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# UGANDA NATIONAL TUBERCULOSIS LOGISTICS SYSTEM ASSESSMENT TOOL (LSAT)



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## **USAID | DELIVER PROJECT, Task Order 1**

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### **Abstract**

In May and June 2009, the National Tuberculosis and Leprosy Program (NTLP), within the Uganda Ministry of Health (MOH), and with technical assistance from the USAID | DELIVER PROJECT, Task Order 1, conducted an assessment of the performance of the logistics management and supply chain systems for tuberculosis commodities in Uganda.

This assessment aimed to develop a broad picture of how the logistics system now in place promotes efficient management of tuberculosis medicines. Using the Logistics System Assessment Tool (LSAT) process, key sections of the logistics cycle were examined to develop this picture. This report presents the findings of the assessment, including recommendations to improve the tuberculosis logistics systems in Uganda.

Cover photo: A district-level tuberculosis and leprosy program supervisor and a nurse examine the tuberculosis drug stores in her Health Center III facility in Mukono District, Uganda, in May 2009.

## **USAID | DELIVER PROJECT**

John Snow, Inc.  
Plot 65 Katalima Road  
Naguru  
Kampala, Uganda  
Phone: (256) 414-253-246  
Fax: (256) 414-253-245  
E-mail: [askdeliver@jsi.com](mailto:askdeliver@jsi.com)  
Internet: [deliver.jsi.com](http://deliver.jsi.com)

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# ACRONYMS

CPD	Continuous Professional Development
DHO	District Health Office, District Health Officer
DOT	directly observed treatment
DOTS	directly observed treatment short-course
DTLS	District Tuberculosis and Leprosy Supervisor
ENT	ear, nose, and throat
FEFO	first-to-expire, first-out (warehouse management)
GDF	Global Drug Facility
GFATM	Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria
HC	Health Center
HIV	human immunodeficiency virus
HSD	Health Sub-District
LMIS	logistics management information system
LSAT	Logistics System Assessment Tool
MDR TB	multi-drug resistant tuberculosis
MOH	Ministry of Health
MSF	<i>Médecins Sans Frontières</i> (Doctors Without Borders)
NGO	nongovernmental organization
NTLP	National Tuberculosis and Leprosy Program
PHC	primary health care
SOP	standard operating procedure
TB	tuberculosis
TU	treatment unit
USAID	U.S. Agency for International Development
WHO	World Health Organization
ZTLS	Zonal Tuberculosis and Leprosy Supervisor



# ACKNOWLEDGMENTS

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# EXECUTIVE SUMMARY

Uganda's ability to provide and manage tuberculosis (TB) drugs is a critical topic for a health system burdened with significant HIV and AIDS and tuberculosis infection rates. To improve drug delivery to the clients who need them, in 2004–2005, the National Tuberculosis and Leprosy Program (NTLP), with assistance from the DELIVER project, designed and put into place a new vertical system. This system operates largely in parallel to Uganda's essential drug program, which is operated through the National Medical Stores. Although the TB system remains active, it has never been assessed—this has led to many unanswered questions, such as how successfully has the new system been implemented and which aspects of the system are in need of improvement.

In May–June 2009, the Logistics System Assessment Tool (LSAT) process was used to assess the system. The goals were to develop a brief snapshot of current operations, identify key logistics strengths and challenges, and suggest recommendations for improvement. This included site visits to each type of treatment facility and stores in ten districts, with at least one chosen from each zone countrywide, plus the central warehouse, resulting in a total of 51 sites visited. Facility findings were shared and further refined in an information gathering workshop; a wide range of system participants were invited to participate. Findings were also discussed at a STOP TP partnership meeting. Key informant interviews were held with the World Health Organization (WHO), the Global Fund, the NTLP, and the USAID | DELIVER PROJECT implementers to address information gaps. As a small non-randomized sample was chosen for data collection over a short timeframe, findings should be viewed as indicative, but not necessarily representative, of current Ugandan TB drug logistics system operations. Further study is needed to reach this level of refinement.

Uganda's vertical maximum-minimum TB drug logistics system clearly assigns roles for every level to contribute to its effective operations. The central-level program logistics unit interacts with external partners and the Ministry of Health (MOH) entities on forecasting, coordination, policy, and procurement. The program manages national TB drug stores, packages customized shipments for each district countrywide, manages the automated logistics management information system (LMIS), and supervises the lower levels. The zonal level is used as a pass-through distribution and storage center, in addition to providing support supervision to districts in their area. Districts have similar supervisory responsibilities for facilities in their area, but are also expected to coordinate reporting, monitor stock levels, and manage facility distribution in the district or, in the case of rural facilities, pass stock to appropriate health sub-districts (HSD) for facility distribution. Facilities that are designated TB treatment units (TUs) are expected to keep stock for their site, serve client needs, and send bi-monthly reports to the district for onward transmission to the center. Based on geographical location, districts are assigned to either the A or B reporting group, allowing each to report bi-monthly on alternating months, which reduces the burden on the central level as they work with all districts countywide. Higher levels typically deliver supplies to zonal and district levels, while facilities collect stock from their district (or HSD, if hard to reach). The system operates on a *No Report, No Product* basis, encouraging timely reporting by linking it to ordering and product replenishment.

In general, the TB logistics system appears to function reasonably well as designed. In most cases, the person managing the drugs has been trained on TB management standard operating procedures (SOPs). Most facilities reported both—the most recent report submission dates and

the last time TB drugs were received dates within the previous two months. Supervision visits had been made to most sites within six months, most within three months. First-to-expire, first-out (FEFO) management is followed in the stores, as are many other key storage and inventory management practices. Stock cards are being used with products in most locations and the latest logistics forms capture stock on hand, consumption, and loss and adjustment data. For dispensing, it appears that standard treatment guidelines are disseminated and generally followed. TB drugs are provided at no cost to clients, making them more accessible to Ugandans who need them.

However, opportunities for improvement were noted. Of critical concern, is the scenario presented by recent stockouts and expiries found countrywide across multiple TB drugs. Although available drugs generally appear to move through the system reasonably well and FEFO practices are largely followed, national stockouts and expiries created system-wide challenges in recent months. In this period, concerned about the risk associated with interrupting treatment regimen, some treatment units continued dispensing recently expired drugs. As in other stockout periods, many sites did not enroll new TB clients, limiting access to testing and treatment for many Ugandans.

Historically, the government of Uganda has not budgeted funds for these essential commodities, relying entirely on donor support. Thus, the system is highly dependent on the timely release of external funds and the smooth processing of all needed administrative, evaluative, and financial steps leading up to the release of funds; as well as timely forecasting and procurement activities, release of products, and coordination across all parties involved in supplying TB drugs. When this process did not operate according to plan, Ugandans nationwide were placed at risk. Notable stop-gap measures were undertaken by the program to mitigate the drug availability crisis, including borrowing some commodities from Kenya; the government of Uganda also procured a small quantity of drugs through the Joint Medical Stores, its first TB drug procurement in recent years. Unfortunately, the quantities were not sufficient to fill the pipeline and some newly released drugs had a very short remaining shelf life, which contributed to expiries. This local procurement seems an important first step toward fund allocation by the government to promote the program's self sustenance and reduce donor dependence. However, further coordination and attention to procurement practices is needed to ensure coverage for Ugandans who need consistent access to these critically important drugs.

Other areas for further consideration include providing LMIS tools, supervision, storage, and staffing. Although logistics data can be successfully captured using tools now in place, some locations continue to use older versions of these forms that do not fully facilitate this process. Some reported not being sure how to obtain the appropriate tools/forms; further clarification of this process would be useful.

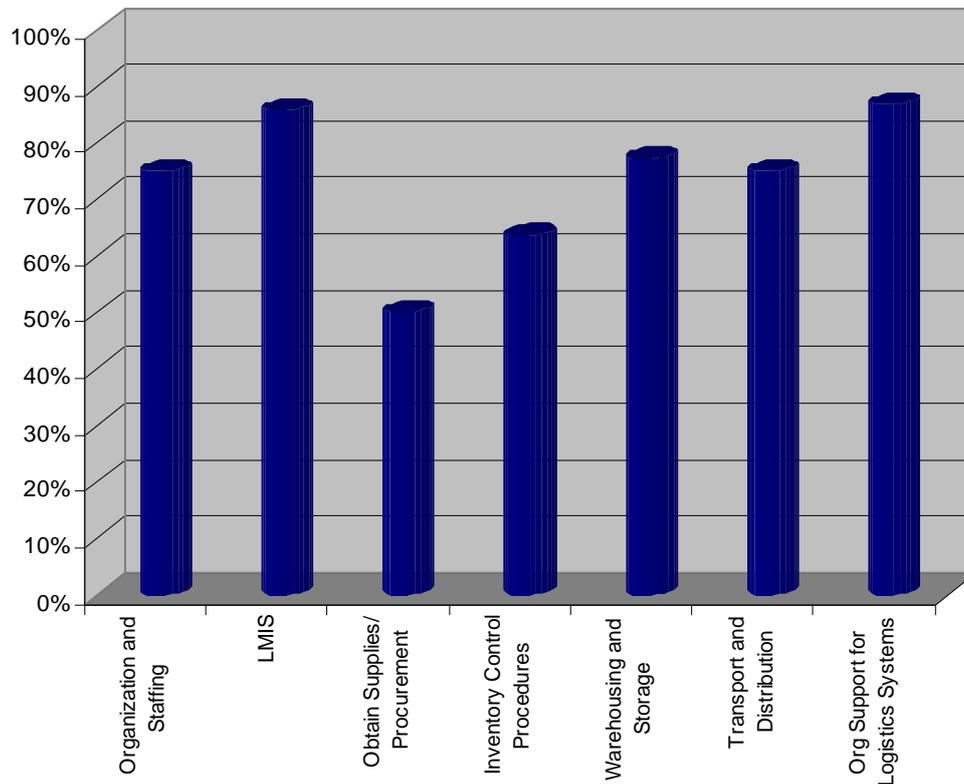
Although tools and resources for guiding tuberculosis activities have been developed and implemented, further development of the tuberculosis supervision tool may be a wise investment. In some cases, supervisors noted that they hadn't provided supervision on key aspects of logistics because they did not know that this was their part of their scope of work. Clarification of key logistics activities to be monitored may help in providing consistent, strong supervision on key logistics topics. By adding key indicators for TB commodity management to the district medicines support supervision checklist, the program can encourage consistent support from all supervisors extending beyond those TB focal persons who currently provide supervision on logistics.

Storage space was congested in many stores, with limited available space, which was further hampered by uncollected damaged and expired goods. Improvements could be made by

removing these goods, coordinating shipments with the programs that share storage space, ensuring the widespread dissemination and posting of storage guidelines.

Most staffers who work on logistics tasks at treatment units have been trained; however, they are typically carrying a heavy load of other tasks, often serving as the in-charge; they also lack back-up coverage when they are away or busy, because no other staffer has been trained. As nationwide trainings have not been held in several years, to ensure coverage despite the workload and other commitments, it's worth considering training strategies to expand the pool of those who can manage logistics. The central level has a dedicated staff that are focused on the program and logistics full-time; however, this small team also faces challenges as they juggle many roles and responsibilities.

**Figure I. LSAT Rating By Key Logistic Area**



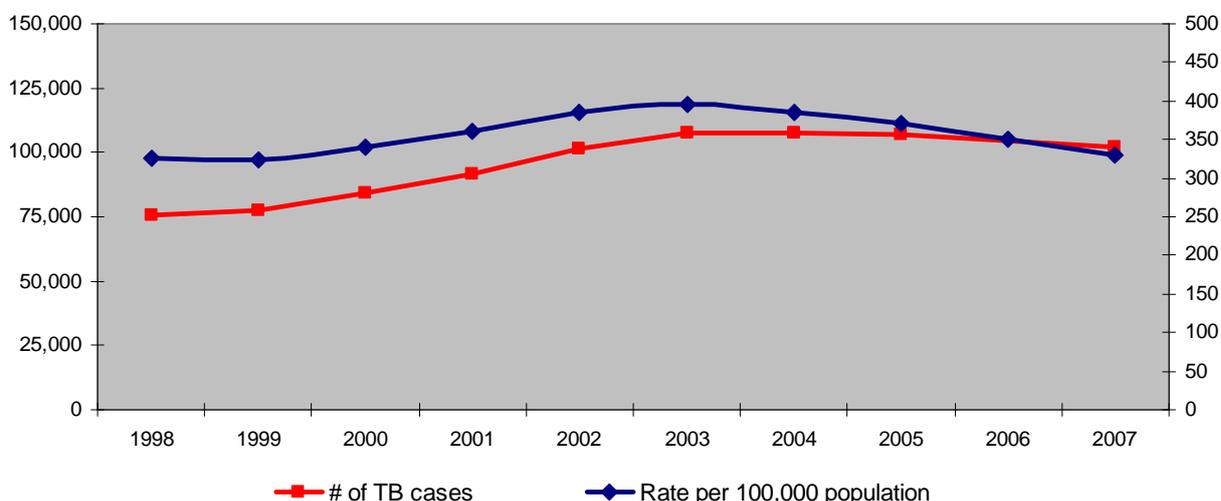


# BACKGROUND

Tuberculosis remains a key health challenge in Uganda. Patients require a series of medications that must be taken over an extended period. The USAID | DELIVER PROJECT partners with Uganda’s NTLP to support the logistics of the supply chain for TB medicines. A new vertical system for managing these critical commodities was developed in 2004-2005; however, the performance of this system had not been assessed. In May–June 2009, the LSAT process was used for an assessment of the logistics system for TB medicine. The goals were to develop a brief snapshot of current operations, identify key logistics strengths and challenges, and make recommendations for improvement.

According to the WHO estimates, Uganda contended with an estimated tuberculosis incidence of 330 per 100,000 residents in 2007, a rate that may be diminishing but still remains a serious concern. In many instances, HIV and AIDS co-infection is present in some identified cases, providing an opportunity for linkage between programs. Multi-drug resistant tuberculosis (MDR TB) cases have been detected in Uganda; however, rates are thought to remain low and, to date, few strategies have been employed to respond to these cases. Directly observed therapy short-course (DOTS) is used for treatment countrywide, often as community-based or family-based DOTS. These initiatives aim to ensure the consistent following of patients’ regimen and to minimize the development of drug resistance.

**Figure 2. Estimated Tuberculosis Incidence in Uganda (WHO 1998–2007)**



The Ugandan MOH system structure includes national-level organizations—the NTLP and National Referral Hospitals, as well as facilities that include Regional Referral Hospitals, District Health Services, Health Sub-District Services, District General Hospitals, Health Center IVs, Health Center IIIs, and Health Center IIs. See table 1 for a description of each level of service delivery and a brief description of the MOH structure—the environment in which the TB system operations. For this assessment, we studied TB medication logistics activities at all levels, focusing on the sites that manage TB (Many Health Centre II sites do not meet this criteria).

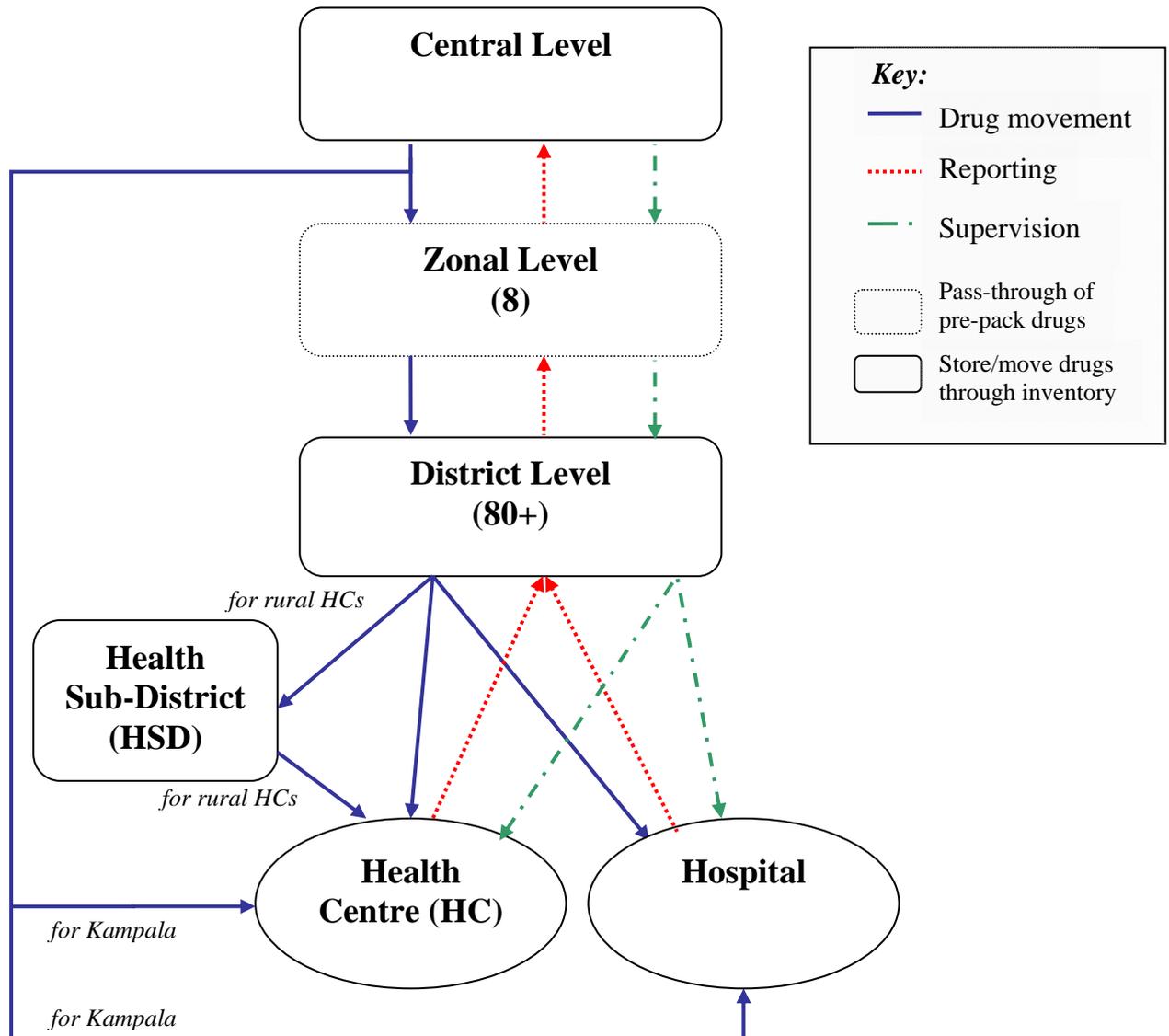
**Table I. Service Delivery Points in Uganda**

Service Delivery Points	Level	Service Overview	Population
National Referral Hospital	National referral facility	Same as Regional Referral Hospital, plus comprehensive specialist services, teaching and research. Supervise Regional Referral Hospitals.	27,000,000
Regional (Zonal) Referral Hospital	Regional referral facility	Same as District General Hospital, plus specialized services (e.g., ear, nose, and throat [ENT], ophthalmology, pathology, radiology), higher-level surgery, medical services, teaching and research. Supervise District General Hospitals, Health Center HC-IVs.	2,000,000
District General Hospital	District referral facility	Basic preventative, promotive, outpatient curative, maternity, inpatient health services, emergency surgery, blood transfusion, laboratory, general services. In-service training, consultation, research. Supervise lower-level health units within district.	500,000
Health Center HC-IV	HSD referral facility	Basic preventative, promotive, curative, rehabilitative care, 2nd level HSD referral including live-saving medical, surgical, obstetric emergency care.	100,000
Health Center HC-III	Community facility	Continuous basic preventative, promotive, curative care, lab services, 1st level HSD referral coverage, supervision of HC-II and community services.	20,000
Health Center HC-II	Community facility	First interface between formal health sector and community. Ambulatory services, some maternal services, some links with Village Health teams.	5,000

Within the national borders, Uganda is divided into eight zones, which contain districts, the highest level of local governance in the country. In recent years, districts have rapidly increased in number, bringing services and decision making closer to local communities; meanwhile, making it necessary to create related infrastructure and systems to service the area. One recent study of Ugandan redistricting cites a *near explosion* in the number of districts—increasing from 39 to 79 in less than a decade. Some existing new districts are developing; meanwhile, more than a dozen additional districts are expected to form in the coming months, with the total number of districts approaching 100. It is important to note that the creation of new districts has also put pressure on the available resources in the health sector infrastructure (most of the new districts do not have a hospital), including salaries, staff recruitment, training, etc.

For this assessment, researchers visited at least one district in every one of Uganda’s eight zones, with two districts visited in the largest two regions. Figure 3 shows further detail on the relationship between levels in the existing TB logistics system.

**Figure 3. Tuberculosis Drug Logistics System Operating in Uganda**





# METHODOLOGY

Because the system had not been examined since implementation, this assessment was undertaken to develop a general snapshot of how it is operating, with a focus on identifying strengths and weaknesses and developing recommendations.

The LSAT was selected as the best way to access this information, given the resource constraints. This tool employs three elements: data collection workshop(s), visits to small sample of facilities (highly recommended), and key informant interviews, as needed. All three elements were used for this assessment. The process includes careful qualitative examination of key aspects of the logistics system and its environment.

Key logistics topics examined in an LSAT:

- Organization and Staffing
- Logistics Management Information System (LMIS)
- Obtaining Supplies and Procurement
- Inventory Control Procedures
- Warehousing and Storage
- Transport and Distribution
- Organizational Support for Logistics
- Product Use
- Finance & Donor coordination

The USAID | DELIVER PROJECT, NTLP, and counterparts worked together to identify districts for this assessment. To achieve the geographic coverage desired by the program, ten districts were selected, including one from each of the eight zones in Uganda, with an additional district for each of the two large zones. Based on reporting characteristics, the districts that were selected included both districts, with lower and higher reporting rates.

Based on feedback from multiple project staffers, the project prepared, reviewed, and edited the facility data collection and LSAT workshop tools. The project introduced the materials in a two-day workshop with the data collection team, who collaborated to further refine it. The data collection team, comprising 20 participants, included counterparts from NTLP, zonal supervisors, the SCMS project, and the USAID | DELIVER PROJECT staff, including experienced short-term consultants who contributed to the facility data collection, reporting, and/or the LSAT workshop. Ten teams were formed to visit each of the selected districts; these data collection teams included zonal supervisors, program staff, and logisticians from the project, SCMS, and short-term consultants with experience in logistics. The teams were also able to link up with the District Tuberculosis and Leprosy Supervisor (DTLS) in their respective districts. District and Zonal supervisors provided information that was useful in selecting facilities to be visited. Apart from the ten selected districts, data collection was also conducted at the NTLP central warehouse. Team members collaborated to identify appropriate personnel from multiple levels in their research district to be invited to the LSAT workshop, which was to be held in Kampala, with central-level participants and other stakeholders. The consultant and project deputy director met with the USAID activity manager to discuss plans and to clarify mission expectations.

After the field visits, each team compiled, analyzed, and presented their findings in a two-day technical workshop. Each team shared their district's findings with the full group; thereafter, the

findings by each LSAT component, across districts, were compiled and again presented to the full group for feedback. Further refinements were made based on group feedback; which ultimately led to a preliminary cross-district broad snapshot of the TB logistics system.

The central-level assessment was carried out through a workshop that brought together tuberculosis personnel working at all levels of the MOH system—from central to lower levels, as well as logistics consultants, nongovernmental organizations (NGOs), partners, and private sector counterparts. (See appendix B for a list of workshop participants.) To provide feedback, the facility findings were also presented at this workshop. Using group work, each component of the logistics system was examined and further refined. Each group shared their proposed snapshot of that area of the system with the full workshop. Honest, open feedback was sought and incorporated to further refine these results. Key informant interviews were held before and after the workshop to address key gaps, particularly on topics like procurement and donor coordination, which are largely handled by personnel who were unable to attend the workshop.

# FINDINGS

Using the logistics cycle as a guide, the LSAT results are collected to examine key areas within the cycle. Following are the findings, based on this organizing model.

## ORGANIZATION AND STAFFING

From the logisticians at the central-level program unit to the zonal and district TB and leprosy supervisors, to those managing drugs at the treatment unit, assessors found personnel in place to manage TB logistics. A logistics management group operates within the program unit; it has dedicated zonal tuberculosis and leprosy supervisors in each of the zones; warehouse and transport staff that move medicines through this pass-through entity provide additional support. Each of the districts has a D'TLS, who is fully dedicated to supporting and supervising program activities in their district. District stores also provide an important function by receiving and managing stock intended for facilities located within the district; these implementing staffers have training in stores management.

Some interviewees commented on disconnects between District Health Officers and support of the tuberculosis and leprosy program in their area, suggesting that the vertical structure of the program separated it from other programs that the district supervises. In some cases, district tuberculosis and leprosy supervisors work out of the district store location, not the District Health Office. One suggested approach was to ensure that D'TLS are positioned at their District Health Office; this would help develop further linkages and shared ownership of the program.

Staff retention appears to be high in most areas; therefore, many workers who manage TB commodities are experienced. Written guidelines and procedures assist them with key tuberculosis logistics activities. Although formal training on TB management SOPs hasn't been conducted in several years, most workers managing tuberculosis commodities had reportedly been trained, a factor likely attributable to retention and the use of in-charges for many logistics tasks. Of course, newer or newly assigned personnel have not received formal training on the SOPs; some trained staffers no longer manage tuberculosis drugs.

Several assessment participants noted that in-charges perform much of the lower-level reporting; they, by definition, manage a wide range of additional responsibilities. Most sites reported heavy workloads and frequent multi-tasking, factors that impact timeliness and quality of reporting. Many facilities have only one trained staffer, without a back-up option if that person is on leave or otherwise occupied at the time of reporting. It is suggested that supervision include contingency planning discussions. Future SOP trainers may also want to consider broadening the pool of trained staff whose role includes reporting. On-the-job training and mentoring can also help in developing capacity. For example, after appropriate guidance is provided, the person who would provide coverage could practice by drafting an upcoming report for review by the lead reporter, followed by appropriate mentoring.

## STRENGTHS

- Logistics management unit is in place and TB focal persons are positioned at central, zonal, district levels and at some facilities
- Committed staff with high retention rates perform logistics activities
- Some District Health Officers (DHOs) support anti-TB activities in their catchment area (e.g., budget, office space, assigned TB focal persons at TUs)
- Helpful resources—guidelines, job aids, logistics materials, and manuals
- Government support and partners in logistics management.

## CHALLENGES

- Heavy workload for limited staffer (multi-tasking, understaffing)—contributor to incomplete/inaccurate tool completion
- Limited number of staff trained in logistics management, those trained may not manage TB products (coverage, succession planning), SOPs and job aids are available but not in use at some sites
- Lack of staff to offload supplies at stores (higher levels)
- Policies have limitations (e.g., logistics staffing).

## RECOMMENDATIONS

- Identify vacancies, recruit and advocate for filling logistics-related posts with appropriate personnel.
- Develop a plan for back-up coverage while key staffers are absent.
- Distribute TB clinic days through the week to lessen workload.
- Improvise to fill support staff gaps at stores for short-term, advocate for long-term post.
- Encourage use of the SOPs and job aids during supervision visits.

# LOGISTICS MANAGEMENT INFORMATION SYSTEM

An LMIS is in place and in use at all levels of the TB logistics management system. Most units have the necessary tools to capture the logistics information that is used at central level for planning. However, in some facilities, outdated formats were being used. Some personnel were unsure how to acquire updated forms and how to know when updates were made. This area could be improved with supervision and form replenishment strategy clarifications.

Most of the facilities that were visited self-identified that their last report submission was completed for dates within the last two months, approximately half in each month; most also reported the last product receipt was in the last two months, which is consistent with the *no report, no product* policy. However, higher levels noted that reports are not arriving in time for reporting deadlines and, sometimes, are incomplete and/or inaccurate. In addition to confirming knowledge of how to report, more attention should be given to why timely, accurate reporting is important and why it should be prioritized. Consideration should also be given to whether a second reporter is needed to provide coverage.

The LMIS is currently automated only at the highest level, where Supply Chain Manager, PipeLine, and Excel are used to assist with planning and supplies management. The central level includes a small team of busy staffers, so it may be practical to either expand this team or try to improve the quality of data sent to them, which could be accomplished using automated reporting strategies. While facility-level automation is unrealistic, several districts advocated for automating reporting at their level. They noted that other reporting is already computerized (at least in some districts) and staff has sufficient computer literacy to successfully manage this task. However, given the number of districts that would need to be resourced and trained—likely to soon approach 100 districts—as well as the evolving nature of district formation in Uganda, it may be more useful to roll out simple spreadsheets (e.g., Excel) to this level. Of course, such an endeavor should be preceded by an assessment of computer literacy, appropriate resourcing, available infrastructure, etc.

While this assessment was limited, it is probably more practical to look at automation opportunities at the zonal level. Serving as a pass-through location, zones do not actually manage products; however, they are responsible for tuberculosis activities in their districts by providing supervision and transiting pre-packed products to these districts. Uganda is divided into only eight zones, which is a more reasonable number for the initial introduction of automation and follow-up mentoring, as well as resourcing. While automation would presumably provide the same data already being compiled, it is possible that further linkages will be developed between zones and sites within their prevue as they pay more attention to reporting. Again, additional study of capacity, infrastructure, computer literacy, and more would be needed before selecting a course of action.

Using demonstrations and user discussions, a brief review was also made of the automation tools currently in use, including Supply Chain Manager, PipeLine, and MS Excel. Users appeared to be comfortable with the tools already in place, and they benefited from the historical data these tools provided. Challenges were, however, noted in reporting consumption for given periods. Currently, this data is estimated based on Supply Chain Manager reports, followed by calculations performed using MS Excel. The Supply Chain Manager system was developed to assist with supply planning and, for this use, it appears to be both appropriate and sufficient. However, the data is captured within two separate databases, corresponding to *A* and *B* group

districts, respectively. Because the TB logistics system is based on bi-monthly reporting, with half of the country reporting each month, the databases capture information relating to periods that do not coincide. For example, a district in the *A* group might report data covering a January–February, then March–April; meanwhile, a *B* group district would report on their December–January and February–March. This rotating system relieves some burdens that would be placed on higher levels if all areas reported and were resupplied monthly; it also coincides with the bi-monthly system implemented by NMS for other commodities. At a future date, the NTLP envisions integrating product provision within the NMS system. By design, these periods do not coincide, so unless reporting is adjusted to capture monthly amounts, determining consumption for a given month will always require some adjustment and estimation, regardless of the tool being used.

### STRENGTHS

- Regular communication between facilities and DTLS
- Reporting forms available in most locations
- Deadlines and reporting schedule widely known
- Regular reporting—last time within two months (40 times), within three months (44 times)
- Stock cards regularly updated in many sites
- Usually timely reporting/ordering/receipt when drugs are available.

### CHALLENGES

- Some units are not using dispensing logs (capture consumption).
- Incomplete reports sometimes submitted.
- Some reports completed incorrectly (e.g., opening stock not matching the closing balance of the previous cycle).
- Some reports arrive too late for decision making.
- Confusion when quantities received doesn't match amount requested.

### RECOMMENDATIONS

- Emphasize use of dispensing logs during supportive supervision; consider attaching it to the TB unit register to capture consumption trends.
- Research any LMIS reporting gaps during supportive supervision and assist with reporting questions.
- Send reminders to improve reporting (e.g., SMS, email, phone call).
- Communicate between levels to clarify discrepancies between quantities ordered and received.
- More support supervision backed, co-funded by NTLP partners—STOP TB Partnership—to motivate staff.
- Revisit level where automated system should reach (e.g., expand to zone or district) to ease management of logistics data.

# OBTAINING SUPPLIES AND PROCUREMENT

Procurement was identified as a critically important influence on the logistics system functionality; perhaps, it is the one in greatest need of attention.

Donors procured most of the anti-tuberculosis medicines, with only one recent emergency procurement by the Government of Uganda through the Joint Medical Stores. The Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria (GFATM) and Global Drug Facility play primary roles in the external procurement process, with Crown Agents Consultancy, Inc. as their current procurement agent.

Areas that need improvement include communications and coordination between procurement donors and between government and program officials. Because anti-tuberculosis drugs play an essential, time-sensitive role in the health status of many Ugandans, special attention should be paid to link procurements, shipment, and funding considerations to anticipated commodity needs of the system. While external assistance has greatly benefited Ugandans by providing this lifesaving treatment; during the past year, several anti-tuberculosis drug supplies stocked out and/or expired. This was passed down to clients whose medical needs, in some cases, could not be properly attended to. Without product available in-country, the likelihood of developing drug resistance may also increase. Communication, of course, may be especially challenging because of the physical distance between key partners and the country programs; therefore, it is recommended that a coordination committee be formed as a conduit of information and to enable planning for all involved from initial product procurement through to clearance and entry into the national inventory.

Another notable challenge has been in providing pediatric formulations. As with other drugs, national stockouts have occurred in recent months. (Although the TB infection rates in Uganda are higher among adults than children, one heavily impacted zone reported that, in their area approximately one in three TB cases is pediatric.) Although they are available in the marketplace, few pediatric medications are currently registered for use in Uganda, which hampers supply efforts. According to the central-level program officials, this concern is currently being addressed, with additional registrations expected in the near future.

In addition to the standard pipeline for anti-tuberculosis drugs, some areas identified additional drug sources. As stock levels decreased, additional sources stepped forward to offer assistance. At the national level, arrangements were made to borrow a limited supplies of drugs from Kenya. One zone reported assistance from the *Médecins Sans Frontières* (Doctors Without Borders) (MSF) that enabled them to avoid stocking out during the recent period of national stockouts and expiries. Multiple MSF country programs and other organizations provided assistance. If not already in place, the program should consider further connections with these groups and, if feasible, opportunities for contingency planning for any future emergency. Of course, ensuring the continuous supply of needed medicines must be the top priority; however, may be advisable to have a back-up strategy in case of an emergency.

## STRENGTHS

- Procurement unit in place to manage procurement processes for MOH
- Procurement restricted to pre-qualified or registered suppliers who have met set quality checks
- Quantification done based on projected patient data and scheduling based on actual use (consumption data)
- Regulatory quality assurance mechanisms in place-PPDA rules, e.g., NDA regulates and monitors quality and manufacturers
- Funded drug procurement (Global Drug Facility [GDF], Global Fund).

## CHALLENGES

- Without a dedicated GOU budget for TB drug procurement, government is limited in ability to control medicine provision.
- Procurement schedule not followed at times, leading to delays in delivery/bringing in too much at the same time, which leads to stockouts/expiry.
- Limited registered suppliers on current list (e.g., for pediatric formulations, leading to stockouts).

## RECOMMENDATIONS

- Government should provide a budget/vote to fund anti-TB drug procurement including second line drugs for treating MDR TB.
- Activate coordination group more closely and regularly link partners, suppliers, program, and other key system participants from the procurement level through clearance and entry into the national stocks.
- Regular monitoring of procurement schedules with suppliers and shippers to ensure coordination and adherence to schedule.
- Encourage registration of more anti-TB drug manufacturers, especially for pediatric formulations (consider requesting NDA waivers).

## **INVENTORY CONTROL PROCEDURES**

Facilities and stores overwhelmingly self-reported to be following FEFO in managing anti-TB drug stock. Nearly all also showed the use of tracking documentation. However, it was found that some lower-level facilities do not use stock cards. Although current stock cards track loss and adjustment, stock on hand, and consumption information, we noted some use of older, unrevised cards that were missing loss and adjustment tracking. Some facilities do not regularly update their dispensing logs. These issues can be addressed through targeted supervision, which should both ensure that recorders know how to complete the document properly and also include guidance on why it is useful and desirable to complete these items in a timely manner. Many staffers manage multiple responsibilities, so recording issues may be linked to lack of recent training or reduced prioritization for other responsibilities.

Some sites noted that resupply quantities do not match requested amounts; rationale for this difference may relate to recent national shortages. To avoid miscommunication and to empower each level to plan appropriately, strong ongoing communication is needed between levels. Whenever order quantities do not match the resupply amount sent, an explanation should be sent. By the same token, when supplies received do not match order quantities, and either there is no explanation or it is not understood, recipients should contact the supplying level for clarification. Without such communication, staffers may become frustrated, distrustful, and possibly less likely to participate. All parties must understand the rationale behind quantities requested and supplied in order to plan for the current and next resupply period.

## STRENGTHS

- LMIS forms used to manage and track anti-TB drugs received and issued/dispensed (49 times)
- Inventory control guidelines are in place
- FEFO is followed, with damaged/expired drugs separated from stock, and losses and adjustments captured in records
- Sites are able to calculate minimum and maximum stock levels (minimize over/understocking); an emergency ordering system is available if they fall below min before the cycle ends.
- Periodic physical count is carried out at all levels to establish expiries, losses, and stock on hand.

## CHALLENGES

- Inventory control guidelines not fully followed in some cases (dispensing log not used, use/updating stock cards, etc.)
- Significant expiries recently noted due to receipt of short shelf life medicines
- Limited guidance or action on removal of damaged and expired drugs, which increase congestion in stores; also lack of guidelines for redistribution of excess medicines in the system
- Some forms are stocked out, some sites are using out-of date forms (e.g., stock cards without losses and adjustments column); there is a lack of clarity on how to order additional forms.

## RECOMMENDATIONS

- Address stockout concerns; identify strategies for ensuring continuous stock availability.
- Revisit expiry retrieval process, organize incineration, develop guidelines for redistribution of excess medicines, and disseminate at all levels.
- Identify gaps in providing forms; provide standard LMIS forms, stock cards, and job aids, as needed.
- Support supervision, emphasizing proper inventory control procedures, including regular updating of all LMIS forms, especially stock cards and dispensing logs.
- Monitor at the central level to ensure items with a short shelf life are not received.

## WAREHOUSING AND STORAGE

Most units visited had acceptable storage conditions. Storage rooms were available to house anti-TB medicines at the central, zonal, and district levels, as well as HC-IV and some HC-III sites. The remaining smaller HC-III and HC-II treatment units kept these medicines in designated cupboards. Regardless of the level, these commodities were kept in secure areas under lock and key, with a limited number of designated key holders.

One challenge was limited storage space in some district-level stores and, to a lesser degree, at lower-level facility storage areas. While TB drugs do not require an inordinate amount of space, many storerooms stocked products serving multiple programs, some requiring a significant amount of space. In several locations, stores were full of other commodities, impeding access to anti-TB drugs to varying degrees. Those who share stores across programs should carefully monitor shipment activities, synchronizing plans when possible and planning forward to store these products as efficiently as possible. (Note: Central-level stores were also found to be near capacity on the day of visit, causing some concern as national stocks were not yet at full supply. However, the central-level program notes that the National Medical Stores have significant additional capacity available for them.

Supervising entities should try to work with stores to plan for upcoming, as well as current needs, particularly because room for expansion is limited in most locations. While storage conditions were acceptable in most locations, most locations did not have fire safety equipment in place. One facility had a fire incident. Fire extinguishers, or at least a bucket with sand, could be critical in protecting supplies and saving personnel in the event of a fire; it is suggested that resources be identified to address this need. Also, although storage rooms typically had a roof, often ceilings were missing, exposing the medicines to the environment. This likely contributes to the rodent and bat problems noted at several sites.

Commodity arrangement also needs improvement at some warehouses; labels and expiry dates were facing away from the viewer, products blocked other products from view, and some products were poorly organized. Simple adjustments could improve the management of products by using FEFO; this would increase the spacing of products and organization.

Facilities are separating expired and damaged products from usable stock. However, the disposal and destruction of damaged and expired TB products has not moved forward, leading to some confusion about next steps and causing additional congestion within the stores. Based on discussions, it appears that disposal and destruction of TB drugs should be the same as that for other drugs; however, there is infrequent pickup and destruction of drugs. Meanwhile, these separated and unusable drugs require some of the site's valuable available storage space. Attention should be given to stop the accumulation of damaged and expired stocks, which are using valuable storage space.

## STRENGTHS

- Stores securely kept with a lock with easy accessibility during working hours (40 times)
- Storing according to FEFO management (39 times)
- Expired drugs are separated from non-expired drugs
- Drugs separated from flammable and corrosive products, e.g., fuel, chemicals (40 times)
- Guidelines for storage in place
- Visual quality assurance inspections conducted at all levels
- Written procedures/guidelines for destroying damaged/expired products in place.

## CHALLENGES

- Most facilities lack fire safety equipment (31 times).
- Have inadequate storage space (30 times).
- Congestion from damaged and expired drugs (separated but not disposed of).
- Uncoordinated deliveries to shared storeroom housing multiple programs' commodities.
- In some stores, lack of pallets, shelves, and ceilings.
- Storage guidelines not posted for reference.
- No dedicated storekeepers in some districts.
- Storage guidelines not posted at all levels.

## RECOMMENDATIONS

- Support supervision should focus on observing appropriate storage guidelines at all levels.
  - Strengthen storage capacity at the zonal level and TUs (construction, improvement, and equipment).
  - Expand storage space at central and zonal level—include in the strategic plan.
  - Assess storage needs and ensure provision of adequate storage space with ceiling, shelves, pallets, and good ventilation.
  - Develop/disseminate fire safety procedures; implement additional fire safety measures.
  - Expedite disposal of damaged and expired medicines.
  - Coordinate delivery schedule across programs that share stores.
  - Recruit storekeepers in districts without storekeeper.
  - Provide and post standard storage guidelines and support supervision that focuses on observing appropriate storage guidelines at all levels.
-

## TRANSPORT AND DISTRIBUTION

Generally, supplies are delivered across all levels with the goal of ensuring supplies reach treatment units on time. From the cross-section of levels observed, supplies were usually delivered on time, often following a schedule that is known at all levels and is a guide for reporting and distribution. Developing, widely disseminating, and consistently following a regular schedule is necessary when managing time and supplies.

The key challenge is the availability of functional vehicles, fuel, and allowances at the district level to ensure the smooth delivery of TB supplies, as well as to encourage support supervision. NTLP usually provides transport for distribution from the central to the district level. Districts may have vehicles for delivery to the lower units, but they are often limited by inadequate fuel supplies and, sometimes, by vehicle maintenance. Some facilities use motorcycles and public transport to pick their supplies, although the budget is usually a key challenge. Also, often the in-charge is responsible for reporting and picking up supplies; the pick up may be delayed during busy periods. Services at the facility may also be hindered when the in-charge is on travel picking up supplies. In some cases, it may be helpful to identify an additional facility contact that can help with the transaction, freeing the in-charge to serve clients and manage the site.

As the program looks toward eventual integration, the managers may want to consider options that include integrated program deliveries from the district level to facilities (e.g., malaria, HIV and AIDS, and TB). This may reduce the costs associated with the delivery of supplies and may encourage the coordination of shipments to match available shared storage space. In some districts, transportation has been integrated into other activities (e.g., supervision) to maximize the use of available vehicles.

## STRENGTHS

- Staff commitment and good communication between levels ensures smooth drug delivery at all levels—received anti-TB drugs within two months (45 times)
- Available transport/established infrastructure for drug distribution—NTLP from central to zonal level to districts; district has transport to lower units; pick up from higher, if delayed; some facilities have capacity to pick up drugs from district stores
- Distribution integrated with other activities, i.e., reporting, support supervision visits
- Partners support some districts, as needed.

## CHALLENGES

- Inadequate budget for fuel and vehicle maintenance and limited availability of shared vehicles for distribution at all levels.
- Some deliveries arrive late/not according to schedule and/or schedule isn't well-known.
- Facility in-charge often manages resupply, who is busy with many tasks.
- Waterproof garments are not available when transporting drugs in the rainy season.

## RECOMMENDATIONS

- Identify transport gaps; provide flexible means of transport and/or funds to facilities that do not have them.
  - Strengthen coordination and integration of the available transport means by district/HSD.
  - Ensure the distribution schedule for TB commodities is prominently posted and followed at all levels.
  - Consider training additional staff so resupply activity burden can be shared.
  - Consider providing waterproof garments for transporting drugs during the rainy season.
-

# ORGANIZATIONAL SUPPORT FOR LOGISTICS SYSTEM

In general, the program has successfully provided the materials required for managing anti-TB medicines. Communications at and between all levels of the logistics system, generally, appears to be quite strong.

Most sites we visited benefit from regular supervision, including recent visits. However, it should be noted that, due to time and resource constraints, this assessment did not attempt to reach the most rural sites. Anecdotally, we learned of more difficult-to-reach areas that are infrequently supervised because of program and district resource constraints. For these areas, alternate strategies may be appropriate. For example, with clear tools and guidance, logistics supervision could be integrated into planned supervision by other programs. Leveraging resources from multiple sources could increase supervision frequency.

In most cases, supervisors regularly review individual facility reports. However, follow-up on recommendations has been limited. If supervisors completed a log or other record book at the end of each visit, indicating follow-up actions and recommendations; during the next supervision visit, facility staff could easily review what happened. Supervisors also report that the standard supervision guidance could be improved by clarifying exactly which logistics topics they should review during the visit. Supervision on logistics appears to vary somewhat depending on the supervisor; therefore, disseminating a clear, easy-to-use tool may be useful in ensuring consistent logistics support nationwide.

The level of support provided by the District Health Officer (DHO) is one important consideration for lower-level program support. Districts vary widely in their level of support for tuberculosis activities. Some districts that budget funds for tuberculosis activities provide office space for the DTLS at the District Health Office (DHO), prioritize tuberculosis activities, and, on occasion, even assign a TB focal person at treatment units. A supportive DHO helps ensure transport availability for supervision and/or addressing challenges that may arise. A few DHOs may see tuberculosis as a separate vertical program and, because of that, have less direct interaction. Building linkages and shared ownership with their tuberculosis program and DTLS may help facilitate tuberculosis operations. Positioning the DTLS at the DHO may help with this process.

## STRENGTHS

- Good working relationship and communication between DTLs' and zonal storekeepers, DTLs', and treatment unit in-charges—teamwork on ordering and facility reports reviewed with DTLs
- Supervision program in place for all levels, conducted regularly (last time within three months (30 times; within six months 35 times)
- Most staff managing anti-TB drugs had been trained on SOPs (36 times)
- On-the-job training and staff mentoring on LMIS in some treatment units
- Staff have been trained by NTLP at all appropriate levels.

## CHALLENGES

- No countrywide formal LMIS training conducted in the past four years, so newly recruited staffs are not formally trained.
- Continuing professional development not in place at some sites; some supervision provided does not support staff development.
- Support supervision checklist does not sufficiently clarify logistics areas that should be reviewed; limited follow-up on supervision recommendations.
- Supervision schedule unclear at times, with some sites rarely supervised due to budget constraints.
- Vertical TB program sometimes viewed as separate, which may limit access to some areas of support/collaboration.

## RECOMMENDATIONS

- Conduct training needs assessment. Depending on findings, provide additional training, including refresher trainings. Sites should consider delegating reporting to staff for a period of time (cross-training, readiness to provide back-up coverage), as well as mentoring opportunities, exchange visits, and operationalizing Continuous Professional Development (CPD) to address the LMIS and other updates.
- Predetermine and disseminate the supervision schedule in advance, whenever possible. This program should include supervision of district stores, preferably by the Zonal Tuberculosis and Leprosy Supervisor (ZTLS). The supervision checklist should be updated with a greater focus on logistics. Provide on-the-job training in supportive supervision (where not in place). Use supervision reports/logs to follow-up on implementation of previous action points. Consider integrating anti-TB drug management into general essential medicines regular supervision, especially at less frequently supervised sites (e.g., remote).
- Reward, disseminate, and encourage best practices (e.g., awards, rankings, newsletter highlight).
- Increase TB program linkages by positioning DTLs at the DHO, continue regular interactions with other programs at the central level; position program plans for anticipated future integration with NMS system, further develop private-public partnerships, as appropriate.

## PRODUCT USE

Most of the staff at the facilities visited had been trained on TB logistics management; although, in some cases, the training was provided through on-the-job initiatives but with supervisors who cover both logistics and case management topics. Supervision is done regularly, and often includes coaching on product use.

If facilities were unable to obtain medications from their supplying warehouse, they employed various strategies in response to recent expiries and/or stockouts of anti-TB medications (borrowing, donors, etc.). Most sites surveyed reported separating all expired stock from usable stock; presumably, they were unable to provide treatment to clients normally serviced at their location. As expected, during stockout periods, treatment units are advised not to accept new clients; which, presumably, limits access to testing and treatment for potential clients who may have needed them. Some facilities resorted to dispensing expired drugs to existing patients. These sites felt the risk of using expired drugs outweighed the risks associated with stopping treatment altogether. Prior to our study, many sites received some stock and had resumed treatment; however, notably pediatric and retreatment drugs stockouts were found at facilities across the country, presumably related to countrywide shortages.

Although stocked anti-TB medications are dispensed free of charge, reducing barriers to client access, concerns were shared about the distance of the treatment units from rural communities. Some facilities service clients who live far away from the nearest treatment facility. Under standard DOTS protocols in place, clients are expected to travel to their facility frequently to receive their medicine; for some, this is burdensome and difficult to continue. Suggestions included opening treatment facilities closer to rural locations and/or adjusting protocols to use the family or community-based DOTS more in these areas.

Some interviewees and workshop participants advocated for clear policy guidance in managing MDR TB. While actual case management falls outside the scope of this assessment, the implications that relate to introducing additional medicines and/or adjustments to providing drugs already in the system are important topics to monitor. Uganda is thought to have relatively low rates of MDR TB; however, cases have been found and it is unclear how this trend will continue.

Some system participants advocated for a clear, formal process for addressing product quality concerns. When issues arise, presumably they are communicated to the supervising personnel. Some questioned how far this feedback travels, suggesting that additional centralized tracking at the national level would identify related product concerns in multiple areas; the situation could be investigated and feedback could direct that stocks be separated as a preventative measure.

## STRENGTHS

- TB products are now available at most facilities—received anti-TB drugs within two months (45 times)
- Drugs available free of charge
- Staff is trained
- SOPs and STGs are used in most facilities
- Community-based DOTS and family-based DOTS are implemented
- TB program monitoring is done at all levels
- Drug quality control measures in place.

## CHALLENGES

- Recent stockouts and expiries seriously hampered ability to serve clients—existing patients could not receive needed drugs, facilities do not recruit new patients during stockout periods, some dispensed expired drugs during stockouts as preferred alternative to no drugs, pediatric formulations still not available.
- Concerns about best way to support TB patient access in remote areas for testing and treatment.
- Inadequate resources, especially for CB-DOTS.
- Concerns that pre-packed pediatric formulations could result in improper patient dosing based on weight measurements.
- Written guidelines for MDR TB referral system and case management not available.
- No written procedure for registering complaints on product quality.

## RECOMMENDATIONS

- Ensure continuous availability of anti-TB drugs in system to avoid interruption of service delivery.
- Develop referral system for managing MDR TB and communicate plan to all levels.
- Consider including TB management in community-level health education.
- Consider opening additional treatment units (improve access to TB services).
- Evaluate pre-packed pediatric formulations to ensure appropriate use.
- Provide written guidelines for MDR TB cases.
- Develop and disseminate guidelines for reporting complaints in product quality.

## FINANCE AND DONOR COORDINATION

Regarding finance, one widely shared concern is the Uganda government's lack of control over commodity financing. Although donor support is warmly welcomed and needed to assist this resource-constrained health system; currently, there is no budget line to fund TB drugs, even though providing these supplies is critical to meeting the nation's health needs. In light of recent stockout and expiry concerns, for the first time the government of Uganda has procured small quantities of drugs through the joint medical stores system. This is an important step toward ownership of commodity security for key tuberculosis commodities. It is suggested that the government of Uganda begin to regularly budget some drug procurement. Even if financial constraints do not allow for full government funding of commodities, the government should position itself to respond to under-funded key commodity gaps.

Donor coordination is an area with strong opportunities for improvement. While multiple groups conduct essential funding and activities, at times there is a lack of coordination, resulting in lost time and less-effective implementation. For example, during our research, we learned informally about the imminent arrival of long-awaited key drugs; the program and its implementing partners had not been alerted to its arrival and had to quickly take action to ensure the appropriate processing and plan for distribution. We also heard concerns about the effectiveness of communication between donors and between in-country parties. It is clear that improved communication would benefit system functionality. A strong coordinating committee focused on anti-tuberculosis commodity supplies might help improve management and coordination of activities and avoid additional stockouts and emergencies caused by expiries. As noted earlier, districts vary widely in the level of support given to tuberculosis activities in their district. As the program is part of their health portfolio, we suggest that district resources—including budgeted funds, transport, and personnel—should be made available to support these activities. However, one notable constraint is the late release of primary health care (PHC) funds to the district. As with any funding source, the timely release of funds is critically important; this process should be monitored and, perhaps, encouraged to ensure that the funded activities move forward.

## STRENGTHS

- Funding available for anti-TB drug procurement and activities—donors, partners, MOH (activities)
- MOH recently initiated first anti-TB drug procurement (increase control over supply issues by mitigating dependence).

## CHALLENGES

- Commodity supply is donor-dependent.
- Donor funds/drugs have not been released on a schedule matching supply chain needs.
- Inconsistent, incomplete coordination on supplies provision and planning among donors, procurement agents, government, and program
- Districts lack budget line items for TB management (e.g., transport, supervision, training, etc.); TB control needs not prioritized for budgeting PHC fund use
- No Government of Uganda line item for anti-TB drugs and only limited funding for logistics activities.
- PHC funds not released on a timely basis.

## RECOMMENDATIONS

- Create budget line items for government procurement of anti-TB drugs and also to fund logistics activities.
- Improve coordination between donors and government with strong consideration given to needed supply schedule and regular communications.
- Activate a strong coordinating group with intention to coordinate activities (including those involved from procurement through clearance and delivery into national stocks).

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# APPENDIX A: FIELD ASSESSMENT TEAM

**Table 2. Field Assessment Team Profile**

<b>Name</b>	<b>Title</b>	<b>Organization</b>	<b>District</b>	<b>Telephone</b>
Mumbe Lawrence	Field Assistant	SCMS	Moroto	0752935560
Simon Kalyesubula	ZTLS-E	MOH/NTLP	Moroto	0782550362
Elly Ogang	ZTLS-N	MOH/NTLP	Gulu	0772661340
Jennifer Luande	Short-term consultant	USAID   DELIVER PROJECT	Gulu	0772316740
Shaquille Sekalala	NTLP Logistics Coordinator	USAID   DELIVER PROJECT	Mukono	0752393058
Karen Martin	Consultant	USAID   DELIVER PROJECT	Mukono	0754570655
Stephen Ekaru	NTLP Logistics Officer	MOH/NTLP	Soroti	0772408664
Gloria Dusabe Ndungutse	Short-term Consultant	USAID   DELIVER PROJECT	Soroti	0782433580
Alex Odama	ZTLS-NW	MOH/NTLP	Arua	0392 961426 0772 890052
Ruth Mbekeka	Short-term Consultant	USAID   DELIVER PROJECT	Arua	0772691663
Monica Amuha Kamagara	Short-term Consultant	USAID DELIVER	Mpigi	0782509299
Abdul Mugerwa	ZTLS-W	MOH/NTLP	Mpigi	0772 499080
Johnson Tumwebaze	Field Assistant	SCMS	Rukungiri	0772744332
Ndyamabo James	DTLS Ntungamo	MOH/NTLP	Rukungiri	0772 567367
Paschal Mujasi	Deputy Director	USAID   DELIVER PROJECT	Kabarole	0752339760
Joseph Mukasa	DTLS-Iganga	MOH/NTLP	Kabarole	0772 961869
Segawa James	Short-term Consultant	USAID   DELIVER PROJECT	Mayuge	0751037728
Mark Mugenyi	ZTLS-SE	MOH/NTLP	Mayuge	0772 565384
Martin Okolimong	DTLS-Kumi	MOH/NTLP	Masaka	0772 535733
Hasoho William	Logistics Advisor	USAID   DELIVER PROJECT	Masaka	0772736008



# APPENDIX B: LSAT WORKSHOP PARTICIPANTS

Table 3. LSAT Workshop Participant List

N	Name	Qualification/ Title	Email Address	Facility/Institution	Contact Number
1	Katsimbazi Charles	DTLS		Rukungiri	0772577789
2	Mbabazi Jacenta	Clinician		Nyakibale Hosp	0782914400
3	Ruyooka Topher	DHO	<a href="mailto:ddhsruk@yahoo.com">ddhsruk@yahoo.com</a>	Rukungiri	0771613800
4	Mwima Patrick	Clinician	<a href="mailto:Mwima.patrick@yahoo.com">Mwima.patrick@yahoo.com</a>	Mayuge HC-III	0782441532
5	Najjuma Monica	Assistant DHO		Mayuge	0772448773
6	Naireka Peter	DHO	<a href="mailto:pnaireka@yahoo.co.uk">pnaireka@yahoo.co.uk</a>	Mayuge DHO'S office	0752859835
7	Kaggwa Patrick	DHO		Mukono DHO'S office	0718111400
8	Lwera Dalauis	Clinician		Seeta Nazigo	0772455920
9	Kimmula James	DTLS	<a href="mailto:kimmulajames@yahoo.com">kimmulajames@yahoo.com</a>	Mukono DHO'S office	0772463066
10	Byibesho Sabina	DTLS	<a href="mailto:byibeshosabina@yahoo.co.uk">byibeshosabina@yahoo.co.uk</a>	Masaka	0772343070
11	Margaret Onyango	Stores Assistant	<a href="mailto:connieonyango@yahoo.com">connieonyango@yahoo.com</a>	Central Unit Wandegeya	0712721071
12	Stephen Ekau	Admin/Logistics Officer		NTP	0772408664
13	Sekalala Shaquille	Logistics Advisor		USAID   DELIVER PROJECT	0752393088
14	Karen Martin	Logistics Advisor		USAID   DELIVER PROJECT	
15	Johnson Tumwebaze	Logistics Advisor	<a href="mailto:jogo@myway.com">jogo@myway.com</a>	USAID   DELIVER PROJECT	0772744332
16	Okurut Francis	Stores Assistant		Soroti	0772344389
17	Egau Edward	DHO	<a href="mailto:egauedward@yahoo.com">egauedward@yahoo.com</a>	Soroti	0782504415
18	Okello John	DTLS	<a href="mailto:John_okello13@yahoo.com">John_okello13@yahoo.com</a>	Soroti	0752419817
19	Okee Betty	Nurse			0782841055

20	Nyeko Gaudenso	DTLS		Gulu	0782509101
21	Muloya Felix	DHO	<a href="mailto:Muloyafelix@yahoo.com">Muloyafelix@yahoo.com</a>	Gulu	0773213866
22	Apio Irene	Nure		Moroto	0782398932
23	Dr.Sekyom Dejere	Deputy HIV/AIDS Team Leader			0772221663
24	Dr.Joa Okecho Tony	DHO		Kabarole	0772482106
25	Baguma Joseph	Storekeeper		Kabarole	0772563907
26	Brenda Kitimbo	Consultant	<a href="mailto:Bkitty200@yahoo.com">Bkitty200@yahoo.com</a>		0712134681
27	Nalwanga Josephine	Programme Officer	<a href="mailto:Nalwanga2007@yahoo.com">Nalwanga2007@yahoo.com</a>		0782752344
28	Nansubuga Harriet	Nurse		Katende HC-III	0782626913
29	Kalyesubula Simeon	ZTLP	<a href="mailto:Simeonk959@gmail.com">Simeonk959@gmail.com</a>	Moroto	0782550362
30	Apangu Pontious	Adum HC-IV		Arua	0782065847
31	Onzima Richard	DLTS		Arua	0756193925
32	Anguzu Patrick	DHO	<a href="mailto:yanguzu@yahoo.com">yanguzu@yahoo.com</a>	Arua	0772696200
	<del>Kyomugisha Edward</del>	<del>Villa Maria Hospital</del>		<del>Masaka</del>	<del>0772408454</del>
33					
34	Naluyomba Ruth	Lab Assistant/Kalungu	<a href="mailto:ruthnaluyomba@gmail.com">ruthnaluyomba@gmail.com</a>	Masaka	0752378192
35	Wepukhulu Zeah	DLTS	<a href="mailto:zeahwepukhulu@yahoo.co.uk">zeahwepukhulu@yahoo.co.uk</a>	Moroto	0772619187
36	Opul Dickson	Director/Bethlehem Medical Centre	<a href="mailto:Dykso29@africaonline.co.ug">Dykso29@africaonline.co.ug</a>		0752636338
37	Zoe Nakuya	Resident Advisor FIND	<a href="mailto:Zoe.nakuya@findlogistics.org">Zoe.nakuya@findlogistics.org</a>	Kampala	0755546979
38	Kiwu Peterson	Orthopaedic Technologist		Mukono	0717711008
39	Chagara Moses	Logistics Officer/Aids Information Centre	<a href="mailto:chagsmo@yahoo.com">chagsmo@yahoo.com</a>		0772913535
40	Menya Alex	Director/Private Sector	<a href="mailto:alexmenyha@yahoo.co.uk">alexmenyha@yahoo.co.uk</a>		0712811197

41	Kaggwa Charles	DTLS	<a href="mailto:charleskaggwak@yahoo.com">charleskaggwak@yahoo.com</a>	Mpigi	0772455759
42	Kabahenda N	In-charge Bukuuku HSD	<a href="mailto:norahadyeen@yahoo.com">norahadyeen@yahoo.com</a>	Kabarole	0772995802
43	Hasoho William	Logistician	<a href="mailto:Hasohol1@yahoo.com">Hasohol1@yahoo.com</a>	USAID   DELIVER PROJECT	0772736008
44	Amuha Monica	Short-term Consultant	<a href="mailto:Amuha2u@yahoo.com">Amuha2u@yahoo.com</a>	USAID   DELIVER PROJECT	0782509299
45	Jennifer Luande	Short-term Consultant	<a href="mailto:iluande@yahoo.com">iluande@yahoo.com</a>	USAID   DELIVER PROJECT	0772316740
46	Mbekeka Ruth	Short-term Consultant	<a href="mailto:Rsempura@yahoo.com">Rsempura@yahoo.com</a>	USAID   DELIVER PROJECT	0772316740
47	Dusabe Gloria	Short-term Consultant	<a href="mailto:gngutse@yahoo.com">gngutse@yahoo.com</a>	USAID   DELIVER PROJECT	0782433580
48	Charles Akora	S.O Officer	<a href="mailto:cakora@malariaconsortium.org">cakora@malariaconsortium.org</a>	Malaria Consortium	0772493933
49	Dr. Nassanga	DHO	<a href="mailto:nassangaruth@yahoo.com">nassangaruth@yahoo.com</a>	Mpigi	0772503088
50	Calnan Jackie	PMS/ HIV/AIDS	<a href="mailto:jcalnan@usaid.gov">jcalnan@usaid.gov</a>	USAID	0772861268
51	Agaba Andysen	Researcher	<a href="mailto:agabaand@yahoo.com">agabaand@yahoo.com</a>	DDRN/DANIDA	0711630788
52	Roger Kamugasa	Executive Secretary	<a href="mailto:Wednet04@yahoo.co.uk">Wednet04@yahoo.co.uk</a>	WEDNET	0772688661
53	Segawa James	STC		USAID   DELIVER PROJECT	0751037728



# APPENDIX C:ASSESSMENT INTERVIEWS

**Table 4. List of People Interviewed for TB LSAT Assessment**

<b>N</b>	<b>Name</b>	<b>Title</b>	<b>Site name</b>	<b>Level</b>	<b>District</b>	<b>Contact number</b>
1	Obo Yonas	Hospital Administrator	Arua Regional Referral Hospital	Zonal/ Regional Hospital	Arua	0772623387
2	Dr. Kalu	Medical Officer	Arua Regional Referral Hospital	Zonal/ Regional Hospital	Arua	0779700301
3	Bayoru Margaret	Stores Assistant	Arua District Store	District Store	Arua	0772903258
4	Amandi Magellan	Pharmaceutical Assistant	Kuluva Hospital	District Referral Hospital	Arua	0775332738
5	Aniku William	Enrolled Nurse	Adimu Health Centre	HC-IV	Arua	0772929845
6	Azaru Jemimah	Nursing Officer	Adumi	HC-IV	Arua	0773215933
7	Adriko Kamilo	Nursing Assistant	Aroi Health Center	HC-III	Arua	0756600122
8	Sr. Angee V.L	Nursing Officer	Gulu Regional/ District Referral Hospital	Regional/ District Hospital	Gulu	n/a
9	Dr. Akii Agel	Medical Superintendent	Gulu Regional/ District Referral Hospital	Regional/ District Hospital	Gulu	0772465393
10	Achiro Lucy	Stores Assistant	Gulu District Store	District Store	Gulu	0772613623
11	Richard Nyeko	Clinical Officer	Lalogi Health Centre	HC-IV	Gulu	0782802289
12	Aketch Barbara	Sen. Clinical Officer	Opit Health Centre	HC-III	Gulu	0772631197
13	Odongo Isaac	Enrolled Comp. Nurse	Palenga Health Centre	HC-II	Gulu	0779208488
14	Dr. Okech	District Health Officer	District Health Office	DHO	Kabarole	0772482106
15	Fulgencia Ntegyereize	District Health Inspector	District Health Office	DHO	Kabarole	775401191
16	Magezi Jackson	District TB & Leprosy Supervisor	District Health Office	DHO	Kabarole	0772674760
17	Baguma J	Storekeeper	Kabarole District Store	District Store	Kabarole	0772563907

18	Kemigisha Violet	Pharmacy Assistant	Virika Hospital	District General Hospital	Kabarole	0782495160
19		Storekeeper	Virika Hospital	District General Hospital	Kabarole	
20	Birungi Campline	Nursing Officer	Bukuuku Health Centre	HC-IV	Kabarole	0751398215
21	Assimwe Deo	Clinical Officer	Kijura Health Centre	HC-III	Kabarole	0773320566
22	Isoke Topista	Enrolled Nurse	Nsorro Health Centre	HC-II	Kabarole	0774118616
23	Akwi Emokol Ruth	Registered Nurse	Kumi Hospital	Zonal/Regional Store	Kumi	0782085041
24	Kassisi Beatrice	Senior Dispenser	Masaka Regional Referral Hospital	Regional/District Referral Hospital	Masaka	0772686057
25	Sr. Wanjala Naigaga Betty	Senior Nursing Officer	Masaka Regional Referral Hospital	Regional/District Referral Hospital	Masaka	0712562817
26	Sr. Mary Gorette Namayanja	Pharmacy Technician	Villa Maria Hospital	NGO Hospital (self-determined catchment)	Masaka	782850060
27	Nakato Christine	Stores Assistant	Masaka District Store	District Store	Masaka	752622063
28	Nansubuga Noeline	Enrolled Midwife	Kyamulibwa Health Centre	HC-IV	Masaka	0775392274
29	Nanziri Mary	Nursing Assistant	Kalungu Health Centre	HC-III	Masaka	0782943017
30	Lubega Rose	Nursing Officer	MRC Kyamulibwa Health Centre	HC-II	Masaka	0782301267
31	Nnyonjo Maria	Records/Supplies officer	South East Zonal store	Zonal/Regional Store	Mayuge	0714203980
32	Najjuma Monica	Stores Assistant	Mayuge District store	District Store	Mayuge	0772448773
33	Naireka Peter	DTLS	Mayuge District store	District Store	Mayuge	0752859835
34	Ndijja Christine	Nursing Assistant	St Francis Buluba Hospital	Hospital	Mayuge	0752251054
35	Gambani John	Clinical Officer	Kityerera Health Centre	HC-IV	Mayuge	0782401281
36	Magumba Asuman	Clinical Officer	Malongo Health Centre	HC-III	Mayuge	0782597619

37	Wepukhulu Zeah	DTLS	Moroto District Health Office	DHO	Moroto	0772619187
38	Mr. Ochin Mathew	Asst. Supplies Officer	Moroto District Hospital	District Referral Hospital	Moroto	0772988943
39	Aciro Julia	Clinical Officer/ Associate DTLS	Moroto District Hospital Stores	District Referral Hospital	Moroto	0782405404
40	Longoli Lucy	In-charge TB ward	Matany Hospital	District General Hospital	Moroto	0782124248
41	Nachugai Rose	Enrolled Midwife	Loengachora Health Centre	HC-II	Moroto	0779764622
42	Kongai Christine	Enrolled Nurse	Loputuk Health Centre	HC-II	Moroto	0781416057
43	Mrs, Kyeyune Anne	Stores Assistant	Mpigi District Store	District Store	Mpigi	n/a
44	Ndimwibo Florence	Dispenser	Gombe Hospital	District Referral Hospital	Mpigi	772916732
45	Ms Rosemary Nakijoba	Enrolled Nurse	Mpigi Health Centre	HC-IV	Mpigi	782974856
46	Kimbowa Immaculate	Enrolled Nurse	Muduma Health Centre	HC-III	Mpigi	782503784
47	Nansubuga Harriet	Nursing Assistant	St. Monica Katende Health Centre	HC-III	Mpigi	782626913
48	Dr. Elly K. Tumushabe	District Health Officer	District Health Office	DHO	Mukono	414290349 772414189 752862810
49	Kimmula James	DTLS (District TB Leprosy Supervisor)	Mukono District Store	District Store	Mukono	0772463066
50	Ndoho Freil	In-charge TB Clinic	Kawolo Hospital	District General Hospital	Mukono	782613112
51	Andrew Aruba	Stores Assistant	Kawolo Hospital	District General Hospital	Mukono	772535311
52	Gesa Musa	Lab Technician	Kawolo Hospital	District General Hospital	Mukono	712441609
53	Sarah Nakijje	Enrolled Nurse	Kojja Health Centre	HC-IV	Mukono	0782225784
54	Namutebi Jolly	Enrolled Nurse	Kyetume Community Based Health Care Programme Gaia Counseling + Medical Care Health Centre	HC-III	Mukono	712221653 779449265
55	Mary Frances	Nurse	Seeta Nazigo Health Centre	HC-III	Mukono	n/a

56	Nshemereirwe Gad	Acting Stores Assistant	Rukungiri District Store	District Store	Rukungiri	0782627967
57	Mbabazi Jacenta	Enrolled Nurse	Nyakibale Hospital	District General Hospital	Rukungiri	078-914400
58	Mutumba Nelson	Health Inspector	Buhunga Health Centre	HC-IV	Rukungiri	0772330691
59	Mutabanura Agnes	Enrolled Nurse	Rukungiri Health Centre	HC-III	Rukungiri	0703919662
60	Asio Mary	Nursing Officer	Soroti Regional Referral Hospital	Regional Referral Hospital	Soroti	0772871282
61	Okurut Francis	Storekeeper	Soroti District Store	District Store	Soroti	0772344389
62	Okas John Francis	TB/Leprosy Assistant	Tiriri Health Centre	HC-IV	Soroti	0777255156
63	Anyait Mary Magdalene	Nursing Officer	Gweri Health Centre	HC-III	Soroti	0772904792

## APPENDIX D: SITES VISITED

**Table 5. Sites Participating in the TB LSAT Assessment**

<b>N</b>	<b>Zone</b>	<b>District</b>	<b>HSD</b>	<b>Site Name</b>	<b>Level</b>	<b>MOH/ NGO</b>
1	South East	Mayuge	Bunya West	South East Zonal Store	Zonal/Regional Store	MOH
2	Eastern	Kumi	Kumi	Kumi Hospital	Zonal/Regional Store	NGO
3	North West	Arua	Ayivu	Arua Regional Referral Hospital	Zonal/Regional Referral Hospital	MOH
4	Eastern	Soroti	Soroti Municipality	Soroti Regional Referral Hospital	Zonal/Regional Referral Hospital	MOH
5	North West	Arua	Ayivu	Arua District Store	District Store	MOH
6	North	Gulu	Omoro	Gulu District Store	District Store	MOH
7	West	Kabarole	Kabarole Municipality	Kabarole District Store	District Store	MOH
8	South West	Masaka	Masaka Municipality	Masaka District Store	District Store	MOH
9	South East	Mayuge	Bunya West	Mayuge District Store	District Store	MOH
10	Eastern	Moroto	Moroto Municipality	Moroto District Store	District Store	MOH
11	Central	Mpigi	Mawokota North	Mpigi District Store	District Store	MOH
12	South East	Mukono	Mukono North	Mukono District Store	District Store	MOH
13	South West	Rukungiri	Rujumbura	Rukungiri District Store	District Store	MOH
14	Eastern	Soroti	Soroti Municipality	Soroti District Store	District Store	MOH
15	North	Gulu	Omoro	Gulu Regional/ District Referral Hospital	Regional/District Hospital	MOH
16	South West	Masaka	Masaka Municipality	Masaka Regional Referral Hospital	Regional/District Referral Hospital	MOH
17	North West	Arua	Ayivu	Kuluva Hospital	District Referral Hospital	NGO
18	Eastern	Moroto	Moroto Municipality	Moroto Hospital	District Referral Hospital	MOH
19	Central	Mpigi	Butambala	Gombe Hospital	District Referral Hospital	MOH

20	South East	Mukono	Buikwe West	Kawolo Hospital	District General Hospital	MOH
21	West	Kabarole	Municipality	Virika Hospital	District General Hospital	NGO
22	Eastern	Moroto	Bokora	Matany Hospital	District General Hospital	NGO
23	South West	Rukungiri	Rujumbura	Nyakibale Hospital	District General Hospital	NGO
24	South East	Mayuge	Bunya West	St Francis Buluba Hospital	Hospital	NGO
25	South West	Masaka	Kalungu West	Villa Maria Hospital	NGO Hospital (self-determined catchment)	NGO
26	North West	Arua	Alyivu	Adimu Health Centre	HC-IV	MOH
27	North	Gulu	Omoro	Lalogi Health Centre	HC-IV	MOH
28	West	Kabarole	Bukuuku/ Burahya	Bukuuku Health Centre	HC-IV	MOH
29	South West	Masaka	Kalungu West	Kyamulibwa Health Centre	HC-IV	NGO
30	South East	Mayuge	Bunya South	Kityerera Health Centre	HC-IV	MOH
31	Central	Mpigi	Mawokota North	Mpigi Health Centre	HC-IV	MOH
32	South East	Mukono	Mukono South	Kojja Health Centre	HC-IV	MOH
33	South West	Rukungiri	Rujumbura	Buhunga Health Centre	HC-IV	MOH
34	Eastern	Soroti	Soroti County	Tiriri Health Centre	HC-IV	MOH
35	South West	Rukungiri	Rujumbura	Rukungiri Health Centre	HC-III	MOH
36	North West	Arua	Ayivu	Aroi Health Center	HC-III	MOH
37	North	Gulu	Omoro	Opit Health Centre	HC-III	NGO
38	West	Kabarole	Bukuuku/ Burahya	Kijura Health Centre	HC-III	MOH
39	South West	Masaka	Kalungu West	Kalungu Health Centre	HC-III	MOH
40	South East	Mayuge	Bunya South	Malongo Health Centre	HC-III	MOH
41	Central	Mpigi	Mawokota North	St. Monica Katende Health Centre	HC-III	NGO
42	Central	Mpigi	Mawokota North	Muduma Health Centre	HC-III	MOH

43	South East	Mukono	Mukono South	Kyetume Community Based Health Care Programme Gaia Counseling+ Medical Care Health Centre	HC III	NGO
44	South East	Mukono	Mukono South	Seeta Nazigo Health Centre	HC III	MOH
45	Eastern	Soroti	Soroti	Gweri Health Centre	HC-III	MOH
46	North	Gulu	Omoror	Palenga Health Centre	HC-II	MOH
47	West	Kabarole	Bukuuku/ Burahya	Nsorro Health Centre	HC-II	MOH
48	South West	Masaka	Kalungu West	MRC Kyamulibwa Health Centre	HC-II	NGO
49	Eastern	Moroto	Bokora	Lorengachora Health Centre	HC-II	MOH
50	Eastern	Moroto	Matheniko	Loputuk Health Centre	HC-II	MOH
51	Central	Kampala	Kampala	NTLP Central stores	Central	MOH



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**USAID | DELIVER PROJECT**

John Snow, Inc.

Plot 65 Katalima Road, Naguru

Kampala, Uganda

Phone: (256) 414-253-246

Fax: (256) 414-253-245

E-mail: [askdeliver@jsi.com](mailto:askdeliver@jsi.com)

Internet: [deliver.jsi.com](http://deliver.jsi.com)