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Lessons Learned in Supply Chain Management of HIV & AIDS Commodities



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A health care worker picks up supplies on his bike.

One significant lesson learned is that while HIV programs and commodities are atypical in many ways, the supply chain interventions and solutions are not unique to HIV commodities, and are largely relevant for other commodity categories.

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Unprecedented levels of financial and human resources have been allocated for the prevention, care, and treatment of HIV-infected and -affected individuals, families, and communities in resource-limited settings. Managing supply chains for these commodities is a unique challenge given that HIV treatment requires lifelong therapy with adherence rates above 95 percent, and that few or no substitutions can be made for many commodities if a stockout occurs. Since stockouts at health facilities can result in treatment interruption that can quickly lead to viral resistance or missed opportunities for diagnosis, the global community has invested significant resources for procuring and managing the supply of HIV and AIDS commodities. Consequently, these supply chains are some of the most efficient and effective in public sector health systems, and they offer lessons that can be applied toward improving supply chains for other commodities in these settings.

The lessons learned presented here are gleaned from the USAID | DELIVER PROJECT's experience in designing and implementing HIV and AIDS commodity supply chains and strengthening health system capacity to manage HIV commodities. One significant lesson learned is that while HIV programs and commodities are atypical in many ways, the supply chain interventions and solutions are not unique to HIV commodities, and are largely relevant for other commodity categories. In fact, the success of HIV supply chains has catalyzed governments to use similar principles and solutions to improve other commodity supply chains.

Other lessons discussed here are presented in the context of HIV and AIDS, but are generally applicable to other commodity categories. This brief specifically highlights lessons relating to requirements for HIV supply chains as they mature and become more complex, including a discussion of organizational and strategic structures that must be in place to facilitate supply chain operations and ensure that commodities flow to the people who need them, when and where they need them.



I. A Logistics Management Unit serves as a focal point for attracting dedicated supply chain resources and for organizing and managing supply chain interventions.

Public sector health systems are typically organized around a vision for service provision, and undertaking logistics management functions is commonly a secondary rather than primary purpose. Supply chains are often developed as afterthoughts once it becomes apparent that commodity availability is essential to providing health services, i.e., “No Product? No Program”¹. Consequently, in-country supply chains often lack dedicated and skilled human resources devoted to routine logistics management tasks, as well as the structural entities through which to organize and manage resources and operations.

At facilities, logistics management functions are often assumed as secondary responsibilities by staff who are primarily employed to provide clinical services. Nurses, pharmacists, and laboratory technicians perform logistics management functions in order to be able to perform their primary functions as service providers. Although they rarely receive pre-service or in-service logistics training, these cadres of staff are tasked with reordering commodities, monitoring stock levels and expiry dates, and maintaining adequate supplies to ensure that services are not interrupted. This process is further complicated by the fact that logistics management responsibilities at the central level are dispersed among numerous program staff, offices, or locations, leading to challenges in communication and a lack of clarity in pathways for resolving problems or making decisions. In essence, because the performance of the supply chain depends on the motivation of already overworked staff with inadequate logistics training and no formal recognition of these added responsibilities, supply chain breakdowns such as stockouts and product wastage are not uncommon or unexpected.

LMU Staff Cadres

- data entry clerks
- pharmacists
- laboratory specialists, and
- logistics officers

The USAID | DELIVER PROJECT has worked with Ministries of Health in a variety of countries on different approaches to address these issues. Across a number of settings, a Logistics Management Unit (LMU) has been created within a Ministry of Health (MOH) in order to enhance supply chain operations, increase numbers of dedicated staff, and in some cases significantly strengthen the in-country supply chain. The functions, staffing,

The Role of a Logistics Management Unit

Tasks performed by the LMU could include:

- Approving facility orders
- Preparing routine feedback reports for facilities
- Conducting routine field monitoring and logistics support visits to facilities
- Assisting with registration and customs clearance, inspection and testing of commodities
- Managing central logistics management information system (LMIS) software
- Conducting routine supply pipeline analyses
- Generating logistics system progress reports for MOH and partners
- Identifying potential gaps in supply and mobilizing resources as necessary
- Conducting quantifications of commodity requirements and costs
- Coordinating procurement and logistics functions with international and local organizations and donors
- Monitoring and evaluating overall logistics system performance
- Leading supply chain interventions and improvements

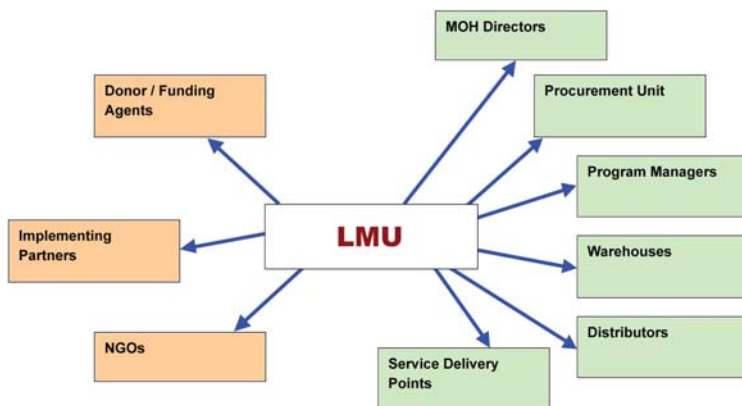
¹ USAID | DELIVER PROJECT motto

and placement of LMUs have varied across countries, with corresponding variations in impact. The LMU lessons described in this brief are drawn from countries in which the LMU has been perceived to be a successful intervention with lasting impact on the supply chain. As an example, Zambia and Zimbabwe LMUs are well established with dedicated, full-time staff, and have proven pivotal in improving the management and availability of HIV and AIDS commodities.

The LMU should serve both an operational and a strategic purpose. Operationally, LMU staff are tasked with increasing visibility throughout the supply chain by sharing quality information when and where needed for evidence-based decision making, with the ultimate purpose of ensuring a continuous flow of products. These staff perform routine logistics management functions, such as calculating resupply quantities for facilities, and serve as a resource for clinical staff responsible for commodity management for questions or for help in troubleshooting supply issues, and for other stakeholders in the supply chain. The LMU can also perform routine resupply tasks such as calculating resupply quantities for facilities. Strategically, the presence of an LMU solidifies supply chain management as a national priority as staff and resources are dedicated to these activities, which in turn benefits overall program planning and management.

The LMU is often physically situated at the central warehouse, but individual staff members may be based at regional or provincial levels to improve communication and interaction with lower-level facilities. In Tanzania, a cadre of Supply Chain Management Advisors (SCMAs) will be established. These SCMAs are stationed at each zonal store to provide support and training as required to health facilities within the zone. This has contributed to an increase in reporting rates and data quality as SCMAs can follow up directly with facilities if reports are not being received.

Figure 1. The Reach of the LMU



The LMU not only gathers information, it also collates and presents the data for decision-making throughout the supply chain. Improving visibility by communicating logistics data to all levels of the system is a key function of this unit. Figure 1 shows the various units and stakeholders with whom the LMU communicates information. The LMU may produce stock status reports for central-level committees to guide national procurement decisions and identify gaps in funding and potential stockouts. Feedback reports that include information on the facility’s reporting accuracy and the current stock status of

products at the national level are also provided to the service delivery points. The LMU in Zambia not only sends feedback reports to facilities, it also provides input to the Ministry of Health’s monthly newsletter that informs health facility staff about ongoing supply chain issues, and highlights top-performing facilities.

In Zimbabwe, the LMU has been instrumental in increasing reporting rates and improving availability of data. The LMU disseminates stock status reports to the MOH and implementing partners that helps to identify potential funding gaps, stock imbalances and other supply chain problems, and leads to better communication and coordination between implementing partners. In Zambia, the LMU has played an active role in improving communication between different partners and among the different levels of the logistics system, which has improved commodity availability.

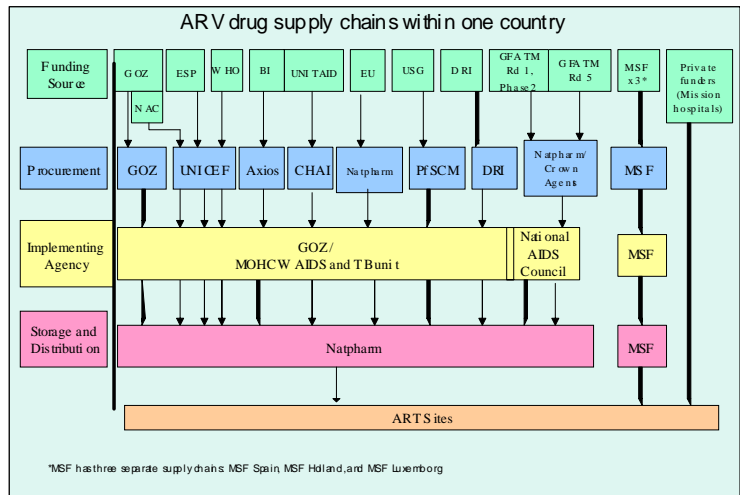

In summary, the LMU is the management structure responsible for organizing, monitoring, and supporting all supply chain activities within the logistics system. The LMU features prominently throughout this document, as its functions cut across all supply chain activities and all system-strengthening interventions.

2. Procurement and Logistics Committees provide an important forum for coordinating supply chain decision making and facilitating stakeholder collaboration.

Supply chains for HIV and AIDS commodities, more than for other public sector supply chains, are typically supported by a large number of partners involved in different aspects of supplying and managing the commodities. Figure 2 illustrates the multiple sources of funding and types of agencies that can be involved in procurement and distribution of HIV and AIDS commodities within one country.

Increased numbers of stakeholders involved in financing, procuring, and distributing commodities for national HIV and AIDS programs can be a positive indication of greater commitment and more significant resources for the program. However, multiple supply chains inevitably result in duplication of efforts and resources, and complicate the management of commodities at every level. Stakeholders and funding sources often bring to the table different program impact goals and strategies to achieve those goals, and may be held to different rules and regulations about what can be purchased, and may use different procurement and distribution mechanisms, thereby increasing the complexity of maintaining a continuous supply of commodities. The risk of gaps or redundancies in supply is high if coordination of procurements between the partners is not carefully managed. At the service delivery level, the reporting burden for health facility staff can be reduced by coordinating reporting requirements and implementing one logistics reporting system

Figure 2. An Example of Multiple Funding Sources for One Country

“Coordination mechanisms are essential to build into the design of a program. Coordination needs to take place within and between government agencies, the federal MOH and state MOHs, the government and the donors, the government and NGOs, the government and the private sector, and between donors.”

Nigeria Country Report 2007

Convening a regular forum that brings together key supply chain stakeholders with the explicit purpose of coordination, communication, and collaboration in all aspects of supply chain decision making and management is instrumental in effectively managing commodity-related resources across programs and ensuring that continuous product availability remains a priority despite the complexities within and across supply chains. The USAID | DELIVER PROJECT has assisted MOHs in many countries to establish and regularly

convene such committees. Experience from different models has demonstrated that these kinds of committees are most effective when membership consists of MOH managers, donors, and implementing partners that are empowered to make decisions and are committed to maximizing product availability by quickly addressing supply-chain-related bottlenecks. The committee should have the authority to take actions and to make important national-level supply chain decisions, such as re-distribution of stocks and advancing or delaying planned shipments to prevent stockouts and avoid expiries. Therefore, this committee is

an important strategic mechanism for implementing supply chain interventions that maintain an efficient and effective supply chain.

The mandate of this committee is different from that of the LMU, which oversees the day-to-day operations of the supply chain. However, the role of the LMU is essential as the LMU often convenes the procurement and logistics committee, and is responsible for providing the relevant information to guide national-level decision making.

In Zambia, this committee is known as the Procurement Technical Working Group (PTWG), and it is chaired by the Permanent Secretary of the MOH—which demonstrates the authority given to this group. The PTWG meets every other week and the members include representatives from the MOH, donors, and implementing partners involved in procurement and logistics of health commodities in the Zambian public sector.

In Zimbabwe, the Ministry of Health and Child Welfare has established the Procurement and Logistics Sub-Committee (PLS). Partners gather monthly to coordinate and collectively manage the HIV and AIDS commodity pipelines to ensure that there are no stockouts, expiries, or other supply chain problems. The PLS also provides a platform for sharing experiences and ideas in the proper management of commodities and for overseeing the overall security of HIV and AIDS commodities.



“...collaboration helps to ensure product availability. In 2005, one cooperating partner had 50 months of efavirenz 50 mg in stock, almost guaranteeing expiration and waste, while another partner was stocked out. By sharing logistics data, the partners were able to transfer stock, which allowed the stocked-out partner to meet demand and the overstocked partner to avoid the chance of expiration.”

Zambia Country Report 2007

Key activities of the Procurement and Logistics Committee:

- Share information and update all members on the status of planned shipments and the stock status (months of stock on hand) of all HIV-related commodities in the country.
- Plan, coordinate, and review the annual quantification exercise and the six-month review and update of the quantification data inputs, assumptions, and results.
- Verify the amounts and timing of funding commitments for procurement of commodities each time the quantification is reviewed and updated.
- Coordinate resource mobilization efforts for procurement of commodities when needed.
- Identify needs for continued technical capacity building in supply chain management, make recommendations, and advocate for resources and technical assistance when needed.
- Develop solutions for common supply bottlenecks or challenges, such as negotiating stock loans or swaps between different supply chains, and advancing or delaying shipments from suppliers to avoid stockouts and expiries.

3. Institutionalizing the quantification process helps build supply chain capacity, skills, and ownership within MOH programs, and enables managers to take preventive action against stock imbalances.

Quantification plays a critical role in determining how effectively a program’s financial and other resources are used for forecasting, supply planning and procurement to achieve the ultimate objective of ensuring continuous product availability to customers. Quantification is a systematic process for linking a program’s current and past trends in service provision and commodity use with national-level policies and plans, and for estimating future commodity requirements and costs to cover supply chain lead times and buffer stocks.

Quantification outputs enable program managers, funders, buyers, and suppliers to plan and schedule their inputs, and to coordinate available resources, and mobilize additional resources where funding gaps are identified. Quantification is a key logistics management function which should include routine review and updates of annual quantification outputs throughout the year to reflect current consumption and to adjust supply plans to avoid stock imbalances if needed.

In many new programs, or those in which financing for commodities is significantly constrained, quantification often is conducted only once a year for budgeting purposes, with no updates or attention to the supply pipeline in the intervening period. While an annual exercise might lead to a spike in coordination and resource mobilization at that time of year, the program loses the opportunity to leverage commitments and implement supply chain interventions required throughout the year. The once-a-year approach to quantification has other disadvantages. Stock imbalances may be more likely since information required for preventive action is not available during the year. Building staff capacity in quantification is limited, as they have few opportunities to practice the skills learned. Because quantification is time and labor-intensive and requires a variety of skills, when conducted only as a budgeting exercise and not as a routine logistics management function, then users may shortcut the quantification process, thereby undermining the validity and usefulness of the results.

Institutionalizing quantification as a priority exercise requires a strategic commitment by the MOH and key partners, as well as the establishment of operational procedures. The MOH must commit to the process by assigning staff, from the LMU if one exists, to be responsible for quantifications and allocating the necessary resources and time required to fulfill this role. In Zimbabwe, where the LMU is well established, this role is institutionalized within this unit. Where such a unit does not exist, as in Ghana, a “quantification team” has been established and endorsed by the MOH. The quantification team is responsible for leading the quarterly review and update of the quantification, collecting and analyzing the data to compare actual consumption with forecasted consumption, and adjusting supply plans based on these data and current stock levels. Responsible staff must be equipped with the requisite skills and knowledge to encompass all the steps, including data collection, applying multiple forecasting methodologies, and monitoring the supply pipelines. Procedures must be developed to facilitate regular reviews and updates of quantification outputs, and dissemination of results.

A quantification is built on past data combined with assumptions about the future. Because programs continue to evolve, for example by scaling up services or introducing new initiatives to better serve the population, it is essential that assumptions made during the annual quantification exercise are regularly reviewed and updated. This is especially true in the case of antiretroviral (ARV) medications because of the serious implications of stockouts and the high price of ARVs compared with other essential health commodities. Using a systematic process enables quantification teams to improve the quality of data and assumptions over time, ultimately leading to more reliable outputs. This process will also maintain the validity of the quantification and institutionalize capacity within the organizational structure, as updating, reviewing, and conducting the annual quantification exercise becomes a core responsibility of identified staff members.



“Continual monitoring of commodity needs and use patterns also has led to the realization that initial assumptions that dictated forecasts are not always realized. It is important to collect data on the distribution and use of medicines continually, analysis of which is crucial for better forecasts and management of the supply chain.”

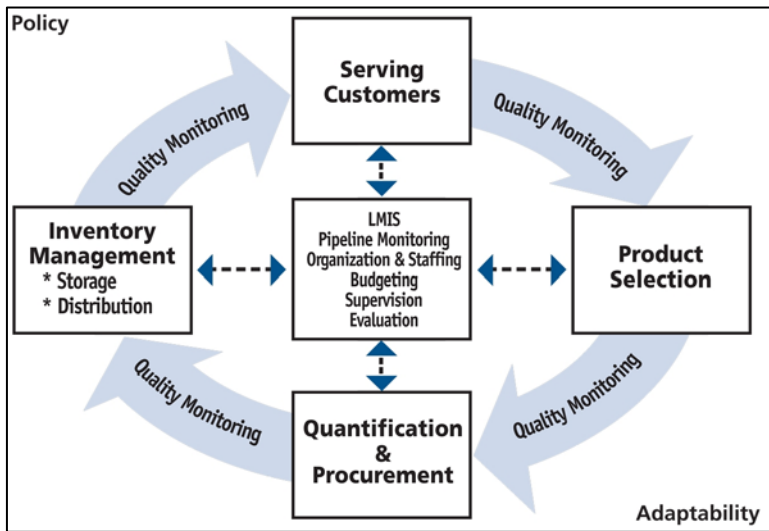
Tanzania Country Report 2007

In Malawi, the MOH asked the USAID | DELIVER PROJECT to conduct a quantification for HIV test kits. The project used the opportunity to build local capacity by including MOH staff from the pharmaceuticals unit, central medical stores, and the HIV and AIDS department throughout the exercise. MOH staff developed skills in collecting data from facilities throughout the country, processing the data to forecast future needs, and converting the requirements into a supply plan for the coming financial year. A

timeline and procedures for routine review and updating of the quantification and the procurement plan were developed. This compared actual consumption data against forecasted consumption and reviewed the assumptions made during the original quantification exercise.

4. Purposefully designing in-country logistics systems to meet current and evolving customer needs can prioritize use of resources and enhance performance over time.

Figure 3. The Logistics Cycle



Often, a significant factor leading to poor logistics system performance—characterized by stockouts, overstocks, and expiries—is the lack of purposeful design or implementation of the in-country logistics system, which can result in missing or poorly executed logistics management functions. Most public sector health systems have one or more logistics systems, which originally have been designed to serve a specific purpose and customer but over several years have evolved in an ad hoc manner away from the original purpose. Because of the environments in which they operate, supply chains are dynamic and are expected to evolve as the programs they support mature and expand. In the

absence of dedicated human and financial resources for managing the supply chain, many logistics systems have evolved without direction or have changed in response to financial constraints rather than to accommodate customer or commodity characteristics. One indication is that few public sector logistics systems collect consistent, nationwide logistics information for forecasting, planning, and budgeting purposes at the central level.

The key components of a logistics system include:

- a logistics management information system (LMIS) for collecting logistics data that are routinely analyzed and used for management decisions.
- an inventory control system (ICS) that guides the maintenance of established stock levels of commodities through standardized ordering procedures and maximum and minimum stock levels.
- quantification and procurement of products that have been carefully selected to meet the needs of the population.

As countries rationalize the number of supply chains in their health systems, and reducing duplication and complexity to place a greater emphasis on serving customers, the design of a logistics system should encompass a discussion of solutions for all components of the system, from the inventory control system and the LMIS, to infrastructure, transportation, and staffing challenges. Designing a logistics system not only includes determining the parameters of the system, but also documenting standard operating procedures and training staff in how to implement them. System designers should identify resources

required to monitor and manage the system, so that it can evolve in a purposeful manner to continue to meet the needs of its customers.

The USAID | DELIVER PROJECT has facilitated the design and implementation of HIV and AIDS logistics systems for a variety of countries, programs, and commodities, including HIV test kits, ARV drugs, OI drugs, and laboratory commodities. The approach developed by the project is to facilitate an interactive workshop where the users of the system are the designers of the system. This approach provides an opportunity to build an understanding and appreciation of logistics in the country, while fostering local ownership and identifying future champions of the system. Involving users from all levels of the system ensures that the needs of the ultimate customers are identified and that the design will accommodate these needs.

In Sierra Leone, the USAID | DELIVER PROJECT's mandate was limited to designing the logistics system for ARV drugs and training trainers to teach health facility staff across the country how to use and manage the new system. After years of civil war, Sierra Leone's infrastructure and systems were virtually nonexistent. The system design workshop provided participants with the tools and skills needed to help bring order to their situation. The staff within the National AIDS Secretariat were capable and dedicated and took on the next steps of implementing the system once the USAID | DELIVER PROJECT's involvement ended. The National AIDS Secretariat has since mobilized resources to enable trainings across the country, and hired and dedicated a person within the secretariat to monitor and manage logistics functions for the system.

Implementing a new logistics system requires a significant commitment of time and human and financial resources by the program and implementing partners. For a logistics system to be sustainable, the MOH must be committed to the implementation process and to ongoing system monitoring and management. This commitment includes numerous aspects; using the LMIS as an example, the commitment should include dedicating staff to the ongoing collection, analysis, and use of logistics data for decision making, (either by forming an LMU or employing a logistics officer), and taking responsibility for ongoing printing of ordering and reporting forms. In addition to the MOH commitment, support and commitment from other stakeholders to participate and utilize the designed logistics system is needed. In Zambia, the commitment of stakeholders to collect and report the same LMIS information has allowed the LMU to aggregate national data and regularly provide an up-to-date snapshot of the national stock situation.

A well-designed logistics system eases the burden on health care workers and improves the overall functioning of the supply chain, thereby facilitating rational decisions, maximizing the use of resources, and preventing unwanted stock imbalances at all levels of the system.

5. Prioritizing investments in the LMIS improves data visibility and strengthens strategic decision making for supply chain improvements.

Data visibility, in the context of supply chains, refers to two things: having access to information throughout the supply chain, and having mechanisms to use this information to respond to a situation or event to avoid supply imbalances. Increasing the visibility of information throughout the supply chain can help improve transparency and trust across the levels of the system, because users who need information to make decisions have it readily available. For example, when a feedback report from the central medical stores informs health centers that there are national-level shortages of a particular commodity, staff are able to plan for the shortage by adjusting the number of stockdays' dispensed or borrowing from neighboring health facilities.

When logistics information is readily available to supply chain users, who use the data to inform management decisions, supply chain performance improves. Supply chain operations depend on how efficiently data are collected, analyzed, and used to make routine supply chain decisions. Data need to be available to decisionmakers throughout the system, and presented in a useful way to facilitate decision making on use of resources and prevention on supply chain interruptions.

Improve reporting rates

The first step is to improve data collection through improving reporting rates from health facilities. When designing the logistics system, barriers to reporting should be identified and addressed. In countries where the USAID | DELIVER PROJECT has worked, data collection is usually paper based, relying on fax, mail, courier service, or transport to move the reports through the system. The following interventions can help to improve reporting rates:

- simplify reporting by limiting the number of data items to be collected,
- link reporting to resupply,
- reduce the reporting burden by lengthening the reporting interval for facilities, or computerizing the LMIS at the central level,
- provide feedback reports to motivate staff by demonstrating that the data they send are useful,
- address barriers to transmission of reports.

In Kenya, Zambia, and Zimbabwe, LMIS reporting rates for ARV drugs have averaged above 90 percent, reaching as high as 100 percent in some months. The strategies used in these countries include implementation of a “no report, no product” policy to encourage timely and complete submission of reports, increasing the reporting interval from one month to two months, employing a courier service to deliver reports to the LMU, and dedicating individuals at the LMU to follow up with non-reporting sites via phone or e-mail.

Present national stock status as months of stock on hand

Once collected, the data must be made available in a form that is meaningful for those using the information throughout the supply chain. The LMU is one such mechanism for compiling the information and sharing it in a useful way. The LMU collects the information, aggregates it, and presents it in different ways to the various stakeholders throughout the system. In a country or program where there may not be a logistics management unit, one or two logistics officers may be dedicated to a particular vertical program to manage the data.

In some situations, computerization has relieved the burden and reduced errors in the calculations required for data aggregation. In Zimbabwe, a central-level software tool called ZISHAC (Zimbabwe Information System for HIV & AIDS Commodities) is utilized to aggregate and analyze logistics data at the central level. In Kenya, an Oracle-based program is used to aggregate and analyze data. However, computers are not the answer to all data management problems. Before implementing a computerized LMIS, much consideration must go into deciding at what level in the logistics system computers should be used and which software package to use. Where computerization is not feasible, it is best to create simple worksheets that can be used to aggregate essential data items only.



Refer to *Turning the Digital Corner: Essential Questions for Planning for a Computerized Logistics Management Information System*

Ensuring that data collected and reported are useful also involves training staff on how to use the data, ensuring reports are submitted to the people who have the authority to respond to the information, and standardizing reporting forms so that recipients are familiar with the data presentation format and instantly recognize the information presented. Improving data visibility throughout the supply chain not only improves decision making, but also increases the transparency of decisions made by local and international organizations thereby ensuring optimal supply chain performance.

Conclusion

Strengthening supply chains for HIV and AIDS commodities is critical due to the implications of supply chain breakdowns for the final customers. When planning to improve supply chain performance, it is important to consider both operational and strategic interventions that target all levels and all components of the logistics system. As demonstrated, the Logistics Management Unit is a key management and operational structure for monitoring all supply chain activities within the logistics system, and is the vehicle through which best practices in supply chain management can be institutionalized.

The authors' views expressed in this publication do not necessarily reflect the views of the U.S. Agency for International Development or the United States Government.

USAID | DELIVER PROJECT

John Snow, Inc.

1616 Fort Myer Drive, 11th Floor

Arlington, VA 22209 USA

Phone: 703-528-7474

Fax: 703-528-7480

Email: askdeliver@jsi.com

Internet: deliver.jsi.com