



Chapter 18

Supply Chain Management in HIV/AIDS Programs

1. Introduction

HIV/AIDS prevention, care and treatment, and mitigation programs cannot succeed without a reliable and consistent supply of condoms, high-quality drugs, HIV test kits, laboratory reagents and medical consumables, etc. needed to support service delivery. Comprehensive and, effective prevention diagnosis, counseling and treatment programs sometimes require more than 120 distinct products. While the efforts to scale up HIV/AIDS interventions include increased investment in commodity procurement, not enough attention has been focused on the supply chain responsible for the management and delivery of these commodities.

The sheer volume of commodities required to provide HIV/AIDS services to initially thousands, and eventually millions, of people can be staggering and complex to manage. Furthermore, some of these products are new to the health care system and some require special handling such as a cold or a cool chain.

Investing in effective and efficient supply chains can maximize the use of resources, reduce waste, improve quality of service, and ultimately, ensure that customers receive the products they need and donors are persuaded to provide even more resources.

2. What is a Supply Chain?

The term supply chain describes the links of many organizations, people, and procedures involved in getting commodities to the consumers. Typically a supply chain would include partners from manufacturing, transportation, warehousing and service delivery. Together, these organizations orchestrate the flow of products, information and funds.

A key ingredient of a successful supply chain is that partners are focused on improved coordination and information-sharing, but more importantly, all of them are focused on serving the end-customers. Businesses around the world have shown that customer-driven²⁶ supply chains benefit all partners and consumers.

As shown in Figure 18.1, in health care, the supply chain partners usually include manufacturers, pharmaceutical companies, donors or funding agencies, procurement agents including UN agencies, ministries of health, health administrative units, central, regional and district medical stores, the private sector, NGOs and service delivery points (SDPs).

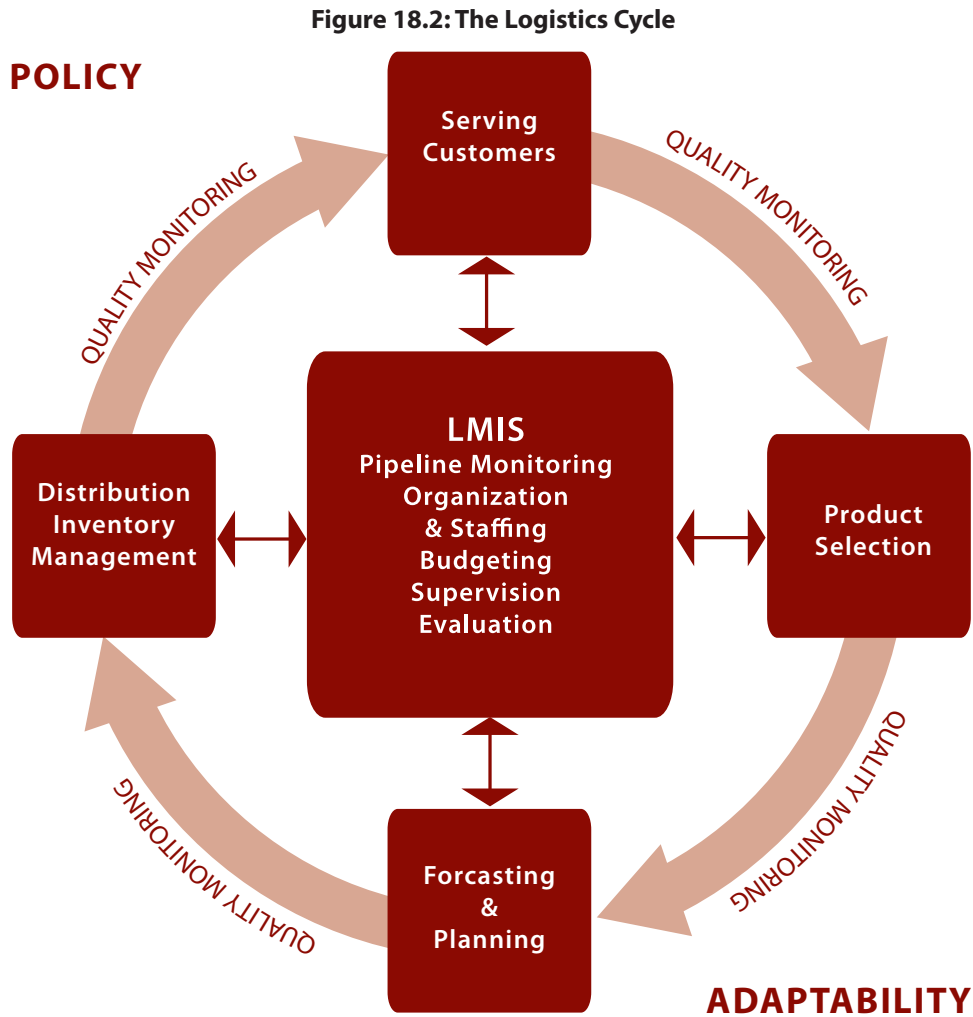
Figure 18.1: Supply Chain Partners



²⁶ All the partners of the supply chain are focused on the customer.

While the term supply chain describes the inter-relationships among organizations, logistics²⁷ refers to the specific functions that needs to be carried out by each of the supply chain partners such as selecting products, forecasting demand, procuring/ ordering, storing and delivering from one level to the next until the commodities reach the clients.

Figure 18.2, describes all the activities and resources that are continually needed to operate effectively. This is also known as the Logistics Cycle.



Source: DELIVER/John Snow Inc

Striking the balance between maximizing service and minimizing the costs of the system is a continuous challenge for health program managers. However, because of the high risk of drug resistance due to intermittent treatment, ensuring a full and continuous availability of health products is absolutely critical. On the other hand, maintaining excessive levels of drugs can be very costly.

Regardless the type of supply systems used for getting the commodities to the consumer, whether managed through the public sector or the private sector, the goals of commodity availability and accessibility are dependent on good logistics – the ability to accurately forecast, procure, transport and deliver the right goods, in the right quantities, in the right condition, to the right place, at the right time for the right cost. Even for those unfamiliar with the technical components of the logistics process, these goals would seem self-evident.

²⁷ While the concepts of supply chain and logistics are different, in practice, these terms are often used interchangeably.

Table 18.1: Importance of Logistics Functions

| Logistic cycle | This step is important because: | What may cause delays in the step? |
|----------------------|---|---|
| Product Selection | Specifies the products that need to be purchased | Lack of clinical protocols, guidelines or policy |
| Forecasting | Projects the total requirements for the short, medium and long term | Lack of data on the consumption patterns and on stock levels in the country |
| Procurement | Enables the products to be purchased | Poor specifications, incomplete projections, unclear procurement procedures |
| Storage | Stores supplies according guidelines in order to ensure that the shelf life of the product is well-maintained | Storage staff not informed of the procurement in the pipeline |
| Inventory management | Enables program managers to know the stock levels | Lack of a system in place, lack of stock cards |
| Transportation | Transports the commodities to its destination | Transport procedures unclear, commodities transported as a secondary item as part of other programs, transport managed on an ad-hoc basis |
| Re-supply | Enables service providers to get refills | Lack of procedures for the re-supply process. |
| Serving customers | Serves patients and improves health outcomes | Lack of availability of products |

3. Why is supply chain management important?

Supply chains help achieve the desired program impact. These include:

- Increases program impact and decreases drug resistance through consistent and reliable supply of essential products.
- Enhances quality of care by ensuring that the products are available for the services being delivered.
- Improves cost-effectiveness and accountability through reduction of loss and wastage.
- Increases customer satisfaction and brings rationality to the system.

In addition, each of the activities in the logistics cycle is also important, because the coordinated completion of each of the activities enables the products to be delivered to consumers.

4. What is needed for effective supply chain management operations?

Effective supply chain operations requires:

Policy Support

Policy makers need to understand the vital role played by logistics; value the tangible benefits and ensure that all customers are reliably supplied. A key to ensuring policy support is to include a “logistics champion” in the National AIDS - Program secretariat (or coordinating agency).

Customer Focus

The focus of the logistics operations should be on satisfying customer needs. A key to achieving a customer focus is for all the staff involved in the national HIV/AIDS programs to know their customers and their needs. For example, a successful logistics system will ensure that products that are simple to use and can be administered on site are delivered to locations that are convenient to the consumers.

Strategic Planning

Supply chain functions should be viewed as a mission-critical function that adds value to the outcomes of the health interventions. A key to achieving strategic planning is to ensure that an assessment of the supply chain is completed early in the process of developing the national HIV/AIDS program and the results are used to design and strengthen the system. A performance measure system of the logistics functions which assesses timeliness of deliveries, availability of products at the service sites (measured as percentage product availability or stockout rates), reduction of waste, etc. should be established and should drive the system.

People and Money

Investment of money and of trained people is critical for the effective management of a logistics system. A key to achieving an effective logistics systems is to invest at least 15 – 20 percent of the commodity cost in logistics²⁸. As the systems become more efficient, the overall cost of the system should go down. Staff skills in logistics activities should be appraised and plans made for improving capacity, if needed.

Logistics Management Information System (LMIS)

Reliable, accurate and timely logistics information should also drive the system. Three key logistics measurements are essential for day to day management of the supply chain: consumption, stock on hand and losses and adjustments. This information is not only important for daily stock management, but, aggregated and analyzed, enables managers to project future needs and to better negotiate with and manage suppliers. A key to achieving improvement in the management of the supply chain is to design and implement a basic manual LMIS that reports these key essential measurements

5. How to ensure that supply chain planning is adequate?

Logistics systems or supply chain management systems can be continually improved to provide better customer service, improve efficiency or effectiveness. However, there are four key areas that should be addressed early in the process of planning.

Product Selection

The first step to supply chain planning is to know the initiatives the national AIDS program will support and the commodities that will be required to meet that service delivery. *Figure 18.3:*

Generally, the framework for a comprehensive national HIV/AIDS program illustrates the range of services, commodities, and infrastructure required for service delivery. Each of the components of the program should be considered as part of a continuum of care for people living with HIV/AIDS and for HIV/AIDS prevention.

A Comprehensive HIV/AIDS Program

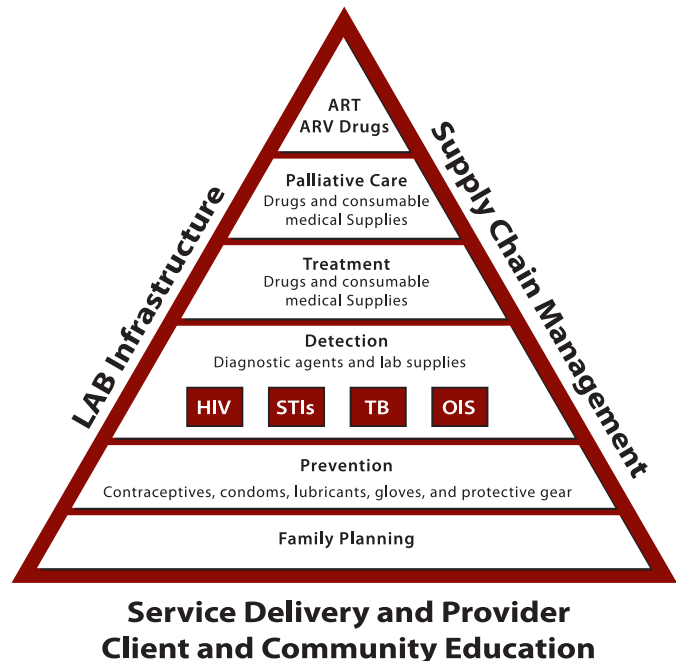


Figure 18.3: Systems and medical services for a comprehensive HIV/AIDS program

²⁸ According to the health care industry analyst reports, the cost of logistics is estimated from 15% to as high as 45% of the cost of commodities or hospital expenditure. Data on the cost of operating healthcare logistics systems in developing countries currently is lacking.

Selecting the right product is essential. Standard treatment guidelines, essential drugs list (EDLs), HIV testing protocols and national formularies should serve as a basis for product selection. Criteria for product selection is usually based on the standard guidelines provided by the World Health Organization²⁹(WHO).

In addition, to the standard WHO criteria, product choice should also take into account the implications for logistics management.

Logistics considerations for product selection include:

- Standardize and limit the number of commodities that are duplicative. A limited number of products makes the logistics functions easier to operate.
- Reduce commodities that require additional accessories such as semi-rapid tests.
- Purchase commodities that ease the burden on the provider and the client. For example, use of rapid assay HIV tests that allow for same day testing and confirmatory testing at the same site so clients don't have to make a return visit at a later date to receive results.

Planning and Forecasting³⁰

Where historically data are limited, it is difficult to accurately forecast needs. Quantification of HIV/AIDS commodities requirements should take into account the following factors:

- Treatment protocols, norms and standards.
- Estimates of numbers of beneficiaries to be served.
- Service absorptive capacity such as staff skills, infrastructure, etc.
- Laboratory infrastructure and capacity for services requiring laboratory diagnostics (e.g. treatment of TB, OIs and ARVs).
- Status of the supply pipelines and stock levels in-country.

New or expanding HIV/AIDS programs and rapidly changing technologies make it particularly important for supply chains to be able to adapt to changing needs. To ensure an effective and timely response to changes in demand, it is critical to:

- a) Initiate/establish a logistics management information system (LMIS) that captures the three essential data items; – consumption, stock on hand, and, losses and adjustments and that routinely aggregates and analyzes these data at the national level, as early as possible in the project cycle.
- b) Ensure flexible procurement mechanisms that allows for changes in quantities and product formulations.
- c) Negotiate flexible delivery schedules with suppliers to adjust to program demands.

Procurement

From a logistics perspective, uncertainty of forecasts, rapid change in technology and, shorter shelf life of some products, requires flexibility in the procurement³¹ process that allows for purchasing of smaller quantities, more frequent deliveries and changes in product selection in order to take advantage of new and improved products as they become available. While the unit cost of this type of procurement may be high, delivered cost may be low as it reduces the risk of loss due to expiry, pilferage, or poor storage.

²⁹ These include: product's relevance to priority health problems; proven efficacy and safety in a variety of settings; quality of product; favorable cost-benefit ratio; and affordability.

³⁰ Refer to Technical Guide: "Battling HIV/AIDS: A Decision Maker's Guide to the Procurement of Medicines and related Supplies" Chapter 4- Product Selection, Quantification, and Quality Assurance, for more information

³¹ Refer to Technical Guide: "Battling HIV/AIDS: A Decision Maker's Guide to the Procurement of Medicines and related Supplies" Chapter 5-Procurement and GOM Chapter 22 "Procurement of HIV/AIDS Medicines and Supplies", for more information

Commodities can be procured either by: (a) the National HIV/AIDS Program using National Competitive Bidding, International Competitive Bidding or Limited International Bidding methods (also see the chapter on procurement for other methods); (b) a Procurement agent like a private sector agency or UN agencies. The best procurement method will depend on the nature of the goods procured, capacity etc. It is important that flexibility and staggered delivery are included in the procurement, no matter which type of procurement method is used.

Product Registration and Quality Assurance ³²

Product and supplier registration and quality assurance can take a substantial amount of time that can lengthen the procurement process and result in products being quarantined. Early in the procurement planning, the process of registration and quality assurance should be clearly outlined, streamlined and waivers should be obtained, if necessary.

Distribution ³³

Distribution includes storage, inventory management, re-supply procedures and transportation. There are several ways in which products are delivered to the health care service providers and the consumers/beneficiaries. These include a public sector distribution system, a NGO managed system, commercial systems or a combination of some or all. In order to rapidly mobilize for scaled-up HIV/AIDS commodity programming, it is likely that many or all distribution networks may be used to get the product to the provider and client as quickly as possible. A key principle that could dramatically improve the distribution and inventory management is to reduce the number of intermediate storage points such as regional and district warehouses. This strategy would decrease storage and inventory costs required for the operation.

A major stumbling block to streamlining distribution networks in the public sector is that many of the supply chains mirror government administrative structures. Supply chains increasingly need to de-link from government administrative structures. This is even more critical for HIV products with short shelf lives as, every intermediate storage level, lengthens the pipeline, which increases the risk that the products will expire before reaching the provider and consumer.

The first step in gaining a better understanding of the efficiency and effectiveness of these distribution systems is to conduct an assessment, that identifies the limitations and challenges of each of the systems. In addition to the findings of the assessment, there are generic principles of distribution management that specifically impact the HIV products and should be universally applied.

Storage

- Adequate and appropriate storage is available at the national level, and at every intermediate level down to the final customer.
- Procurement plans take into account storage capacity.
- Storage space is secure, especially for ARVs which are expensive and risk being pilfered.
- A cold chain system is in place for those HIV products that require it.

Inventory management

- Max and Min inventory control systems are in place.
- FEFO (First Expiry-First Out) procedures are used when distributing products.
- Stock cards for record-keeping are used on a daily basis to manage inventory.

³² Refer to Technical Guide: "Battling HIV/AIDS: A Decision Maker's Guide to the Procurement of Medicines and related Supplies" Chapter 4- Product Selection, Quantification, and Quality Assurance, for more information

³³ Refer to Technical Guide: "Battling HIV/AIDS: A Decision Maker's Guide to the Procurement of Medicines and related Supplies" Chapter 3- Managing the Supply Cycle for Better Outcomes, for more information

Transportation

- Secure transportation system and procedures in place for transporting high-value commodities.
- Cold chain system in place during transportation for those products that require it
- Reliable, timely, scheduled delivery will bring confidence in the system and reduce hoarding behaviors.

Re-supply

- Supply imbalances will inevitably occur if everyone in the system does not understand or adhere to proper re-supply procedures.
- A push system is a better approach when demand of the commodities exceeds supply³⁴.

Logistics Management Information System (LMIS)

- A well functioning LMIS is required if the logistics system is to operate effectively and ensure product availability to the consumer.
- Automated LMIS systems are even more critical due to the sheer volume of data expected to be generated in the management of HIV products³⁵.

6. What are the Specific HIV/AIDS Program-Product Issues?

Table 18.2, outlines the specific issues related to the management of HIV products that bring added complexity to the existing logistics systems.

Table 18.2: Logistics implications of HIV products

| Program | Logistics Complexity | Potential Solutions |
|----------------------------------|--|--|
| Condom Distribution | Distribution of the condoms need to include non-traditional places such as bars, hotels, etc. | Consider segmenting the market, and using the commercial and or social marketing programs to complement the public sector. |
| Volunteer Counseling and Testing | Many of the reagents have a short-shelf life. Semi-rapid HIV tests kits require additional accessories and bring an added management burden. HIV testing is conducted off-site. This requires a reliable logistics system to transport blood samples, testing results and requires clients to make multiple trips to the service center. | Shorten the pipeline Consider rapid-only tests Consider rapid tests which can be used on site and provide same day results. |
| Sexually Transmitted Infections | Some of the STI antibiotics are used for other diseases, especially when the general essential drug system does not have enough supplies | Consider meeting the supply needs for both STI and other diseases. Assist in developing a rationing strategy Improve rational drug use |
| Palliative care | The drugs and supplies for palliative care can be used for other diseases. | Consider meeting the total supply needs. Assist in developing a rationing plan Improve rational drug use |
| ART | ARVs are costly ARVs have to be managed in full supply, otherwise there is a high risk of drug resistance. Cost of maintaining full-supply of products can be costly | Secure the logistics system. Long-term financing needs to be planned for the ARV program Streamline the logistics system |

³⁴ Re-supply can be based on a “push” – where the higher administrative levels determines the order quantity; or a “pull” – where the system receiving the supplies determines the order quantity. Either systems can work, and one is not better than the other, if there is adequate communication and data flowing between the levels.

³⁵ Logistics systems have to be information based. The Logistics Management Information System (LMIS) is the engine that drives the supply chain. The data enables program managers to improve forecasts and procurement plans.

7. Lessons Learned and Recommendations

Priority given to supply chain management.

- Countries normally underestimate the complexity, planning and resource requirements, and funding needed for proper supply chain management. As a result programs often get off to a poor start, angering beneficiaries and frustrating donors. Planning for and investment in supply chain management needs to be done at the start of program implementation.

Contracting

- Contracting for many aspects of supply chain management should be considered as a priority not as a last resort.

Finance

- Use of the commercial sector and market segmentation could enable governments to use their resources more strategically – providing free or subsidized supplies and services to the poorest clients or those at highest risk.

Access

- Commercial or social marketing programs can be used to complement the public sector. It could also provide clients with an alternate outlet for getting supplies.

Impact of health sector reforms

- For effective decentralization of logistics systems, staff at local levels need to be well trained and information sharing between levels is vital.
- Integration of supply systems needs to be well planned and executed. Process reengineering methodologies should be used to guide the process of system integration and simplification.

Policy

- When launching a new HIV/AIDS program, collecting baseline data on logistics system capacity and performance can inform the design of the system and resource requirements. This data can also be used to advocate for sufficient resources and to monitor performance of the system over time in order to make adjustments as needed. Identifying and addressing the root cause of each problem requires an understanding of the situation particular to each country setting and adapting generic frameworks and processes to fit each country's needs.

Product Selection

- A limited number of brands of rapid HIV test kits should be selected on the basis of their technical performance (high sensitivity and specificity); preference might be given to those that do not require cold chain storage

Forecasting and Procurement

- The provision of sharps/safety boxes is required to ensure the safe disposal of contaminated sharps. Current supplies remain inadequate to meet the demand for safe disposal of infectious medical waste in health facilities.
- Flexible and staggered shipping schedules to allow more frequent and smaller shipments of HIV/AIDS commodities will maximize product shelf life, reduce product wastage, and avoid overburdening the in-country supply pipeline.

Distribution: Storage, Inventory Management, Ordering and Transportation

- The high price of ARVs and the nature of their use for prolonging survival and improving quality of life of HIV/AIDS patients make ARVs more subject to pilferage and leakage to other markets. Therefore, strict monitoring of inventory levels and secure transportation and storage facilities will be needed. New procedures for handling ARVs should be as consistent as possible with existing procedures for handling high value or restricted access drug items in health facilities.

Logistics Management Information System (LMIS)

- A well functioning LMIS is required if the logistics system is to operate effectively and ensure the availability of quality products at service delivery points. Close monitoring of product consumption and stock levels through routine reporting is particularly important for ensuring an adequate supply of quality products, responding to changes in demand, managing increased volumes of commodities, and minimizing pilferage and misuse. It is essential that the LMIS be designed and in place to collect, analyze and disseminate information on stock on hand, dispensed-to-user data and losses and adjustments before distribution of products begins.

Product Use

- Clinical algorithms can help with the proper use of the products

Medical Waste Management

- Planning and budgeting for the consistent use of auto-disable syringes helps ensure that injections are given with a sterile syringe and needle since these devices cannot be reused. Ensuring safe injections reduces the risk of iatrogenic transmission of HIV, as well as other blood-borne pathogens.
- The provision of sharps/safety boxes is required to ensure the safe disposal of contaminated sharps. Current supplies remain inadequate to meet the demand for safe disposal of infectious medical waste in health facilities.
- Bundling sharps boxes with the corresponding quantities of syringes/needles can ensure that the two are distributed together and in sufficient quantities.

