field."

—Alphonse Lufulwabo, IDDS-trained Truenat super-user

Annual Highlights

Diagnostic

- IDDS built the rapid molecular diagnostic capacity of the TB laboratory network by introducing Truenat in 38 sites across 4 provinces of the country. This has improved TB case detection in many Truenat sites, especially in Mbuji-Mayi.
- IDDS informed mobilization of national resources and guidance by providing a consultant to lead the development of the new Strategic Plan for the National Tuberculosis Reference Laboratory (2023–2026).
- To improve quality and standardized practices across the TB laboratory network, IDDS supported the development or revision of 28 SOPs, plans, and guidelines to build capacity of NTRL staff to process and test specimens and interpret test results.
- IDDS conducted assessments of the Kisangani and Lubumbashi provincial laboratories to identify activities that will strengthen their capacities to be able to perform DST, reducing the burden on NTRL and decentralizing testing nationally.

Challenges

- IDDS planned to purchase some small materials and to repair the biosafety cabinet (BSC) at Kisangani Provincial Laboratory, but an assessment conducted jointly with NTP found that the BSC needed to instead be replaced. IDDS therefore revised the procurement plan to integrate the purchase of a new BSC.
- In Q4, NTP organized major activities, including internal review, annual review, and external review, with all TB partners and stakeholders. This agenda conflict resulted in a delay in the implementation of IDDS activities.

What We Learned

- Creating new opportunities for communications is key to success. The Truenat super-users' WhatsApp group created by IDDS proved to be a very useful monitoring tool for field actors. Through this platform, users can share information, discuss issues, and find solutions to challenges related to Truenat implementation.

PARTNERS AND COLLABORATORS

- Ministry of Public Health
- Metabiota
- National Biomedical Research Institute
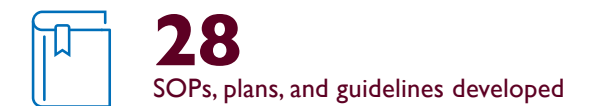- National Tuberculosis Program

Output Data

60 People trained

Equipment maintenance (4)
LMIS (20)
Biosafety (36)

28 SOPs, plans, and guidelines developed

Equipment maintenance (11)
Biosafety and biosecurity (17)

3 Assessments completed

TB testing (2)
NTRL power assessment (1)

3 Laboratories with improved diagnostic capacity
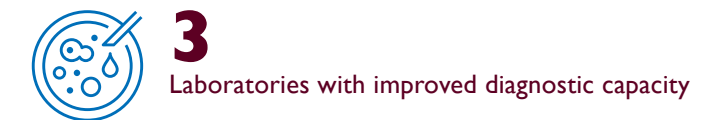
Practical session during the Truenat training at the Provincial Laboratory of Mbuji-Mayi (Kasaï Oriental) in DRC. Photo by IDDS.

/// DRC

Context

IDDS is improving preparedness for outbreaks of priority pathogens in DRC by operationalizing the Ministry of Public Health's laboratory policy and strategic plan and supporting the establishment of a network of public health laboratories in eastern DRC. IDDS is also working to establish safe specimen handling and transport for priority pathogens, including EVD.

> "We thank IDDS for supporting the first-ever integrated disease surveillance and response training in our province. This will allow us to improve the surveillance and control of ongoing outbreaks including monkeypox and cholera."
>
> —Dr. Eustache Bibala, provincial health coordinator of Maniema province

Annual Highlights—GHS

Diagnostic

- IDDS developed a financial sustainability framework and a costed operational plan for the public health laboratory network in DRC's eastern region.
- IDDS strengthened the regulatory environment for diagnostic networks in eastern DRC by disseminating 500 copies of the Ministry of Public Health laboratory policy and laboratory strategic plan 2021–2025, and organizing a dissemination workshop on July 16 attended by 39 key stakeholders (13 female) from four provinces (North Kivu, South Kivu, Ituri, and Maniema).
- To improve quality of laboratory diagnostics and support the decentralization of the detection of priority pathogens, IDDS developed 13 SOPs and training materials that can be used for the diagnosis of priority zoonoses in eastern DRC. IDDS also trained 24 public health laboratory workers (13 female) on bacteriology testing and diagnostics for priority zoonoses, who will act as mentors for others.

Surveillance

- To improve capacity for disease surveillance response at the district level, IDDS trained 29 trainers (2 female) from provincial and health zone management teams on the IDSR third edition guidelines.

PARTNERS AND COLLABORATORS

- Ministry of Public Health
- National Biomedical Research Institute
- Provincial health divisions (North Kivu, South Kivu, Maniema, Ituri)

Challenges

- Ongoing security concerns and a state of emergency in North Kivu and Ituri provinces necessitated close monitoring and restriction of Goma-based IDDS staff movements, including evacuations to neighboring towns for safety.
- Fuel supply issues in DRC resulted in cancelled flights and interrupted travel plans, causing delays and increased travel expenses.

What We Learned

- The provincial management team better understands IDDS' objectives when they are involved in activity implementation.
- Building trust in local public health authorities is augmented by high-quality materials that allow partners to demonstrate project impact, resulting in recommendations to replicate the project model.

IDDS training on waste management during the Ebola outbreak in DRC, September 2022. Photo by IDDS.

Annual Highlights—EVD

Diagnostic

- In response to the EVD outbreak that was declared in October 2021, IDDS conducted supervisory visits to four health zones (Beni, Butembo, Katwa, and Musienene) in collaboration with INRB and the *Division Provinciale de la Santé* (Provincial Health Division). The supervisory team met with the chief of each health zone and reviewed EVD surveillance data. IDDS observed active involvement in EVD surveillance by laboratory staff of the health zones; many of these staff had participated in previous IDDS-supported EVD RDT training.
- To support capacity for EVD testing, IDDS equipped INRB facilities in Beni, Butembo, and Mangina with 1,000 GX cartridges and waste management supplies, such as waste bins and trash bags.
- To accelerate specimen transport for EVD testing, IDDS hired a vehicle to transport EVD specimens and commodities, such as viral transport media, cryotubes, waste management supplies, and GX cartridges that were procured by other implementing partners. To improve biosafety and biosecurity, IDDS also used these vehicles to transport used and expired GX cartridges for incineration.

Challenges

- Due to the high number of implementing partner organizations operating on the ground during the initial weeks of the EVD outbreak, there were some challenges with harmonization of activities and minimizing duplication of efforts.

What We Learned

- Sufficient supervision across the health zones that were affected by the outbreak ensured that staff were prepared to meet the increased demand for specimen testing.
- Security concerns across the country delayed implementation of some activities in the work plan.

Output Data

198 People trained

Equipment maintenance (93)
Testing and specimen referral (24)
Biosafety and biosecurity (52)
IDSR (29)

4 Supportive supervision visits

Specimen referral (3)
Testing-EVD (1)

1,038 Specimens transported

COVID-19 testing

18 SOPs, plans, and guidelines developed
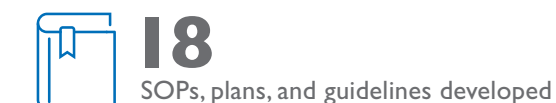
Equipment maintenance (1)
Testing (12)
Biosafety and biosecurity (4)
Waste management (1)

3 TWG meetings held

Equipment maintenance (1)
Testing (1)
Biosafety and biosecurity (1)

/// ETHIOPIA

Context

In Ethiopia, IDDS works with five human health laboratories and one animal health laboratory to strengthen AMR diagnosis and surveillance, by procuring instruments, providing technical assistance and mentorship, updating documentation, improving data reporting through the introduction of WHONET, and identifying opportunities to integrate surveillance systems across sectors.

"We greatly value the magnificent mentorship and training provided by IDDS to our staff."

—Wondwossen Kumlachew, Animal Health Investigation and Diagnostic Laboratory

Annual Highlights

Diagnostic

- To strengthen the AMR surveillance network, IDDS assessed the baseline capacity of five human health laboratories and one animal health laboratory, and conducted microbiology laboratory quality management training for 16 participants (6 female), supervision, and mentorship in microbiology to support operations at these sites.
- IDDS strengthened capacity of the AMR surveillance network by training staff to perform preventive and curative maintenance of laboratory equipment. IDDS trained 10 biomedical engineers (all male) across 8 human health sites and 2 animal health sites, empowering all of these locations to perform their own on-site maintenance of microbiology equipment.

Surveillance

- To improve the efficiency of data management for AMR surveillance, IDDS trained 26 staff (9 female) from 16 AMR sites to use WHONET to electronically analyze their AMR detection data and submit reports both to clinicians (improving patient management) and to the Ethiopian Public Health Institute for national monitoring.

Challenges

- A six-month interruption in implementation, due to armed conflict, necessitated a revised scope of work and resulted in some activities being postponed until FY 2023.

What We Learned

- Conducting training, supervision, and mentorship jointly with the Ethiopian Public Health Institute helped optimize the impact of limited resources.

PARTNERS AND COLLABORATORS

- Ethiopian Public Health Institute
- Food and Agriculture Organization of the United Nations
- National Animal Health Diagnostic and Investigation Center

Output Data

52
People trained

Equipment maintenance (10)
Electronic reporting system (26)
QMS (16)

7
Supportive supervision visits

Testing and AMR surveillance (4)
QMS (3)

16
People mentored

Biosafety and biosecurity (5)
QMS (11)

5
SOPs, plans, and guidelines developed

Testing

6
Laboratories with improved diagnostic capacity

Outcome Data

Ethiopia: Number of Specimens with Positive Culture for Priority Pathogens at IDDS Sites and Number of Specimens Received for Bacterial Culture at IDDS Sites

	Q2 FY 2022	Q3 FY 2022	Q4 FY 2022
# specimens received for bacterial culture	5,086	4,954	5,356
# specimens with positive culture for priority pathogens	689	732	666

— # specimens with positive culture for priority pathogens   — # specimens received for bacterial culture
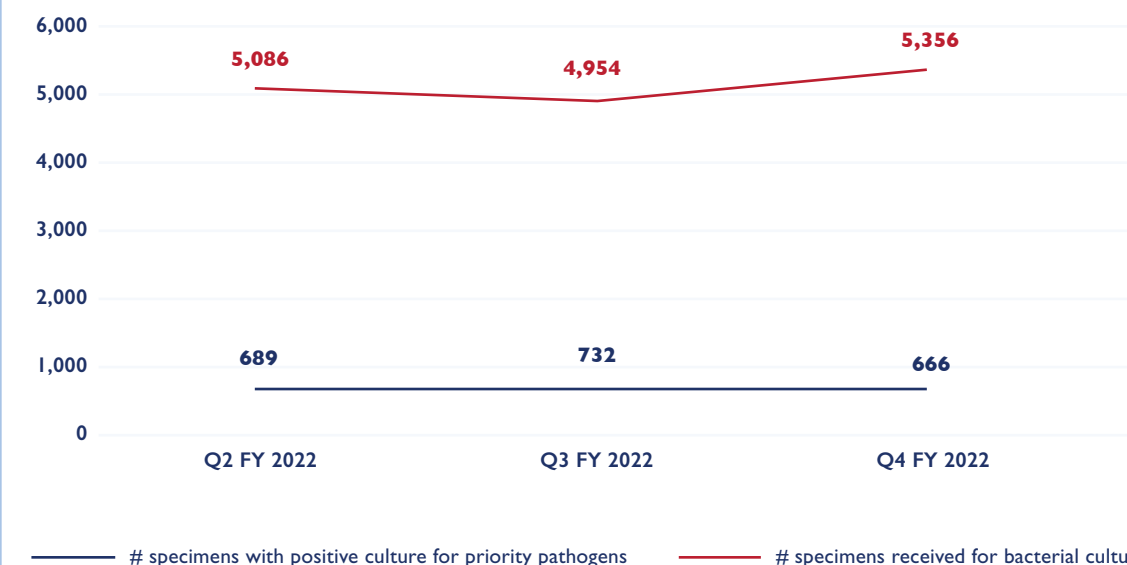
IDDS improved diagnostic capacity at six laboratories in Ethiopia in FY 2022. Photo by Cindy Liu for IDDS.

/// GUINEA

Context

In Guinea, IDDS builds capacity for AMR surveillance across the national diagnostic system through training, expert inputs to policy and regulatory guidance, and quality assurance. IDDS also expands capacity for community-based surveillance and strengthens capacity to detect EVD and COVID-19.

"I realize in the field that the specimen referral system that IDDS has developed is very effective and has improved sample transport in Guinea."

—Dr. Alpha Barry, director of Santé Plus, Mamou Region, Guinea

Annual Highlights—GHS

Diagnostic

- To strengthen laboratory diagnostic capacity, IDDS completed a cost analysis of the SRS piloted in three districts. The costed report provides recommended strategies to reduce the cost of specimen transport, opportunities to reduce the interval between specimen collection and delivery to reference laboratories, and recommendations to improve the quality of specimens being tested.
- To improve capacity for diagnosing priority pathogens, IDDS conducted training on specimen referral, in partnership with the Food and Agriculture Organization of the United Nations (FAO), in Faranah Health District for 21 participants (1 female).

Surveillance

- To improve AMR surveillance, IDDS, in collaboration with the National Institute of Public Health, developed an open-source data management tool to help centralize and further capture AMR data in GLASS.

Challenges

- Frequent stockouts of reagents and supplies limited laboratory capacity to offer uninterrupted bacteriology testing. IDDS held discussions with the Ministry of Health and Public Hygiene about the need to include bacteriology reagents and supplies when developing laboratory budgets.

What We Learned

- To improve specimen referral, stakeholders from the peripheral health systems at the regional and national levels must be involved.

PARTNERS AND COLLABORATORS

- Ministry of Health and Public Hygiene
- National Agency for Health Security
- National Directorate of Laboratories

- Laboratories need quality improvement plans.
- Continuous on-bench mentorship and site supervision are critical to decentralize testing at regional laboratories.

Annual Highlights—EVD

Diagnostic

- To fill a critical gap in the diagnostic network, IDDS piloted a 75-day test of a specimen transport, referral, and tracking system in Faranah, Kindia, and Mamou that relies on SMS messaging and a mobile specimen tracking application. During the pilot, no specimens were rejected at reference laboratories, indicating that the system maintained specimen quality during transport.
- To illustrate the overall capacity of Guinea's laboratory network, in October 2021, IDDS mapped the activities of 55 laboratories in Nzérékoré and 9 additional sites in Kankan. The results of this exercise included a map of all laboratory sites across the country, the number of laboratory personnel, sources of water and electricity, and other critical data.

Challenges

- Some activities were delayed due to ongoing security challenges and supply chain shortages for procurement.

What We Learned

- Involving personnel across sectors outside of public health, such as drivers and couriers, ensures safe and successful specimen transport.

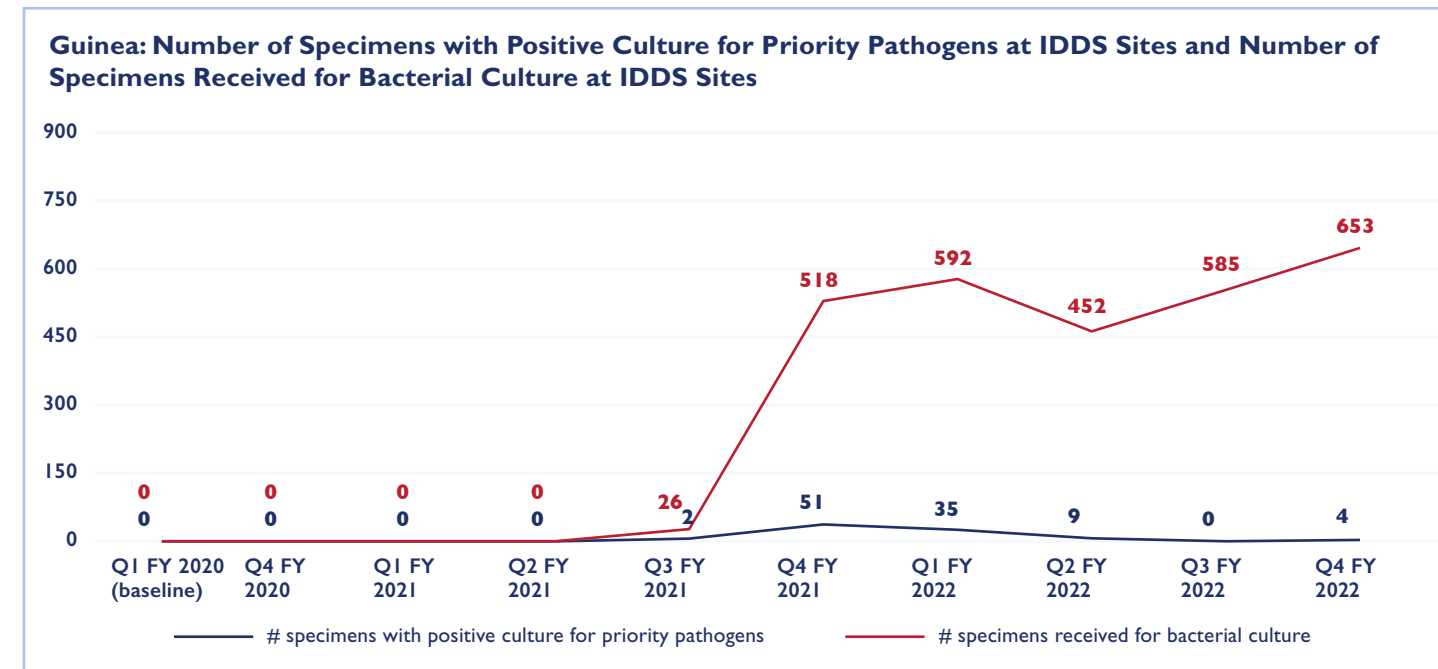## Annual Highlights—ARP

Diagnostic

- IDDS invested in Guinea's public health workforce by training 21 participants (4 female) to use GX and RDTs to detect COVID-19 and distributing illustrated SOPs.
- In collaboration with the *Direction Nationale des Laboratoires* (National Directorate of Laboratories), IDDS worked with four laboratories on GX machine maintenance, recalibration, and repair.
- To boost diagnostic capacity for COVID-19, IDDS equipped six central reference laboratories in Conakry with 1,000 extraction reagents and 320 other PCR testing commodities.

Challenges

- Some sites experienced delays in GX equipment maintenance both because of supply chain issues and because they were not able to respond to requests for information from Cepheid. To mitigate this issue, IDDS worked with the *Direction Nationale des Laboratoires* to develop a procedure for regional- and district-level laboratories to review and develop monthly reports of GX operation logs, which will be shared with Cepheid.
- The volatile security situation delayed implementation of project activities; timelines were adjusted accordingly.

Outcome Data

Guinea: Number of Specimens with Positive Culture for Priority Pathogens at IDDS Sites and Number of Specimens Received for Bacterial Culture at IDDS Sites

	Q1 FY 2020 (baseline)	Q4 FY 2020	Q1 FY 2021	Q2 FY 2021	Q3 FY 2021	Q4 FY 2021	Q1 FY 2022	Q2 FY 2022	Q3 FY 2022	Q4 FY 2022
# specimens with positive culture for priority pathogens	0	0	0	0	2	51	35	9	0	4
# specimens received for bacterial culture	0	0	0	0	26	518	592	452	585	653

Output Data

90 People trained

COVID-19 testing (21)
SRS (69)

2 TWG meetings held

Data quality, analysis, and use (1)
SRS (1)

2 Assessments completed

SRS (1)
Laboratory mapping (1)

3 Supportive supervision visits

Testing and QMS

1 Pilot conducted

SRS

3 Laboratories with improved diagnostic capacity

/// INDIA

Context

In India, IDDS works to strengthen strategic public sector TB laboratories and engage private sector laboratories to improve TB diagnosis and care. IDDS collects evidence on the feasibility and impact of new TB diagnostics and supports laboratory networks in detecting and preventing the spread of AMR.

> "The work in Hisar has the potential to change Hisar, India, and even the world."
>
> —Dr. Rajesh Raju, state TB officer in Haryana, speaking about the potential impact of private sector engagement in IDDS' new one-stop model for diagnosis of TB

Annual Highlights

Diagnostic

- IDDS improved the quality of the TB diagnostic network by revising and introducing a supervisory, monitoring, and evaluation package for NRLs and intermediate reference laboratories and developing a grading tool to rank TB laboratories according to their performance in delivering key services. With inputs from NRLs and CTD's laboratory unit, IDDS also developed a biosafety manual and an associated monitoring mechanism.

- IDDS increased TB case notification and provided patients with faster access to their laboratory results by engaging a private sector laboratory in Hisar district of Haryana state to demonstrate the feasibility of a new "one-stop" model. By reducing turnaround times and improving the DST rate, the new model is expected to improve the rate of patients who initiate the correct treatment regimen.

- To generate evidence supporting the effective utilization of Truenat at NTEP sites, IDDS conducted a study of the root causes of Truenat "invalid/indeterminate" rates. IDDS also established the proof of concept of using Trueprep-extracted DNA for LPA testing.

- To advance the national effort to contain the spread of AMR, IDDS provided technical and managerial support in organizing expert inputs to the National Action Plan on AMR for 2022–2026.

PARTNERS AND COLLABORATORS

- Ministry of Health and Family Welfare
- Intermediate reference laboratories
- IQVIA through USAID iDEFEAT TB
- Haryana State Tuberculosis Cell
- Hisar District Tuberculosis Center
- National Institute for Research in Tuberculosis
- National reference laboratories
- National Tuberculosis Elimination Program
- Thyrocare Technologies Limited

Challenges

- Ministry staff are challenged by commitments to other projects, so IDDS has devoted extra time to following up and closely coordinating to advance project activities. sustainability of continued technical assistance for essential TB diagnostic services.

What We Learned

- Active involvement and support from district stakeholders (chief medical officer, district TB officer, medical officer TB control, and other NTEP staff) have helped in gaining ownership and leadership of the one-stop TB diagnostic model in Hisar district.

- The runner mechanism for specimen collection and effective channels of communication between the public and private facilities contributed to a more effective TB diagnostic care cascade. This was a groundbreaking approach to obtaining specimens from remote areas without delays. For district stakeholders, this is a vital learning opportunity to expand this model to other districts and states.

- The involvement of block coordinators from the community enhances the rapport building and engagement for the smooth implementation of the one-stop model.

- To ensure the data quality and validity of the tests offered by the private laboratory engaged in the one-stop model, digital and in-person monitoring is necessary to ensure that data were uniform across levels.

Output Data

147 People trained

QMS (131)
New diagnostic tools - Truenat (16)

1 Pilot conducted

QMS

29 Supportive supervision visits

Testing skills and procedures (3)
New diagnostic tools - Truenat (11)
Private sector engagement (4)
QMS (1)
Implementation of NTEP policies (4)
Certification-TB free status (6)

2 TWG meetings held

QMS (1)
New diagnostic tools (1)

2 SOPs, plans, and guidelines developed

QMS

3 Assessments completed
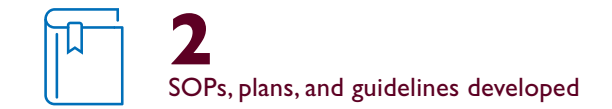
Private sector engagement (1)
New diagnostic tool - Truenat and other (2)

1 Laboratory* with improved diagnostic capacity

*Private sector laboratory supported in Hisar to provide TB services as part of the national TB network.

IDDS team supervising the training of laboratory technicians in Chennai, India. Photo by IDDS.

/// INDIA

Context

IDDS received emergency response funding to support the COVID-19 outbreak response in India from July to December 2021. Support focused on procurement, training and technical assistance, and EQA for GX and Truenat COVID-19 testing.

Annual Highlights

Diagnostic

*   IDDS delivered 4,890 GX COVID-19 cartridges to 3 laboratories and delivered 800 Truenat tests and associated reagents to 2 laboratories.
*   IDDS procured and delivered 2,400 auxiliary diagnostic commodities such as the Trueprep® AUTO transport medium for swab specimen packs.

Challenges

*   IDDS experienced significant challenges in all proposed activities. Due to high staff turnover, there were challenges in identifying the new authorized points of contact at multiple recipient sites to sign for the commodities received, which contributed to delivery confirmation delays.

*   IDDS planned and prepared to offer Truenat and GX COVID-19 testing webinars. IDDS identified participants and facilitators and reviewed and updated training materials. However, when IDDS shared these materials with the Indian Council of Medical Research (ICMR), the council indicated that it would take many months before the appropriate authorities could review and approve the proposed training. Thus ICMR could not provide concurrence on the webinar content (including SOPs and job aids) within the IDDS timeframe, but it stated that IDDS could proceed without government collaboration and branding. IDDS concluded that ICMR's buy-in and participation were critical for the effectiveness of this activity and discussed this challenge with the USAID mission. Ultimately, the mission concurred that IDDS should not proceed without ICMR participation.

What We Learned

*   Setting expectations on timelines and implementation in collaboration with ICMR will ensure success of any future COVID-19 response activities.

IDDS tours Molbio's production facility, where Truenat is manufactured, in Goa, India. Photo by IDDS.

/// INDONESIA

Context

IDDS supports the Government of Indonesia's cross-sectoral One Health approach for the detection and surveillance of zoonoses/emerging infectious diseases (EIDs). This includes providing technical assistance to improve the operations and development of *Sistem Informasi Zoonoses dan Emerging Infectious Diseases* (SIZE), the country's integrated health information system that is interoperable among three sectors (human, animal, and wildlife).

> ## "The training is very valuable, impactful, and responded to our needs."
>
> —Salli Hattu, laboratory officer in Ambon, Indonesia, speaking about IDDS training on the PREDICT laboratory protocol

Annual Highlights

Surveillance

*   To strengthen coordination between health sectors (human, animal, and wildlife) for zoonosis/EID surveillance, IDDS launched a pilot to implement Four-Way Linking guidelines and cross-sectoral Integrated Surveillance, a framework that helps countries strengthen collection, analysis, and sharing of national data between sectors at the national and local levels.
*   To improve national One Health coordination, IDDS provided technical inputs to the Coordinating Ministry for Human Development and Culture in formulating a national regulation on cross-sectoral prevention and control of zoonotic diseases. IDDS' work on the Integrated Surveillance, Four-Way Linking, and National SIZE Roadmap will be included in the regulation to reinforce implementation of these strategies.
*   To share lessons learned with One Health stakeholders, IDDS co-hosted a national webinar on foot and mouth disease. IDDS also conducted a webinar for the G20 One Health Side Event chaired by Indonesia in 2022 related to the One Health approach for prevention, preparedness, and response strategy and capacity. Finally, IDDS conducted a three-day virtual workshop on leptospirosis surveillance and control using a One Health approach.
*   To improve the capacity of laboratory officers to detect new EIDs, IDDS facilitated certified training on the PREDICT Laboratory Protocol at four public health laboratories. IDDS also conducted One Health training for field zoonosis officers in preparation for their utilization of SIZE.

*   Ministry of Health
*   Coordinating Ministry for Human Development and Culture
*   Ministry of Agriculture
*   Ministry of Environment and Forestry

Challenges

*   Changes to governmental organizational structure and staff turnover required migration of the SIZE host server and database.
*   Staff turnover within the national and local governments required renewed efforts to transfer knowledge to new staff members.
*   Outbreaks of new non-zoonotic animal diseases (e.g., foot and mouth disease) led to shifting priorities and commitments.
*   Program sustainability at the local level required close coordination with the Ministry of Home Affairs.

What We Learned

*   Conducting in-person meetings for developing guidelines and roadmaps is more effective than online meetings because they offer more time for direct interactions. Participants can also be more active and focused during in-person meetings. The inputs, ideas, and suggestions delivered during the offline meetings are clearer.
*   Maintaining constant communication and coordination with ministries and institutions and other GHS partners is necessary to strengthen collaboration, particularly in carrying out the activities that can be integrated, connect the dots, fill the gaps, and prevent duplication of activities.
*   From the pilot implementation of the Four-Way Linking guidelines and Integrated Surveillance, IDDS learned that leptospirosis is a neglected zoonotic disease of public health importance that needs to be detected, prevented, and controlled through cross-sectoral coordination using a One Health approach.

Output Data

53
People trained

Testing zoonoses with PREDICT protocol (23)
Zoonoses surveillance with One Health approach (30)

40
TWG meetings held

Interoperability (7)
Testing zoonoses with PREDICT protocol (4)
Data quality (1)
Data analysis and use (27)
EID surveillance with One Health approach (1)

269
Rabies cases reported in SIZE

5
SOPs, plans, and guidelines developed

PREDICT curriculum on testing zoonoses (1)
Cross-sectoral surveillance integration (1)
Cross-sectoral four-way linking (1)
Operational roadmap for health information system on zoonoses and EID management (1)
National decree on cross-sectoral working group on zoonosis and EID control (1)

1
Pilot conducted

Data analysis and use and data quality

KENYA

Context

In Kenya, IDDS works at the national level and five surveillance sites (Bungoma, Malindi, Murang'a, Nyeri, and Kitale Hospital Laboratories) to strengthen AMR diagnosis and surveillance.

"I processed many clinical specimens and developed confidence in culture reading and interpretation of pathogens from normal floras and learning urine culture processing by correlating dipstick findings and bacterial growth on a plate. I have introduced the use of dipstick in all urine for culture processing and this has eased our interpretation of urine cultures."

—Erick Wanjala, a microbiology technologist from Bungoma County Referral Hospital who benefitted from a two-week placement, sponsored by IDDS, at the Aga Khan University Hospital's microbiology laboratory

Annual Highlights

Diagnostic

- To improve the quality of bacteriology testing at the county level, IDDS sponsored two-week placements for five laboratory technologists (two female) at the Aga Khan University Hospital clinical microbiology laboratory. The training has enhanced the laboratory technologists' competencies in strengthening QMS in bacteriology culture processing, which will improve and align procedures to enhance timely, verifiable, and quality culture results.

- To improve efficiency and quality of bacteriology testing, IDDS helped to equip four laboratories with tools for automating certain procedures, which will improve clinical management of patients and generate AMR surveillance data.

- To expand access to quality-assured bacteriology testing, IDDS supported Nyeri County Hospital and Malindi Sub-County Hospital to include bacteriology testing in the scope of their International Organization for Standardization (ISO) accreditation.

Challenges

- Preventive maintenance and repair of two automated bacterial identification and AST instruments, located in Kitale and Malindi hospitals, was delayed by BioMérieux.

PARTNERS AND COLLABORATORS

- Ministry of Health
- Ministry of Agriculture and Livestock Development
- Aga Khan University Hospital
- County health departments (Bungoma, Kilifi, Murang'a, Nyeri, and Trans-Nzoia)
- National Antimicrobial Steering Inter-Agency Committee

IDDS reviewed contracts and resolved the delay in servicing these instruments.

- A server issue interrupted electronic data entry by Malindi Sub-County Hospital laboratory, but NPHL provided an interim solution during the period of interruption.

- Murang'a and Bungoma laboratories do not have laboratory information systems, so they are currently using WHONET, which is not aligned with the national database, to capture and share data. A national informatics team is addressing the misaligned variables.

- The National Microbiology Reference Laboratory experienced delays in providing feedback on re-testing AMR isolates to the referring AMR surveillance sites. IDDS provided support both to the referring sites as well as the National Microbiology Reference Laboratory as processes and procedures were revised.

- Space limitations at Murang'a County Referral Hospital laboratory are affecting services, including placement of automated equipment, but this is expected to be resolved because the county has committed to expanding the laboratory.

What We Learned

- A medium-term (two-year) equipment lease contract may be more cost efficient than direct purchase by counties, because equipment repairs and preventive maintenance are part of the contract. Counties can apply cost savings to buying reagents, ensuring continuity of laboratory services.

- AMR surveillance information systems require a dedicated informatics/information technology expert to maintain and guide systems operation for smooth capturing and transmission of data. Lack of a dedicated person at NPHL has markedly affected data capturing and reporting from the surveillance sites to the national level due to systems connectivity delays.

- Continuous efforts to educate clinicians on the benefits of laboratory testing for confirmation of diagnoses and AMR surveillance are essential, especially given the high turnover of clinicians in public facilities. The best way of sustaining this exercise is to integrate training into existing requirements for continuing medical education at the sites.

- Surveillance sites need to adopt laboratory information systems that are easy to use and compatible with national-level or widely used systems, so that technical support for systems operation and maintenance can be streamlined. For example, Bungoma County Referral Hospital has faced major challenges because it is the only site in the country currently using the Basic Laboratory Information System.
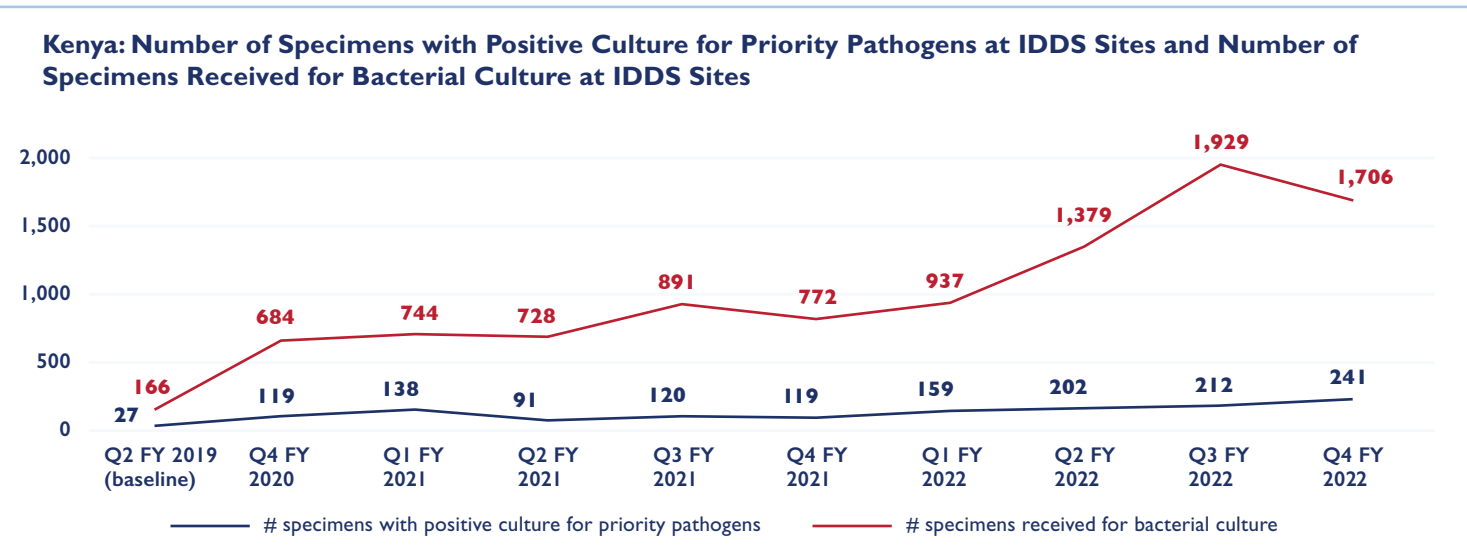
Output Data

2
Laboratories accredited with IDDS support

5
Laboratories with improved diagnostic capacity

44
People mentored

Bacteriological testing (14)
SRS (16)
Data analysis and use (4)
QMS (10)

Outcome Data

990
People Trained

QMS (199)
Bacteriological testing (104)
SRS (145)
Data analysis and use (44)
Antimicrobial diagnostic advocacy (498)

1
Pilot conducted

SRS

6
SOPs, plans, and guidelines developed

QMS (1)
SRS (5)

2
TWG meetings held

SRS

Kenya: Number of Specimens with Positive Culture for Priority Pathogens at IDDS Sites and Number of Specimens Received for Bacterial Culture at IDDS Sites

LIBERIA

Context

In Liberia, IDDS is continuing to build capacity for bacteriology testing and supports NDD to provide technical oversight to the diagnostic network, with a focus on improving the quality of services offered.

"IDDS has provided us with the skills and services that enable us to provide services to our patients and help them to recover from situations like chronic wound infections, chronic urinary tract infections and many others. We are able to provide the correct antibiotics and reduce AMR in our population following guidance provided through the laboratory results."

—William Walker, laboratory technician at Phebe Hospital in Bong County, Liberia

Annual Highlights—GHS

Diagnostic

- To improve access to bacteriology testing in hard-to-reach areas, IDDS developed new diagnostic capacity (culture and AST) in two county hospital laboratories: Tellewoyan (Lofa) and G.W. Harley (Nimba).

- IDDS built capacity for uninterrupted bacteriology testing at Tellewoyan Hospital laboratory by supporting the installation of solar panels and solar power equipment, including batteries, a battery rack, and a power inverter. The new equipment has provided a more stable power source for diagnostic machines and prevented interruptions in testing, all of which helps maintain rapid turnaround of patients' results and enables timely public health interventions.

- To improve quality across the diagnostic network, IDDS trained auditors on SLIPTA, improving their capacity to conduct QMS audits and mentorship. Specifically, IDDS trained five auditors from the human health sector while FAO trained two veterinary laboratory staff (one of the seven was female).

Challenges

- Low rates of referral of bacteriology specimens resulted in the need to re-train technicians on use of the WHONET system because it had not been in regular use after the first training. IDDS also increased activities to promote the referral of bacteriology specimens.

- Challenges with the central processing unit at G.W. Harley Hospital resulted in data not being entered into WHONET. IDDS worked with the vendor that supplied the computers to fix the central processing unit.

- SLIPTA audits in Lofa were delayed to October 2022 due to challenging road conditions.

What We Learned

- Collaboration with MoH partners helps reduce costs associated with activities and encourages partners to work toward shared goals.

- Involving a member of NDD in every visit to a county helps NDD staff to understand and own IDDS project activities.

Annual Highlights—EVD

Diagnostic

- IDDS improved EVD diagnostic quality by distributing EVD specimen management SOPs to three IDDS-supported counties (Bong, Nimba, and Lofa).

- IDDS equipped Tellewoyan Memorial Hospital with chemistry analyzers, hematology analyzers, and associated reagents and supported the installation of and user training for chemistry and hematology analyzers.

What We Learned

- It is important to closely work with other implementers to avoid duplication of activities and thus maximize the impact and use of available resources.

Annual Highlights—ARP

Diagnostic

- IDDS enhanced Liberia's COVID-19 response through technical assistance in Bong, Lofa, and Nimba counties on antigen RDTs and safe and timely specimen collection, packaging, and transportation to the National Public Health Reference Laboratory for PCR testing.
- To improve quality of COVID-19 diagnosis, IDDS coordinated timely processing of COVID-19 EQA proficiency testing panels on GX machines at Phebe Hospital Laboratory in Bong county, and facilitated the submission of the panels to the proficiency panel providers.

- To boost COVID-19 testing capacity, IDDS equipped the national reference laboratory with Qiagen RNA extraction kits, which supported 2,000 COVID-19 tests, 8,000 specimen collection kits, and required personal protective equipment, and donated 13,710 pieces of personal protective equipment, such as gloves, masks (N-95 and surgical), and aprons.

Challenges

- IDDS experienced delays in the delivery of procured items.

Outcome Data

Liberia: Number of Specimens with Positive Culture for Priority Pathogens at IDDS Sites and Number of Specimens Received for Bacterial Culture at IDDS Sites

— # specimens with positive culture for priority pathogens   — # specimens received for bacterial culture
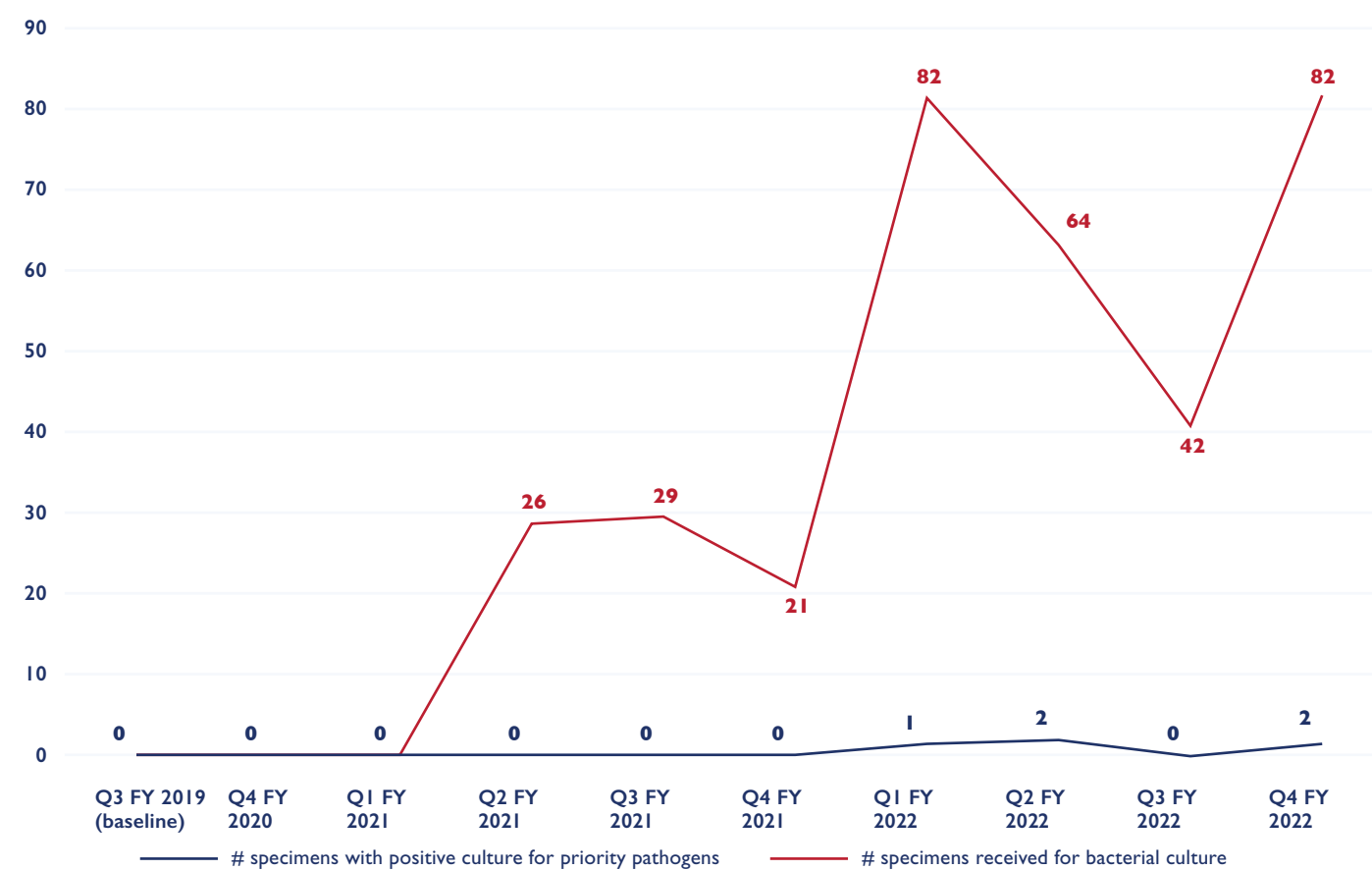
With IDDS support, three county laboratories started performing bacterial culture in FY 2021. IDDS is working with health workers to increase use of these diagnostic services.

Output Data

66 People trained

Bacteriological testing (14)
Biosafety and biosecurity (27)
QMS (25)

9 Supportive supervision visits

Equipment maintenance (6)
QMS (3)

151 People mentored

Bacteriological testing (60)
COVID-19 testing (37)
QMS (54)

9 Laboratories with improved diagnostic capacity

3 SOPs, plans, and guidelines developed

Equipment maintenance (1)
Bacteriological testing (1)
Biosafety and biosecurity (1)

22 TWG meetings held

Equipment maintenance (2)
Commodity management (1)
Bacteriological testing (4)
SRS (4)
Biosafety and biosecurity (3)
Other diagnostic network related topic (2)
QMS (6)

1 Assessment completed

Testing

/// MADAGASCAR

Context

IDDS is working in Madagascar to improve indicator-based surveillance for priority pathogens and assist with strategic planning for the laboratory and surveillance systems.

Annual Highlights—GHS

Diagnostic

- IDDS built laboratory capacity for detecting priority diseases by training and mentoring 45 senior biologists (25 female) on key components of medical biology (hematology, biochemistry, and microbiology).

Surveillance

- To improve national coordination in the fight against AMR, IDDS drafted a national AMR surveillance protocol using a One Health approach. The protocol standardizes methods for monitoring pathogens carrying resistance genes across sectors (human, animal, and environmental health).

What We Learned

- The close collaboration IDDS maintained with the Mérieux Foundation and with the USAID mission has been key to successful implementation of the work plan activities.
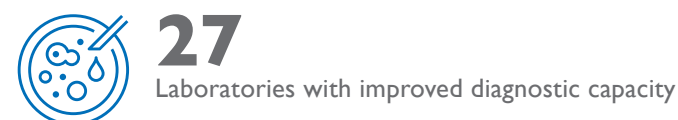
Output Data

170
People trained

Equipment maintenance (53)
Testing, quality controls, and QMS (117)

9
TWG meetings held

Other diagnostic network related topic

27
Laboratories with improved diagnostic capacity

PARTNERS AND COLLABORATORS
- Ministry of Public Health
- RESAMAD laboratory network

Annual Highlights—ARP

Diagnostic

- To increase detection of COVID-19, IDDS delivered an automated nucleic acid extractor, 480 COVID-19 PCR tests and associated reagents, and 1,000 specimen collection swabs to the PZaGa University Hospital Center laboratory in Mahajanga region.

- To improve quality of COVID-19 surveillance, IDDS co-conducted supportive supervision visits to 11 districts to assess current practices and provided on-site training for data collection and management. IDDS also provided financial and logistics support for three two-day workshops to develop bulletins that compiled surveillance data to inform pandemic response actions by the presidency, prime minister, and other top decisionmakers.

11
Supportive supervision visits

COVID-19 electronic reporting systems

39
People mentored

Other diagnostic network related topic

/// MALAWI

Context

IDDS is working in Malawi to expand and improve the TB diagnostic network and introduce new diagnostic technologies and approaches, such as digital X-ray and stool testing for diagnosis of childhood TB.

Annual Highlights

Diagnostic

- IDDS improved capacity for detecting DR-TB by conducting a workshop to review and revise Malawi's diagnostic algorithm. Seventeen participants (two female) from the National TB and Leprosy Elimination Program (NTLEP), NTRL, and TB Local Organization Network (LON) partners gathered in Lilongwe and updated the algorithm, which is now being used to inform revision of national-level guidelines that incorporate use of new diagnostic technologies.

- IDDS hosted a DNA self-assessment process workshop in Lilongwe, during which the project trained 24 participants (6 female) who then conducted the self-assessment. Self-assessment participants included representatives from NTLEP and NTRL, two district-level health workers and one community-level health worker, TB laboratory supervisors, and other implementing partners.

- To improve access to TB screening, IDDS concluded the bidding process for a contractor to complete X-ray room refurbishments at Ekwendeni Hospital. IDDS procured an X-ray machine, which arrived in the country in the last week of September 2022 and will be transported to Ekwendeni Hospital upon clearing customs.

IDDS visit to Ekwendeni Mission Hospital in Malawi. Photo by IDDS.

Challenges

- Fuel shortages interrupted the project team's ability to collect baseline data from supported sites. By the end of the fiscal year, IDDS had collected data from 65 percent of the 54 supported sites and will complete the remainder of baseline data collection during future routine data collection efforts.

What We Learned

- Close collaboration with NTLEP and other implementing partners is key for sustainability and effective implementation. For pediatric TB activities, IDDS worked with NTLEP to deliver stool-based pediatric TB detection training, which included site assessments and briefing of research committees at nine sites. IDDS is also working with the USAID-funded partners TB LON 1 and TB LON 2 for all planning and implementation, which has helped address identified bottlenecks.

PARTNERS AND COLLABORATORS
- National Tuberculosis Program
- National Tuberculosis Reference Laboratory
- Tuberculosis Local Organization Networks

Output Data

64
People trained

Pediatric TB

1
Pilot conducted

Pediatric TB

1
TWG meeting held

Pediatric TB

/// MALI

Context

In Mali, IDDS works to improve detection of infectious diseases by introducing CBS and works to improve the quality of diagnostic services by conducting training, developing reference documents, and working across sectors to integrate best practices for human health and animal health surveillance.

"These commodities will be very useful for the government of Mali and our different partners to follow the disease's genomic trend in the country and make better decisions for disease-fighting measures."

—Etienne Coulibaly, director advisor with Mali's National Institute of Public Health, at a ceremony when IDDS handed over 2,000 test kits to enable COVID-19 genomic sequencing

Annual Highlights—GHS

Diagnostic

- To improve the lifespan of laboratory equipment, IDDS supported the Multisectoral Committee for Laboratory System Strengthening to conduct biannual equipment maintenance follow-up visits to regional hospital laboratories (Ségou, Mopti, and Sikasso) that received equipment maintenance training with support from IDDS in FY 2019. The purpose of the visits was to evaluate activities accomplished since the training and provide coaching to laboratory staff.

Surveillance

- IDDS built capacity for early detection and reporting of diseases and events of public health importance by expanding CBS to two health districts. This year, 761 signals of possible events were sent by community health workers and verified by district health officials, compared to 469 in FY 2021.

- To improve data quality and information sharing, IDDS supported the General Directorate of Health and Public Hygiene to analyze and cross-check surveillance data and provide feedback to data managers at regional and district levels. With this support, partners in Mali developed 13 IDSR bulletins to share with decisionmakers in the national health system.

PARTNERS AND COLLABORATORS

- Ministry of Health and Social Development
- National Institute of Public Health

- To share Mali's experience in expanding CBS, IDDS and two government staff members presented at the West Africa Consortium for Clinical Research on Epidemic Pathogens in Yamoussoukro, Ivory Coast.

Challenges

- In two health districts, rates of "completeness" for daily messages sent by community health workers decreased but were addressed by a post-training supervisory visit and discussions of adjusting staff roles to mitigate the issue.

What We Learned

- Post-training supervisory visits are crucial to maintain high quality in activity implementation, especially at the community level.

Annual Highlights—ARP

Diagnostic

- To boost capacity for COVID-19 testing, IDDS equipped INSP with 7,000 COVID-19 RDTs and 5,000 general laboratory commodities (adhesive films for PCR plates and 1.5 mL cryotubes).

- To improve COVID-19 surveillance, IDDS provided logistics support and technical assistance to the General Directorate of Health and Public Hygiene to hold two four-day workshops on harmonization of COVID-19 data from national, subnational, and facility databases. IDDS also contracted with Nazounki Global Medical Network to install and configure a new laboratory information management system and provide in-person training for INSP staff.

- To share Mali's experience improving capacity for diagnosis of COVID-19, IDDS and two government staff members presented at the West Africa Consortium for Clinical Research on Epidemic Pathogens in Yamoussoukro, Ivory Coast.

Challenges

- IDDS experienced delays with other vendors before contracting with Nazounki Global Medical Network to install and configure the laboratory information management system.

What We Learned

- To minimize the risk of delay in co-funded activity implementation, it is important to have a guarantee with all key parties.

Annual Highlights—EVD

Diagnostic

- IDDS facilitated a PCR test training in coordination with INSP for 14 INSP and regional laboratory staff members (4 female) and procured the relevant EVD testing reagents to support the training. Participants were from central laboratories in Bamako and three regional hospitals in Mopti, Ségou, and Sikasso. The training combined theoretical and practical approaches and was well received by participants.

Surveillance

- IDDS staff traveled to Kangaba for two supervisory visits and met with referral health center staff, including 17 technical directors and 52 community health workers. During the supervisory visits, IDDS technical advisors reviewed the data collection and reporting processes and provided on-site coaching.

Output Data

306 People trained

Electronic reporting systems on COVID-19 (48)
EVD testing (14)
Data analysis and use (6)
CBS (238)

10 TWG meetings held

Equipment maintenance (1)
Commodity management (1)
QMS (2)
Other surveillance topics (3)
Other diagnostic topics (3)

233 Supportive supervision visits

Equipment maintenance (6)
Electronic reporting systems on CBS and indicator-based surveillance with DHIS 2 (212)
COVID-19 surveillance (15)

761 Signals of potential health events sent by CHW to district officials

4 Laboratories with improved diagnostic capacity
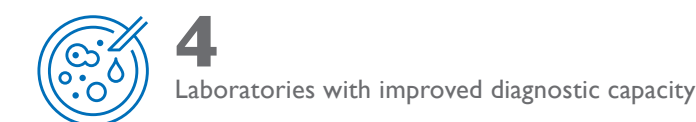
/// NIGERIA

Context

In Nigeria, IDDS is working to expand access to quality and timely TB diagnosis through introduction of new rapid molecular diagnostics and digital X-ray. IDDS is also building capacity to detect DR-TB.

"Ensuring TB diagnostic access to the hard-to-reach rural communities will be key in finding missing TB cases in Nigeria. The addition of Truenat to the TB diagnostic menu in the country is helping to address this key barrier to TB case finding."

—Dr. Bethrand Odume, executive director of KNCV Nigeria

Annual Highlights

Diagnostic

- IDDS expanded access to rapid molecular TB diagnostics in partnership with the KNCV TB Foundation and the Institute of Human Virology, Nigeria, by installing 38 Truenat instruments and co-hosting training of 39 trainers (11 female) who will transfer knowledge to end users and troubleshoot issues with Truenat instruments. IDDS also co-hosted direct training (cluster format) to 75 Truenat end users (30 female) and 28 state laboratory and implementing partner staff (8 female).
- IDDS tracked challenges with Truenat equipment and provided mentoring and supervisory visits throughout the year.

Challenges

- Truenat end users faced difficulty in adhering to guidance and SOPs on quality control immediately after installation, but this issue was addressed by supervisory visits.
- The Truenat platform is not yet incorporated into the EQA program, limiting the ability to identify issues with underperforming sites.

PARTNERS AND COLLABORATORS

- Institute of Human Virology, Nigeria
- KNCV Tuberculosis Foundation
- Stop TB Partnership

What We Learned

- Engagement of community gatekeepers and facility management greatly improved Truenat ownership and acceptability.
- Understaffed sites need ad hoc staff support to ensure continuous operation of Truenat.
- To improve quality and sustain performance across sites, incentives (non-financial and logistics support) are needed for private facilities and volunteers.

/// PAKISTAN

Context

IDDS is strengthening Pakistan's TB diagnostic network to better detect cases of pulmonary TB and identify DR-TB. To mobilize resources and improve quality across the network, IDDS is supporting a DNA and an LNSA, developing a five-year roadmap, and working to support laboratories to obtain ISO accreditation.

Annual Highlights

Diagnostic

- To improve quality across the diagnostic network, IDDS reviewed and revised 17 QMS documents, including technical and management SOPs, quality and biosafety manuals, and client handbooks.
- IDDS provided weekly training for one NRL and three provincial reference laboratories that are working toward accreditation. Fifty people have been trained through the QMS trainings.
- To strengthen sentinel surveillance of TB and DR-TB across the country, IDDS developed a draft protocol for a drug resistance survey and a protocol for sentinel surveillance at six pilot sites in the provinces.

What We Learned

- NTRL and the management staff of Pakistan have shown leadership qualities by being engaged in every activity, from documentation to QMS training. This buy-in is critical for the success of project activities.

PARTNERS AND COLLABORATORS

- National Tuberculosis Reference Laboratory
- Provincial reference laboratories
- Supranational Reference Laboratory in Milan

Output Data

50
People trained

QMS

17
SOPs, plans, and guidelines developed

Testing skills and procedures

IDDS supported TB diagnostic work in 16 countries in FY 2022. Photo by IDDS.

/// PHILIPPINES

Context

In the Philippines, IDDS worked with the government and other implementing partners to address challenges across the COVID-19 specimen referral and transport pathway. An innovative specimen transport model was designed and implemented to ensure functional and timely COVID-19 specimen processing and diagnosis. IDDS continues to support pandemic response through specimen collection and transport, procurement of essential supplies, and training and technical assistance.

> "It is crucial for laboratories like ours that we have the support of institutions like USAID to help make free RT-PCR testing for eligible patients a sustainable endeavor."
>
> —Dr. Marc Edsel Ayes, clinical genomics laboratory manager and clinical health officer, Philippine Genome Center

Annual Highlights

Diagnostic

- IDDS addressed critical gaps in the COVID-19 diagnostic network by collaborating with local government units and facilitating transport of 16,961 RT-PCR specimens from collection points to testing sites in six IDDS-supported provinces (Bulacan, Cavite, Isabela, Laguna, Palawan, and Rizal), and improved capacity for national surveillance by transporting 964 specimens for genomic sequencing.
- IDDS increased COVID-19 case detection by deploying mobile swabbers across 5 provinces to collect 11,536 specimens for RT-PCR and rapid antigen testing.
- To equip laboratories with supplies necessary for COVID-19 testing, IDDS handed over 6 automated extraction machines, 82,000 rapid antigen tests, 20,000 combination kits, 29,110 personal protective equipment (e.g., N95 masks, laboratory gowns), and 520 specimen transport boxes across 6 provinces.
- As part of the project's ongoing commitment to developing the local public health workforce, IDDS trained 183 health care workers (142 female) and 22 trainers (17 female) on COVID-19 specimen collection, packaging, and transport. IDDS also trained 97 health care workers (59 female) to test respirator fit and 27 health care workers (21 female) on biosafety and biosecurity.

PARTNERS AND COLLABORATORS

- Department of Health
- Lung Center of the Philippines
- Philippine Genome Center

Challenges

- After having trouble hiring qualified individuals as field implementation coordinators and mobile swabbers, which delayed the start of specimen collection and transport activities in five provinces, IDDS temporarily assigned medical technologists from the USAID-funded TB Innovations and Health Systems Strengthening Project to facilitate IDDS specimen transport and temporarily allowed staff from Isabela Provincial Health Office to facilitate specimen transport using the IDDS vehicle.

What We Learned

- Establishing a patient-centered, timely, and quality-assured specimen referral and transport system in a rapidly changing operating environment demanded collaboration on both the demand and supply sides of the prevailing COVID-19 crisis.

IDDS handed 50 specimen transport boxes to Laguna Provincial Epidemiology and Surveillance Unit in the Philippines. Photo by IDDS.

/// SENEGAL

Context

In Senegal, IDDS works to improve capacity for AMR detection and surveillance at nine sentinel surveillance sites and supports the national government in monitoring the data reporting submitted by district-level facilities. IDDS also works to expand CBS for infectious diseases and enhanced surveillance capacity for EVD by developing reporting systems for high-risk areas and points of entry.

> "IDDS' support is really appreciated because we did not have any SOPs for bacteriology testing, and further these SOPs will greatly promote the improvement of our quality management system where SOPs are a requirement for any testing process accomplished in the laboratory."
>
> —IDDS trainee from Mbour Health Center

Annual Highlights—GHS

Diagnostic

- IDDS boosted capacity for AMR detection and surveillance by adding two new laboratories (EPS1 Medina, Dakar region and EPS1 Mbour, Thies region) to the list of seven others that have completed all prerequisite activities to begin bacteriology testing. Patients in the vicinity of these 9 sites (out of 12 in the country) no longer need to travel to other districts or cities to access testing.

Surveillance

- To improve the quality of data reporting for priority diseases, IDDS trained 35 medical officers (15 female) across 2 medical regions (St. Louis and Kolda) on DHIS 2 quality modules, completing this work despite a labor strike. The training empowers MoH with complete, timely, and high-quality surveillance data to inform policies.

Challenges

- Working with the Directorate of Laboratories (DoL) requires coordination with other levels of government and is affected by a backlog of both DoL and IDDS activities that were delayed due to a health worker strike earlier in the year. IDDS addressed the issue by meeting with DoL and revising timelines.

PARTNERS AND COLLABORATORS

- Ministry of Health and Social Action

What We Learned

- Engagement with medical regions is fundamental for the field implementation of activities. Given the number of implementing partners, it is a best practice to closely work with the chief medical officers to schedule activities.
- Close monitoring of diagnostic facility activities enables IDDS to provide complete and timely AMR data to MoH.

Annual Highlights—EVD

Diagnostic

- IDDS provided financial and coordination support to MoH to incorporate hemorrhagic fevers into an SMS-based electronic warning system. Based on feedback from the Epidemiological Surveillance TWG, the SMS-based early warning system module for EVD and other hemorrhagic fevers was modified, updated, and added to the existing system in place for the COVID-19 pandemic.
- IDDS provided technical assistance to MoH to update EVD surveillance tools and materials and participated in a meeting to validate the tools in October 2021. The Directorate of Prevention disseminated the finalized tools to health districts.

Outcome Data

Senegal: Number of Specimens with Positive Culture for Priority Pathogens at IDDS Sites and Number of Specimens Received for Bacterial Culture at IDDS Sites

Legend:
— # specimens with positive culture for priority pathogens
— # specimens received for bacterial culture
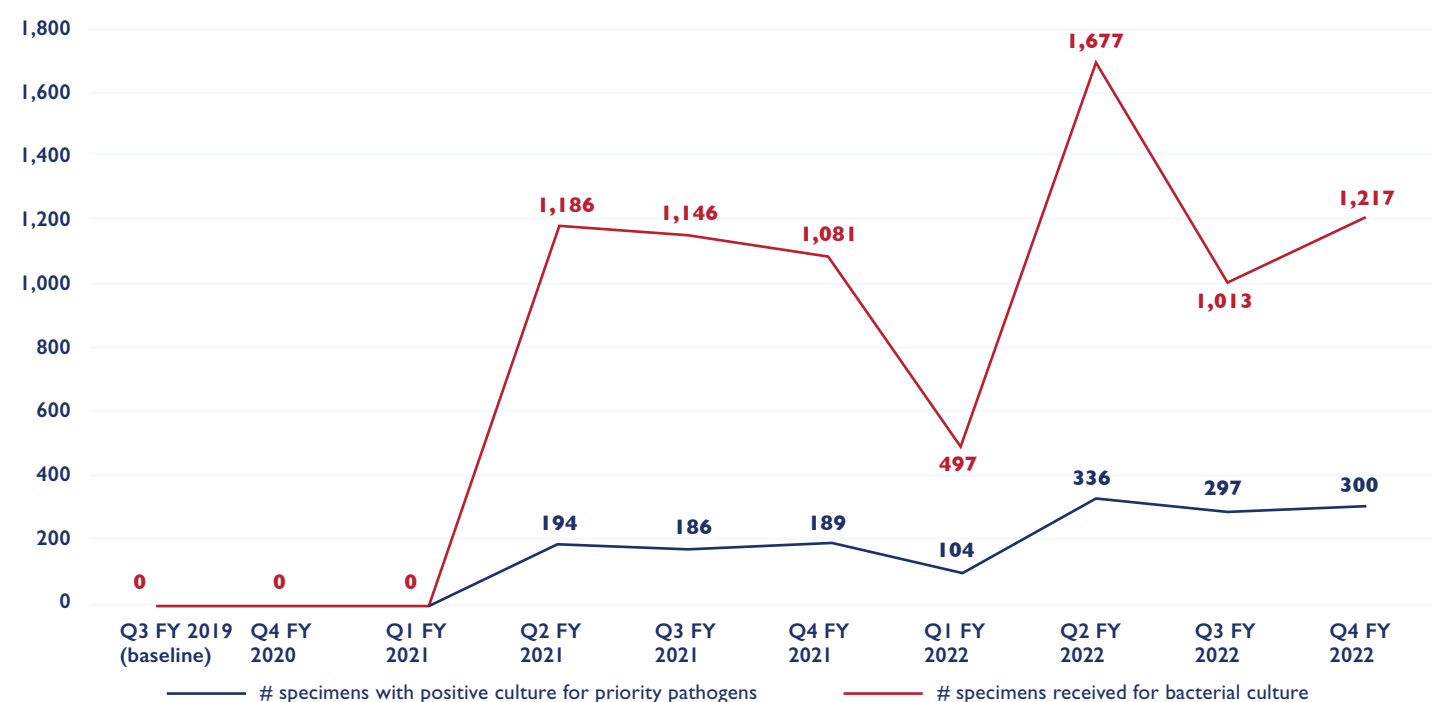
With IDDS support, five laboratories started performing bacterial culture in FY 2021, and one started in FY 2022. IDDS continues to work closely with the laboratories to improve their capacity.

Output Data

208
People trained

Electronic reporting systems (89)
Bacteriology testing (18)
Data quality for surveillance (101)

2
SOPs, plans, and guidelines developed

Electronic reporting systems for EVD

1
Assessment completed

Assessment of diagnostic testing capacity of two new AMR sites

9
Supportive supervision visits

Bacteriology testing (6)
Data quality for surveillance (3)

3
TWG meetings held

Electronic reporting systems for EVD

9
Laboratories with improved diagnostic capacity

/// TANZANIA

Context

In partnership with national programs and academic collaborators, IDDS is working to achieve universal access to TB diagnostic services in Tanzania by strengthening zonal and regional TB diagnostic capacity and building the capacity of four zonal laboratories, the Central TB Reference Laboratory, and their respective catchment areas.

"Hosting the GxAlert server locally will keep us more informed and improve technical troubleshooting and maintenance of the server."

—Collins Minja, information and communications technology officer at Tanzania National TB and Leprosy Program

Annual Highlights

Diagnostic

- To enhance the overall quality and capacity of TB testing, IDDS supported the dissemination of a TB DNA report and TB laboratory operational plan. The operationalization of the plan will enable the zonal laboratories to expand their scope of accredited services to include culture and LPA tests.

- IDDS is improving real-time TB results reporting and data use for patient management and TB program improvement. IDDS contributed to the installation and configuration of a GxAlert server/Aspect platform for TB diagnostic connectivity with the new TB diagnostic technologies in the country's TB diagnostic network.

Challenges

- After experiencing delays in planned activities, IDDS focused on technical review and submission of FY 2021 deliverables and continued to engage stakeholders to align and coordinate the planned activities with government priorities and avoid duplication of efforts.

What We Learned

- Digital applications improve data quality and use.

- Engagement of stakeholders prior to implementation of planned activities ensures that work is streamlined and aligned with national priorities and avoids duplication of efforts.

- The monthly reviews of functionality, access, and utilization of TB molecular platforms led by IDDS were helpful in identifying implementation challenges. These challenges were discussed during TWG meetings, and corrective measures were identified.

PARTNERS AND COLLABORATORS

- Ministry of Health
- Baylor University
- Global Fund to Fight AIDS, Tuberculosis and Malaria
- National Tuberculosis and Leprosy Program
- Tanzania Health Promotion Support
- USAID Comprehensive Client-Centered Health Program

Output Data

19
People trained

QMS

28
People mentored

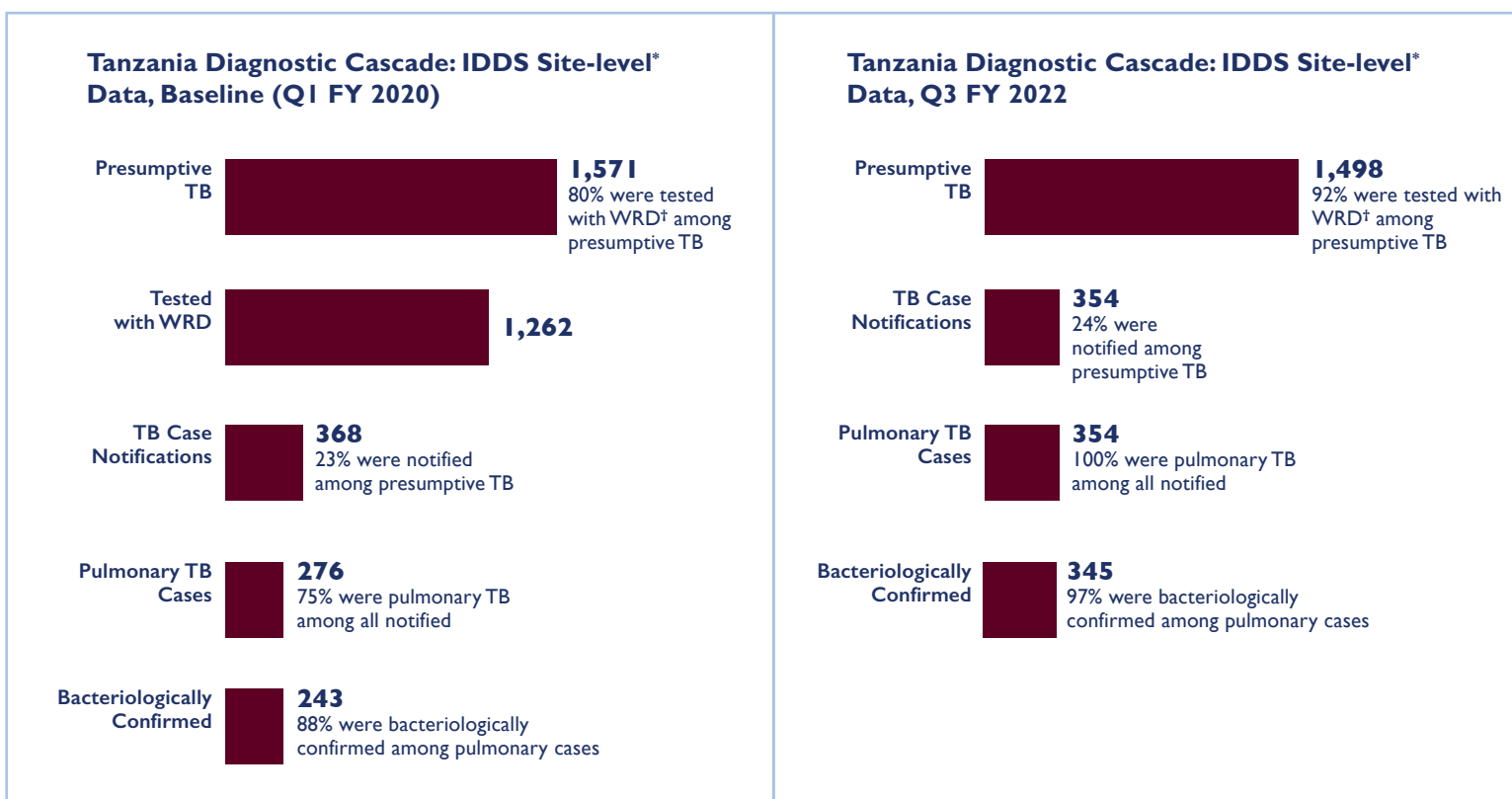Testing skills and procedures

1
TWG meeting held

TB diagnostic network

5
Laboratories with improved diagnostic capacity

Outcome Data
Outcome data are provided through Q3 FY 2022.

Tanzania Diagnostic Cascade: IDDS Site-level* Data, Baseline (Q1 FY 2020)

Presumptive TB — **1,571** 80% were tested with WRD† among presumptive TB

Tested with WRD — **1,262**

TB Case Notifications — **368** 23% were notified among presumptive TB

Pulmonary TB Cases — **276** 75% were pulmonary TB among all notified

Bacteriologically Confirmed — **243** 88% were bacteriologically confirmed among pulmonary cases

Tanzania Diagnostic Cascade: IDDS Site-level* Data, Q3 FY 2022

Presumptive TB — **1,498** 92% were tested with WRD† among presumptive TB

TB Case Notifications — **354** 24% were notified among presumptive TB

Pulmonary TB Cases — **354** 100% were pulmonary TB among all notified

Bacteriologically Confirmed — **345** 97% were bacteriologically confirmed among pulmonary cases

*Tanzania IDDS sites: five diagnostic sites (four zonal reference laboratories and one national reference laboratory).
†WRD: WHO-recommended RDTs.

IDDS interventions in supported laboratories in Tanzania contributed to increased testing with WHO-recommended RDTs from 80 percent at the baseline (Q1 FY 2020) to 92 percent in Q3 FY 2022. Bacteriological confirmations also increased from 88 percent at the baseline to 97 percent during Q3.

National staff training on TB data in Arusha, Tanzania, October 2022. Photo by IDDS.

/// TANZANIA

Context

In Tanzania, IDDS works to strengthen laboratory and surveillance capacities by supporting the National AMR Surveillance Framework and enabling detection of AMR priority pathogens at four supported sites. In FY 2022, IDDS also supported Tanzania's COVID-19 response with training, technical assistance, and procurement of COVID 19 laboratory commodities to support collection and testing sites.

"I was pleased to learn about the AMR surveillance and how Maweni (Kigoma Regional Hospital) utilizes WHONET to track and analyze AMR, and they are on track to develop an antimicrobial formulary using this data that will be reviewed and revised at least bi-annually."

—Carrie Reed, USAID senior infectious disease advisor and U.S. mission representative

Annual Highlights—GHS

Diagnostic

- IDDS contributed to uninterrupted testing of AMR at four IDDS-supported sites throughout the FY. IDDS equipped laboratories with essential supplies, conducted supportive supervision and mentorship, and provided inventory management so that the sites could better forecast and manage their laboratory supplies. IDDS also supported equipment repair, which helped ensure its continued functionality, leading to uninterrupted testing in support of the country's core GHS capacities.

Surveillance

- To improve capacity for monitoring priority pathogens at the national level, IDDS supported the establishment of SOPs, protocols, and databases for surveillance data; a system for reporting to MoH; and a mechanism to analyze data and report back to facilities and WHO. These activities improved data quality, enabling reporting nationally and to GLASS (globally).

What We Learned

- Quality AMR data can enhance utilization of laboratory services because clinicians, nurses, and program staff are more confident in relying on the data in their decision-making and patient management. IDDS can then make the case for additional investment by local authorities and hospital management to sustain the interventions through local ownership and management.

PARTNERS AND COLLABORATORS

- Ministry of Health
- American Society for Microbiology
- Catholic University of Health and Allied Sciences
- Kilimanjaro Christian Medical College
- National Public Health Laboratory
- Muhimbili University of Health and Allied Sciences
- Sokoine University of Agriculture and National Institute for Medical Research
- USAID Medicines, Technologies, and Pharmaceutical Services Program

- Joint site visits by the national government, USAID mission, and collaborating partners enhance collaboration, information sharing, and data use across projects and interventions, not only at the national level but also at the facility level.
- A national coordination mechanism, such as Tanzania's Multisectoral Coordination Committee, is one of the most useful platforms for highlighting best practices and lessons learned in the implementation of project activities. These platforms can influence AMR policies and plans.
- Data review workshops and mentorships are an effective way to address the quality of data reported from the subnational level in which staff capacity is inadequate.

Annual Highlights—ARP

Diagnostic

- To boost COVID-19 diagnostic capacity, IDDS delivered 44,960 auxiliary diagnostic testing commodities and laboratory supplies to NPHL to be redistributed to 7 decentralized PCR testing laboratories.
- To improve quality across the network, IDDS drafted, validated, and distributed a specimen management procedure for PCR testing and genomic sequencing and held a workshop to disseminate guidance to the MoH Laboratory Services Unit, NPHL, regional laboratory coordinators, and PCR testing laboratories.

- To maintain COVID-19 diagnostic capacity, IDDS collaborated with NPHL and Sokoine University of Agriculture to provide advanced and refresher training on PCR COVID-19 testing for 21 laboratory technicians (4 female) and trained 17 staff (5 female) from subnational laboratories to properly manage inventory to avoid commodity shortages.

- IDDS maintained high standards for COVID-19 testing across the diagnostic network through technical support for specimen collection, packaging, storage, and transport. Technical support was provided during supervisory visits to 21 facilities across 5 regions (Mtwara, Lindi, Geita, Katavi, and Rukwa).

Outcome Data

Tanzania: Number of Specimens with Positive Culture for Priority Pathogens at IDDS Sites and Number of Specimens Received for Bacterial Culture at IDDS Sites

specimens with positive culture for priority pathogens — # specimens received for bacterial culture
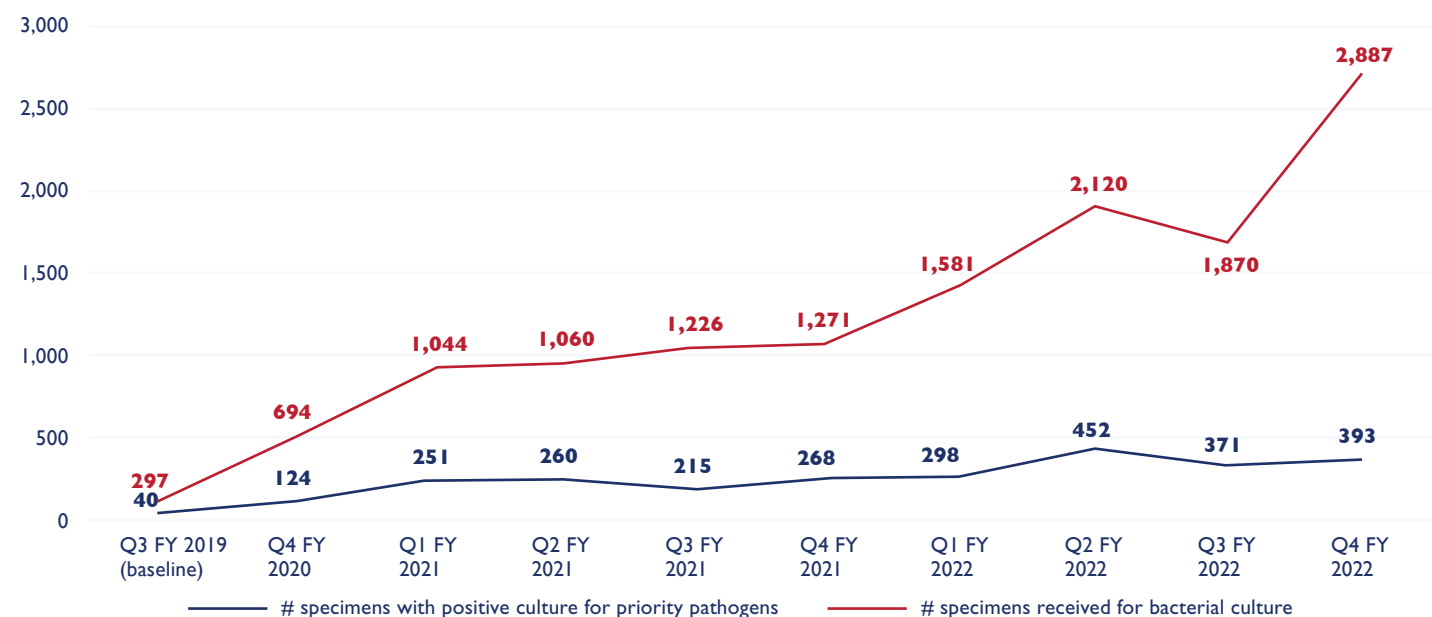
IDDS strengthened capacity for bacteriology testing in four laboratories in Tanzania, which has resulted in increased testing and detection of priority pathogens. At baseline, the four supported laboratories were conducting bacterial culture on urine specimens only and now are able to conduct other types of culture testing, including cultures on blood specimens.

Output Data

66 People trained

Commodity management (12)
COVID-19 testing (21)
QMS (16)
COVID-19 diagnostics (17)

2 SOPs, plans, and guidelines developed

Bacteriology testing (1)
SRS for COVID-19 (1)

1 Assessment completed

Capacity and gap assessment of two veterinary laboratories

9 Supportive supervision visits

Data quality (4)
SRS for COVID-19 (5)

8 TWG meetings held

Commodity management (1)
Data quality (1)
SRS for COVID-19 (4)
AMR surveillance case definitions (1)
National Action Plan on AMR (1)

8 People mentored

Testing skills and AMR surveillance

4 Laboratories with improved diagnostic capacity

/// **THAILAND**

Context

IDDS supported the Thailand Department of Medical Sciences under the Ministry of Public Health to establish a network of RPHLs covering Southeast Asia. The RPHL Network builds regional collaboration for global health security among member countries in the Association of Southeast Asian Nations to strengthen national laboratory systems to perform timely detection of infectious diseases by enhancing collaboration, knowledge sharing, communication, and capacity building.

> "I am very pleased to see the Regional Public Health Laboratory Network stimulating collaboration on laboratory improvements either bilaterally or regionally—good work."
>
> —Dr. Opart Kankawinpong, director general of the Department of Medical Sciences, Ministry of Public Health

Annual Highlights

Surveillance

- To facilitate international collaboration on global health security, IDDS continued its support in FY 2022 Q1 to the RPHL Network, which facilitated its fourteenth video conference in October 2021 for 19 participants (14 female) from Brunei Darussalam, Burma, Singapore, the Philippines, Nepal, and Thailand. A virtual technical session, "COVID-19 Laboratory Diagnosis in the Association of Southeast Asian Nations Countries," was delivered by the director of the Thai National Institute of Health.

- IDDS also supported the RPHL Secretariat to obtain inputs from 39 member and non-member representatives on how to improve the network and sustain its existence. Findings were shared at the RPHL annual meeting to 148 on-site and virtual attendees, during which successes of the network were shared.

- As part of the closeout process, IDDS developed and operationalized a transition plan to successfully transfer responsibilities of the RPHL Network, including website management, to the RPHL Secretariat and Department of Medical Sciences team.

PARTNERS AND COLLABORATORS

- Department of Medical Sciences
- USAID Regional Development Mission for Asia
- U.S. Centers for Disease Control and Prevention
- World Health Organization

Challenges

- A staff transition within the National Institute of Health and the Department of Medical Sciences interrupted institutional knowledge of RPHL activities and required new relationship building.

- There was also a transition of the staff responsible for the RPHL website, necessitating IDDS re-training for new staff and re-distribution of relevant guidance documentation.

What We Learned

- Staff turnover within Thai ministries necessitated additional planning time and budgeting for refresher training for new staff.

- There were many uncertainties during the COVID-19 pandemic for organizing in-person meetings and workshops. Therefore, a risk mitigation plan should be ready in case an in-person meeting is not allowed due to COVID-19 restrictions.

- Handing over the project activities to the government or stakeholders is a slow process; early consultation with the counterparts and stakeholders is helpful.

/// UGANDA

Context

In Uganda, IDDS works to improve diagnostics for priority pathogens and integrate disease surveillance across the human health and animal health sectors through quality assurance, creation and implementation of national guidance, and improvement of data quality.

"I would like to thank the IDDS project for the continuous support given to veterinary laboratory services and for enrolling the regional veterinary laboratories of Gulu, Mbale, Mbarara, and Moroto in a quality management system program that I hope will ultimately lead to accreditation of these animal health laboratories."

—Dr. Susan Nabadda, commissioner of laboratory services/executive director, National Health Laboratory and Diagnostic Services of the Ministry of Health

Annual Highlights

Diagnostic

- IDDS contributed to continuous quality improvement by training 11 auditors (2 female) who will monitor veterinary laboratories' compliance with ISO standards.
- To advance laboratories' efforts to achieve accreditation, IDDS conducted an annual management review meeting, a key step in harnessing ministry support for laboratory improvements.

Surveillance

- To improve the quality and validity of data reports from districts, IDDS upgraded an electronic system for indicator-based surveillance. This saves the districts time and provides key insights for the National Animal Disease Diagnostics and Epidemiology Center.
- To enhance cross-sector coordination and collaboration among One Health stakeholders, IDDS established and trained district One Health teams in Mbale and Kazo districts.

What We Learned

- The involvement of top sectoral leadership and ensuring their commitment toward the implementation of QMS is paramount for success across all project activities, as this will harmonize efforts and contribute to the ability to sustain activities with in-country resources.

PARTNERS AND COLLABORATORS

- Ministry of Health
- Ministry of Agriculture, Animal Industries and Fisheries
- Ministry of Water and Environment
- National Livestock Research Resources Institute
- National One Health Plan
- Uganda Wildlife Authority
- District local governments (Mbale, Moroto, Gulu, and Mbarara)
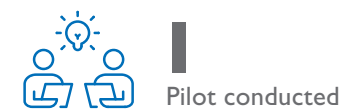
Output Data

201 People trained
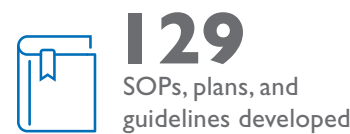
Electronic reporting systems (60)
Data analysis and use (24)
QMS and EQA (64)
Biosafety and biosecurity (13)
One Health surveillance approach (40)

129 SOPs, plans, and guidelines developed

Equipment maintenance (6)
Commodity management (3)
Testing (22)
QMS (8)
Biosafety and biosecurity (89)
Data analysis and use (1)

5 Supportive supervision visits

QMS (1)
Data analysis and use (4)

8 TWG meetings held

Electronic reporting systems (2)
Data analysis and use (5)
QMS (1)

1 Pilot conducted

Electronic reporting systems

34 People mentored

QMS and equipment maintenance

5 Laboratories with improved diagnostic capacity

/// VIETNAM

Context

In Vietnam, IDDS strengthened the TB diagnostic laboratory network and surveillance and reporting systems in line with the National Strategic Plan. TB activities in Vietnam closed out at the end of the fiscal year.

"Previously, it was very difficult to collect sputum or gastric aspirate in small children, and it could only be performed at the hospital. However, now it is easy to collect stool samples from children of any age at home—and the children do not need to go to the hospital."

—Dr. Nguyen Thi Tham, a laboratory technician from Nghe An Hospital

Annual Highlights

Diagnostic

- To improve detection of TB cases among children, especially those who are under five years of age and have difficulty producing sputum for TB testing, IDDS supported implementation of stool GX testing for pediatric TB patients in 13 laboratories in 5 provinces.
- In collaboration with the Stop TB Partnership, IDDS increased capacity for TB screening by providing training and implementing ultra-portable X-ray with CAD-AI software at 10 sites. These sites are now able to use ultra-portable X-ray with CAD-AI software for TB case finding.
- IDDS completed a study on trace results analysis and developed recommended updates to the diagnostic algorithm that account for GX trace results.
- To improve capacity for detecting DR-TB, IDDS finalized the landscape assessment report for next-generation sequencing application for DR-TB surveillance.
- IDDS increased the coverage and capacity of the diagnostic system for bacteriological confirmation of TB through the rollout of Truenat technology to 28 sites. These sites are now capable of using Truenat to diagnose TB and detect RIF-resistant TB.

PARTNERS AND COLLABORATORS

- National Institute of Hygiene and Epidemiology
- National Tuberculosis Program
- Pasteur Institute (Nha Trang and Ho Chi Minh City)

Challenges

- Delayed responses from NTP due to heavy workload and staffing challenges slowed progress. IDDS followed up with NTP to expedite timelines as much as possible.
- NTP did not renew the contract with SystemOne, the vendor designated to support the implementation of the specimen referral network, delaying its launch. IDDS and NTP discussed the implementation of the SRS with TekMax, a company that agreed to support the specimen referral network by providing their specimen management software (TB Trans).
- The slow approval process for the Truenat instruments delayed implementation in some districts.

What We Learned

- Implementation timelines need to account for the long approval process for importing diagnostic equipment and other commodities to Vietnam.
- Project closeout planning should account for established service contracts and monitoring and evaluation data collection to ensure an efficient transition process.

Outcome data
Outcome data are provided through Q3 FY 2022.

Vietnam Diagnostic Cascade: IDDS Site-level* Data, Baseline (Q2 FY 2020)

Presumptive TB — **36,239**
1% were tested with WRD† among presumptive TB

TB Case Notifications — **4,304**
12% were notified among presumptive TB

Pulmonary TB Cases — **3,466**
81% were pulmonary TB among all notified

Bacteriologically Confirmed — **2,740**
79% were bacteriologically confirmed among pulmonary cases

Vietnam Diagnostic Cascade: IDDS Site-level* Data, Q3 FY 2022

Presumptive TB — **20,339**
74% were tested with WRD† among presumptive TB

TB Case Notifications — **4,917**
24% were notified among presumptive TB

Pulmonary TB Cases — **4,291**
87% were pulmonary TB among all notified

Bacteriologically Confirmed — **3,756**
88% were bacteriologically confirmed among pulmonary cases

*IDDS-supported sites in Vietnam are laboratories from seven provinces.
†WRD: WHO-recommended RDTs.

IDDS interventions in Vietnam contributed to improvement in the rate of testing with WHO-recommended RDTs in IDDS-supported provinces from only 1 percent at the baseline (Q2 FY 2020) to 74 percent in Q3 FY 2022, thereby increasing bacteriological confirmation from 79 percent to 88 percent during the same period.

Output Data

44 People trained
QMS (19)
AI-assisted chest X-ray (25)

8 TWG meetings held
New diagnostic tools - AI-assisted chest X-ray and Truenat (7)
Pediatric TB (1)

13 Laboratories with improved diagnostic capacity*

1 SOP developed
AI-assisted chest X-ray

1 Pilot conducted
AI-assisted chest X-ray

6 Supportive supervision visits
New diagnostic tools - AI-assisted chest X-ray (4) and Truenat (2)

4 Assessments completed
GX Ultra trace results (1)
Next-generation genome sequencing (1)
AI-assisted chest X-ray (1)
TB DNA (1)

*The sites are pediatric TB laboratories.

/// VIETNAM

Context

In Vietnam, IDDS is working to improve electronic surveillance of priority pathogens across human health and animal health sectors, implement EBS, and launch innovative SRSs. IDDS also supported Vietnam's COVID-19 response by developing an operational plan for COVID-19 testing on the GX platform and an EQA scheme based on a sustainable re-testing approach.

> "IDDS SRS helps me a lot. I do not need to travel to Thai Nguyen City and back (at least four hours) every time I want to have some tests done at Thai Nguyen CDC. I have more time to complete my daily duty as the only laboratory staff."

> —Loc Thi Thuy, Dinh Hoa District Medical Center's sole laboratory staff member, who spent long days collecting and transporting COVID-19 specimens prior to IDDS' launch of an SRS

Annual Highlights

Diagnostic

- IDDS filled a critical gap in the diagnostic system by piloting a new SRS in three provinces for both human and animal specimens. Through the use of a private courier company, the system improves biosecurity, supports rapid laboratory results to inform patient management, and frees up human resources to increase diagnostic capacity at supported laboratories.

Surveillance

- To capture critical information for monitoring the spread of infectious diseases, IDDS empowered 41 districts with the skills they will need to begin reporting outbreak information into VAHIS. For the first time, national and regional stakeholders will be able to access data from lower levels to inform a coordinated public health response.

- IDDS also improved the quality of data reporting by providing technical support to the Department of Animal Health to improve the software functionality and user interface for VAHIS. The improvements smoothed the data entry and management workflows, which will improve the timeliness and completeness of data reports across five provinces. In FY 2022, 185 outbreaks were reported into VAHIS from 5 provinces including outbreaks of African swine fever, lumpy skin disease, and rabies.

PARTNERS AND COLLABORATORS
- Ministry of Health
- Ministry of Agriculture and Rural Development

Challenges

- Some specimen shipments by Nhat Tin Logistics did not meet the required delivery times. IDDS is working with Nhat Tin Logistics to create cut-off tables that determine the times at which specimens should be ready for pickup and is working to establish an optimized delivery route that omits unnecessary stops.

- Administrative procedures for MoH and relevant agencies are under intense scrutiny following a COVID-19 procurement scandal, leading to hesitation across local provinces to initiate new project activities that are not defined in MoH guidelines.

What We Learned

- Political will and mobilization of human resources by the government and leaders at IDDS-supported sites are crucial for smooth implementation of the specimen referral pilot.

Output Data

486 People trained
Electronic reporting systems (68)
SRS (355)
Data quality (63)

16 SOPs, plans, and guidelines developed
SRS

125 People mentored
Electronic reporting (26)
SRS (45)
Data quality (54)

185 Outbreaks reported into VAHIS

49 TWG meetings held
Electronic reporting systems (4)
Data quality (6)
SRS (39)

2 Pilots conducted
Human health referral systems (1)
Animal health referral systems (1)

29 Supportive supervision visits
SRS (16)
Electronic referral systems (1)
Data quality (12)

/// ZIMBABWE

Context

IDDS is supporting strengthening of the Zimbabwe national TB diagnostic network to be accessible, accurate, adaptable, timely, and integrated for TB and multidrug-resistant TB diagnosis.

"[Truenat] is saving lives and it has made an impact in terms of TB diagnosis so that TB treatment is offered earlier."

—Tanaka Sakubani, national tuberculosis laboratories coordinator, Zimbabwe Ministry of Health and Child Care

Annual Highlights

Diagnostic

- To improve quality across the diagnostic network, IDDS supported the development of the National TB Testing Manual, which contains SOPs for TB testing to be accessed and used by laboratories at all levels of the diagnostic network.
- To mobilize resources for improving access to TB diagnostic services, IDDS supported the revision of the TB-HIV Public-Private Partnership Framework (2022–2025).
- IDDS contributed to expanded diagnostic services through its capacity building activities at Bulawayo NTRL, which was recommended for international accreditation by the Southern African Development Community Accreditation Service.
- To expand access to rapid molecular diagnostics, IDDS supported the introduction of 20 Truenat instruments and trained, through Core TB funds, a cadre of 22 (7 female) national and district-level TB molecular diagnostic subject matter experts (super-users) to provide ongoing supervision and mentorship to the laboratories.
- IDDS laid the groundwork for advancing understanding of technical issues by enrolling 40 participants in the GX MTB/RIF Ultra "Trace Call" study across five sites. The study will inform development of a revised diagnostic network algorithm that accounts for TB trace results.

Challenges

- Differences in reporting timelines by NTP and the IDDS Monitoring, Evaluation, and Learning team necessitated additional efforts to align and verify data.
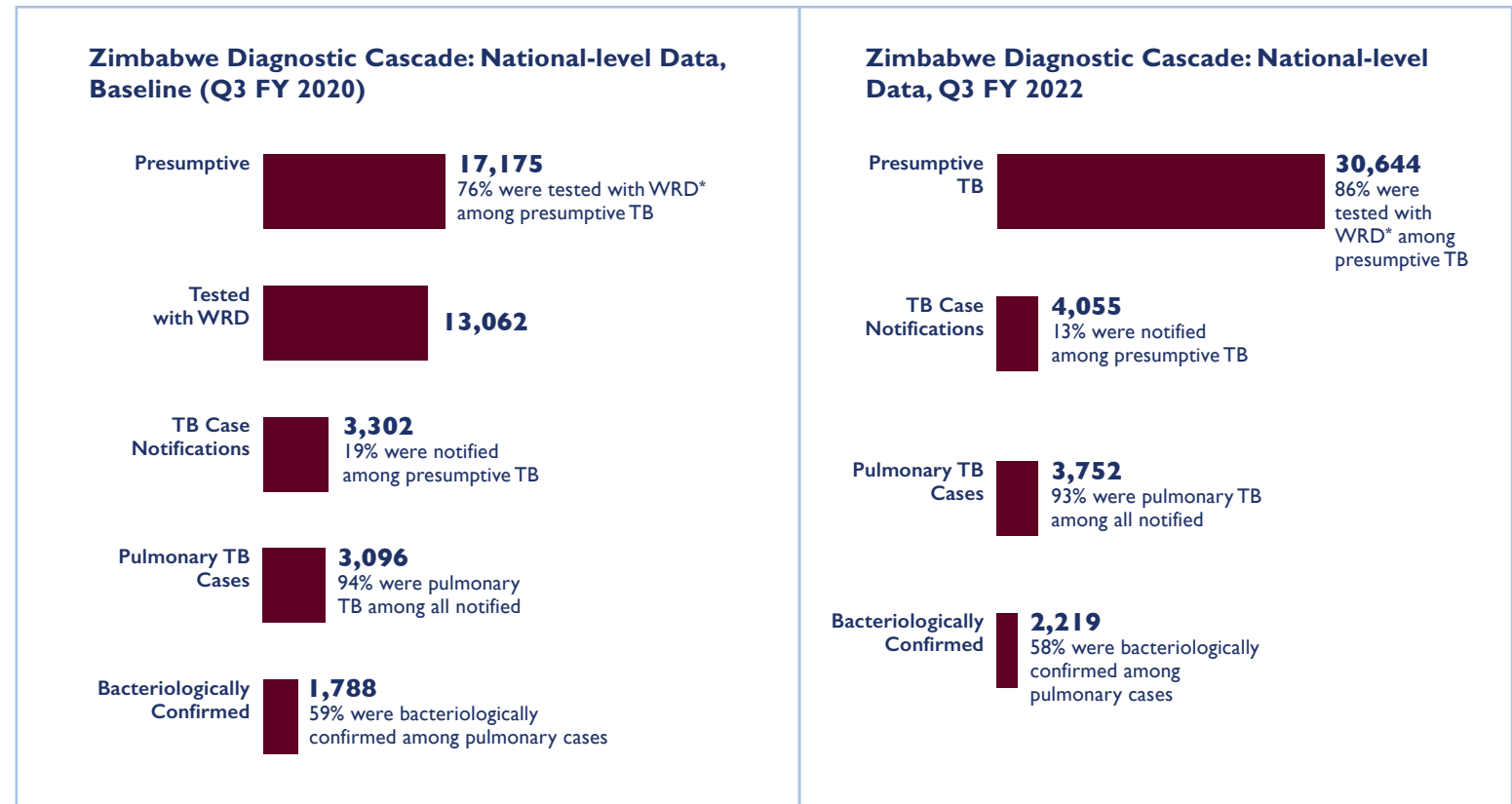
PARTNERS AND COLLABORATORS

- Ministry of Health and Child Care
- AIDS and Tuberculosis Programs
- Biomedical Research and Training Institute
- Chemonics
- Clinical and Laboratory Standards Institute
- Clinton Health Access Initiative
- Elizabeth Glaser Pediatric AIDS Foundation
- Jointed Hands Welfare Organization
- National Tuberculosis Control Program
- The Union Zimbabwe Trust
- USAID Tuberculosis Implementation Framework Agreement
- U.S. Centers for Disease Control and Prevention
- World Health Organization
- Zimbabwe National Quality Assurance Program

What We Learned

- Collaborating with the Ministry of Health and Child Care for development of work plans has reduced duplication of TB activities.
- Engaging with USAID implementing partners can build additional support (including financial support) for TB activities.

Outcome Data

Outcome data are provided through Q3 FY 2022.

Zimbabwe Diagnostic Cascade: National-level Data, Baseline (Q3 FY 2020)

Presumptive — **17,175** 76% were tested with WRD* among presumptive TB

Tested with WRD — **13,062**

TB Case Notifications — **3,302** 19% were notified among presumptive TB

Pulmonary TB Cases — **3,096** 94% were pulmonary TB among all notified

Bacteriologically Confirmed — **1,788** 59% were bacteriologically confirmed among pulmonary cases

Zimbabwe Diagnostic Cascade: National-level Data, Q3 FY 2022

Presumptive TB — **30,644** 86% were tested with WRD* among presumptive TB

TB Case Notifications — **4,055** 13% were notified among presumptive TB

Pulmonary TB Cases — **3,752** 93% were pulmonary TB among all notified

Bacteriologically Confirmed — **2,219** 58% were bacteriologically confirmed among pulmonary cases

*WRD: WHO-recommended RDTs.

The proportion of presumptive TB cases tested with WHO-recommended RDTs increased from 76 percent at the baseline (Q3 FY 2020) to 86 percent in Q3 FY 2022. During the same period, there were increases in the number of TB case notifications from 3,302 to 4,055; in pulmonary TB cases from 3,096 to 3,752; and in bacteriologically confirmed cases from 1,788 to 2,219.

Output Data

224 People trained

QMS (77)
TB diagnostic connectivity solutions (96)
Biosafety (19)
Operational research (32)

178 Supportive supervision visits

TB diagnostic connectivity solutions (70)
QMS (79)
New diagnostic tools - Truenat (19)
Truenat result study (10)

5 SOPs, plans, and guidelines developed

Testing skills and procedures (4)
QMS (1)

2 TWG meetings held

TB testing (1)
GX Ultra trace results study (1)

24 Laboratories with improved diagnostic capacity*

1 Pilot conducted

Clinically diagnosed TB study

*NTRL plus 23 laboratories in Harare are receiving mentorship/training/supervision.

⫻ CORE TB

Context

Through Core TB funding, IDDS works with NTPs to create comprehensive national TB and DR-TB diagnostic networks by developing laboratory strategic plans, DNAs, and roadmaps; introducing and scaling up new diagnostic technologies and techniques; and strengthening laboratory systems to deliver efficient and quality testing for all potential TB cases. As a global leader in improving the capacity and quality of TB diagnostic networks, IDDS conducts operational research on implementation of new technologies and regularly presents evidence to advance solutions to problems in TB diagnostics.

"We have served so many patients since the day we received the [Truenat] machine. They are having their treatment right now and most of them have recovered."

— Peter Chipaka, laboratory microscopist at the Madziwa Clinic in Zimbabwe

Annual Highlights

Diagnostic

- IDDS built capacity for detecting TB and DR-TB by providing support for Truenat implementation across 278 health facilities in 9 countries. IDDS trained 374 laboratory and NTP staff (168 female) to conduct Truenat testing in Cambodia, DRC, Kenya, Nigeria, Uganda, Vietnam, and Zimbabwe and trained 98 Truenat super-users (21 female) in Cambodia, DRC, Kenya, Uganda, and Zimbabwe. These super-users are providing technical support in troubleshooting issues with equipment and mentoring laboratory staff who use Truenat MTB Plus and Truenat MTB/RIF Dx assays.

- IDDS improved quality across TB diagnostic networks by enrolling introducing New Tools Project countries in EQA and providing EQA panels, as well as by training 152 people (59 female) on SmartSpot EQA reporting procedures and 13 (3 female) on key performance indicators. Four countries have completed one cycle of EQA, and 71 percent of Truenat sites in these countries have achieved passing or acceptable scores.

PARTNERS AND COLLABORATORS

- National Tuberculosis Programs in Bangladesh, Burma, Cambodia, DRC, Ethiopia, India, Kenya, Malawi, Nigeria, Pakistan, the Philippines, Tanzania, Uganda, Vietnam, Zambia, and Zimbabwe
- Stop TB Partnership
- USAID introducing New Tools Project

- IDDS improved capacity for detecting DR-TB by conducting a workshop to review and revise Malawi's diagnostic algorithm. Seventeen participants from NTEP, NTRL, and LON partners gathered in Lilongwe and updated the algorithm, which is now being used to inform revision of national-level guidelines that incorporate use of new diagnostic technologies.

- To improve quality across the TB diagnostic network in Pakistan and increase clinician confidence in utilizing test results to inform patient management, IDDS created quality systems documentation and training to support laboratories' journey to accreditation in alignment with international standards.

- IDDS assisted several countries—Burma, DRC, Ethiopia, Kenya, Malawi, the Philippines, Tanzania, and Zambia—to develop LNSAs of rapid molecular diagnostic services such as GX and Truenat and identified opportunities for the countries to expand and improve these services for TB. IDDS is planning for LNSAs in Uganda and Zimbabwe.

- In Ethiopia, IDDS built capacity for self-assessment of the TB diagnostic network and provided recommendations for improving practices, methods, and systems of the TB diagnostic network.

- IDDS built capacity to detect childhood pulmonary TB by training 11 laboratory technicians and clinicians (5 female) on the Simple One-step Process for Stool Testing (a method for detecting MTB complex in stool) in DRC and 50 people in Malawi, including 28 laboratory technicians (4 female), 9 clinicians (2 female), and representatives from NTLEP, NTP, and other implementing partners. The capacity to diagnose TB using stool specimens will enable countries to increase bacteriological confirmation of TB and lead to improved outcomes for children with TB.

Challenges

- In Vietnam, NTP has not yet approved Truenat sites to begin project implementation. Four EQA panels that had already been shipped by SmartSpot have not been distributed due to delayed approval. IDDS redistributed the four panels to TekMax to be used for super-user training and paused the shipment of the remaining 34 panels until NTP approval is obtained.

- The Philippines implemented Truenat testing but did not implement EQA testing right away, because partners wanted to train super-users first and later distribute the EQA panels during supervisory site visits. After IDDS educated partners about the importance of conducting EQA shortly after installation, the program agreed to receive all 3 cycles of EQA panels for 22 sites and will conduct 1 cycle per month during October to December 2022.

- In Cambodia, activities to improve detection of DR-TB have progressed slowly, but IDDS has hired a diagnostic specialist in the country to support both DR-TB and field-funded activities, which should expedite progress.

What We Learned

- Providing virtual training to end users and group managers and in-person training to super-users has improved Truenat EQA reporting rates.

- Collecting data on errors and failures of the Truenat instruments in the field is valuable to better understand challenges and work with stakeholders to develop solutions to reduce recurrences.

- Including all stakeholders at the start of an activity and ensuring their buy-in can delay implementation (as was observed in Pakistan for DR-TB activities), but it remains valuable in the long term because once activities begin, they move much more quickly since stakeholders have reached consensus.

Output Data

890 People trained

New diagnostic tools - Truenat and X-ray CAD (766)
Pediatric TB testing (61)
TB DNA implementation (63)

5 SOPs, plans, and guidelines developed

Pediatric TB testing (3)
Truenat implementation (1)
Radiography (1)

7 TWG meetings held

DR-TB strategy

14 Technical presentations

The Union World Conference on Lung Health (6)
Spatial analysis webinar (1)
International Conference on Emerging Infectious Diseases (1)
Network analysis (6)

1 Pilot conducted

Pediatric TB testing

5 Assessments completed

LNSA (4)
TB DNA (1)

/// MIDDLE EAST AND NORTH AFRICA

Context

IDDS is leading the development of a regionalized tool for DNAs in USAID's Middle East and North Africa (MENA) region, which will be used to evaluate the capacity and functionality of countries' diagnostic networks and preparedness to respond to high-risk emerging disease threats. The DNA tool will be piloted in two MENA region countries.

Annual Highlights

Diagnostic

- An IDDS working group delivered a draft DNA tool to evaluate the current practices, policies, and algorithms for infectious disease detection in the MENA region. The tool will be used to identify gaps and propose evidence-based short- to medium-term interventions to improve access, capacity, and quality of diagnostic networks to increase detection of emerging pandemic threats.

Challenges

- Revision of the initial draft DNA tool was necessary to better align with the project objectives described in the scope of work, which delayed the activity timeline.

The IDDS TB DNA examines every aspect of a country's TB diagnostic system. Photo by IDDS.

/// INTEGRATED DISEASE SURVEILLANCE AND RESPONSE

Context

The IDSR framework was developed by the WHO Regional Office for Africa to improve epidemiological surveillance and response in Africa. The IDSR Technical Guidelines (third edition) specifies what needs to be established at each level of the health system in the Regional Office for Africa to detect and respond to diseases, conditions, and public health events that are responsible for all preventable illnesses, deaths, and disabilities in local communities. The guidelines recommend thresholds for action on priority diseases, public health events, and conditions, and for responding to alerts.

> "With the rollout of the third edition of IDSR, the country would be able to improve the triangulation and use of information to detect and respond to outbreaks in a timely and well-coordinated manner."
>
> —Amadou Diallo, surveillance officer, Tambacounda Health District, Senegal

IDDS is working to implement the third edition of the IDSR guidelines in Senegal and Cameroon. After adapting the guidelines to the Senegal context and translating them into French, IDDS participated in the development and validation of training materials for medical officers and nurses in April 2021. IDDS also worked to identify 12 private sector surveillance facilities to incorporate into the IDSR network, the first public/private venture of its kind in Senegal. In Cameroon, IDSR was adopted and adapted in 2019. IDDS has been providing support for the rollout of the third edition guidelines since 2021.

> "The ISDR training was very beneficial for us as field workers, we were able to update the new concepts and recommendations which we started to apply in the district as soon as we returned."
>
> —Ebah Essama, chief of planning, Regional Delegation of Public Health of Southwest Region, Cameroon

Annual Highlights

Surveillance

- To improve capacity for surveillance of priority diseases in Senegal, IDDS trained 59 nurses (26 female) across 3 health districts in the Tambacounda region in November 2021. The training improved capacity of surveillance officers and nurses to review surveillance data, as demonstrated by a three-fold increase in data analysis proficiency scores observed during a post-training supervisory visit by MoH in February 2022, compared to the previous supervision conducted in September 2021. Overall, the review of the reports revealed an increase in timeliness and completeness, which are some of the key performance indicators of the IDSR commonly assessed at the health facility level and national level.

- To support surveillance of priority pathogens and emergency response in Cameroon, IDDS provided technical assistance in the rollout of the third edition of the IDSR technical guidelines for health professionals from Cameroon's Southwest region in the context of mpox and cholera outbreaks.

- IDDS provided the first-ever district-level training in Cameroon for 41 surveillance focal points and point-of-entry health posts (13 female) from 19 health districts of this region on August 16–21, 2022 in Douala. The training focused both on indicator-based surveillance and event-based surveillance, including CBS. An emphasis was placed on electronic surveillance, e-learning, and the introduction of data into DHIS 2.

What We Learned

- Quality training along with supportive supervision is critical in successfully implementing a public health surveillance intervention.

Output Data

100 People trained

Data analysis/use and electronic reporting system (41 - Cameroon)
Electronic reporting system (59 - Senegal)

ABBREVIATIONS

AI	artificial intelligence
AMR	antimicrobial resistance
ARP	American Rescue Plan
AST	antimicrobial susceptibility testing
BSC	biosafety cabinet
CAD	computer-aided detection
CBS	community-based surveillance
CENAT	National Center for Tuberculosis and Leprosy Control
CNM	National Center for Parasitology, Entomology and Malaria Control
COMMIT	Community Mobilization Initiatives to End Tuberculosis
COVID-19	coronavirus disease 2019
CTD	Central Tuberculosis Division
CXR	chest X-ray
DHIS 2	District Health Information Software, version 2
DOHT	district One Health team
DoL	Directorate of Laboratories
DNA	diagnostic network assessment
DR	drug-resistant
DRC	Democratic Republic of the Congo
DST	drug susceptibility testing
DTC	DataToCare
EBS	event-based surveillance
EID	emerging infectious disease

EPTB	extra-pulmonary tuberculosis
EQA	external quality assessment
EVD	Ebola virus disease
FAO	Food and Agriculture Organization of the United Nations
FY	fiscal year
GHS	global health security
GLASS	Global Antimicrobial Resistance Surveillance System
GX	GeneXpert
ICMR	Indian Council of Medical Research
IDDS	Infectious Disease Detection and Surveillance
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations
INRB	*Institut National de Recherche Biomédicale* (National Biomedical Research Institute)
INSP	*Institut National de Santé Publique* (National Institute of Public Health)
iNTP	introducing New Tools Project
ISO	International Organization for Standardization
LMICs	low- and middle-income countries
LMIS	logistics management information system
LNSA	laboratory network spatial analysis
LON	local organization network
LPA	line probe assay
MENA	Middle East and North Africa

MoH	Ministry of Health
MTB	*Mycobacterium tuberculosis*
MTR	Midterm Malaria Program Review
NAP	national action plan
NDD	National Diagnostic Division
NPHL	National Public Health Laboratory
NRL	National Reference Laboratory
NTEP	National Tuberculosis Elimination Program
NTLEP	National Tuberculosis and Leprosy Elimination Program
NTP	National Tuberculosis Program
NTRL	National Tuberculosis Reference Laboratory
PCR	polymerase chain reaction
QMS	quality management system
RDT	rapid diagnostic test
RIF	rifampicin
RPHL	Regional Public Health Laboratory
RT	reverse transcription
SIZE	*Sistem Informasi Zoonoses dan Emerging Infectious Diseases* (Zoonosis and EID Information System)
SLIPTA	Stepwise Laboratory Improvement Process Towards Accreditation
SOP	standard operating procedure
SRS	specimen referral system
TB	tuberculosis
TWG	technical working group

USAID	United States Agency for International Development
VAHIS	Vietnam Animal Health Information System
WHO	World Health Organization
WRD	WHO-recommended rapid diagnostic test

Photo by Cindy Liu for IDDS.