



WHAT A SUPPLY CHAIN MANAGER NEEDS TO KNOW:

A supply chain manager needs to know the following, which are covered in this chapter:

- The critically important role played by supply chains in attaining health objectives, and the six rights of supply chain management
- The full range of activities that combine to constitute the supply chain
- The role of the supply chain manager as a steward of the supply chain
- How the concepts of supply chain integration, evolution, and segmentation apply to their own supply chains

I.1 WHAT IS SUPPLY CHAIN MANAGEMENT?

A strong health system cannot function without a well-designed, well-operated, and well-maintained supply chain management system—one that can ensure an adequate supply of essential health commodities to the clients who need them.

According to the Council of Supply Chain Management Professionals (CSCMP) —

“Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement...and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.”

Logistics activities are the operational component of supply chain management, including functions such as quantification, procurement, inventory management, warehousing, transportation and fleet management, and data collection and reporting.

Supply chain management includes the logistics activities plus the coordination and collaboration of staff, levels, and functions, with the ultimate goal of aligning supply and demand. A public health supply chain is a network of interconnected organizations or actors that ensures the

availability of health commodities to the people who need them. In this chapter, we will first consider logistics activities, and then discuss supply chain integration, which provides a context in which the logistics activities take place.

Organizations in the supply chain often include departments of ministries of health (procurement, planning, drug regulatory board, human resources, and health programs); central medical stores; donors; nongovernmental organizations (NGOs); regions and districts; health facilities; community health workers; and private sector partners, such as third-party logistics providers, drug manufacturers, distributors, and private service providers.

This network of actors is nested within a country’s health system and the operational and socio-economic environments. Supply chains must satisfy demand for essential health commodities across sectors (public, private, and nongovernmental) and operate at each level of the system — from manufacturers to central warehouses down to communities, and into the hands of customers.

This handbook focuses on specific logistics activities that are undertaken within the context of an integrated supply chain model. This model promotes collaboration and seamless linkages between the activities, levels, and people responsible for managing the supply chain.



Photos courtesy of IAPHL

I.2 WHY SUPPLY CHAINS MATTER

The goal of a public health supply chain is much larger than simply making sure a product gets where it needs to go. Ultimately, the goal of every public health supply chain is to improve health outcomes. A properly functioning supply chain is a critical part of ensuring commodity security—*when every person is able to obtain and use quality essential health supplies whenever he or she needs them.*

Supply chains also help determine the success or failure of any public health program. Both in business and in the public sector, decision-makers increasingly direct their attention to improving supply chains, because these improvements bring important, quantifiable benefits. Well-functioning supply chains benefit public health programs in important ways by—

- Increasing program impact
- Enhancing quality of care
- Improving cost effectiveness and efficiency

SUPPLY CHAINS INCREASE PROGRAM IMPACT

If a supply chain provides a reliable supply of commodities, more people are likely to use health services. Customers feel more confident about the health program when there is a constant supply of commodities—it motivates them to seek and use services. Figures 1.1 and 1.2 show the program impact of improved product availability. In figure 1.1, as the availability of a mix of contraceptive methods improves, the contraceptive prevalence rate (CPR) for the public sector increases. Studies have demonstrated that when a choice of contraceptive methods is available in health facilities, more women use contraception. When more women use contraception, it affects a number of key public health indicators—maternal mortality, infant mortality, and total fertility rates all decrease.

Health programs cannot succeed unless the supply chain delivers a reliable, continuous supply of health commodities to its customers.

**NO PRODUCT?
NO PROGRAM!**

FIGURE I-1.

CORRELATION BETWEEN CONTRACEPTIVE PREVALENCE RATE AND PRODUCT AVAILABILITY

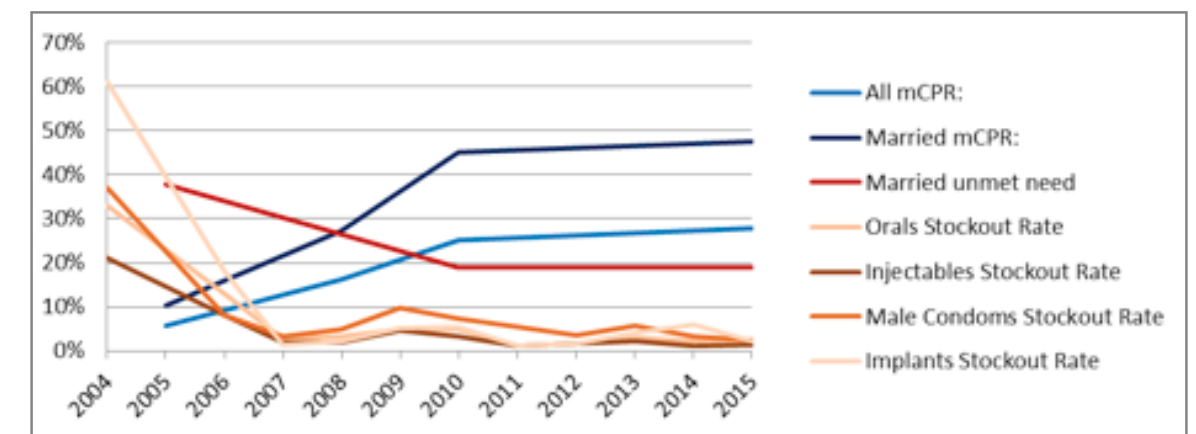
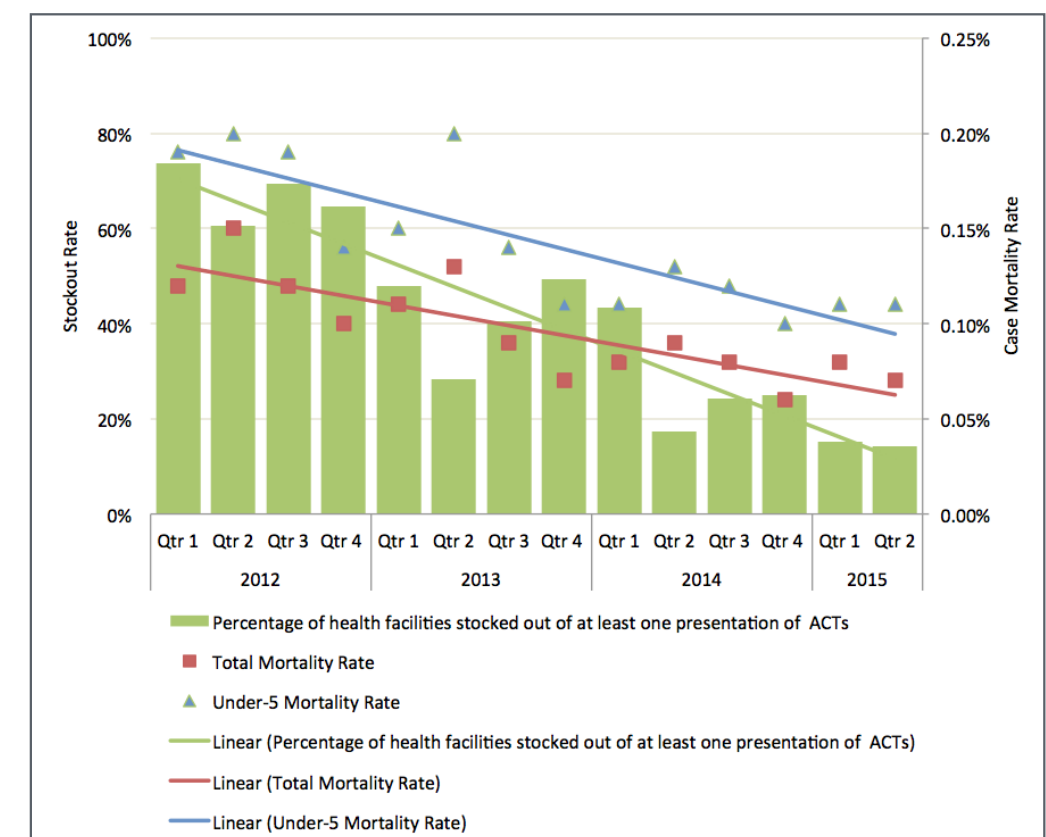


Figure 1-2 shows that improved product availability of malaria treatment reduces malaria case fatality rates. When a person with malaria is able to receive prompt and effective treatment with artemisinin-based combination therapies (ACTs), case outcomes improve.

FIGURE I-2.

CORRELATION BETWEEN MALARIA MORTALITY RATES AND PRODUCT AVAILABILITY



Photos courtesy of USAID | DELIVER Project



SUPPLY CHAINS MATTER.

SUPPLY CHAINS ENHANCE QUALITY OF CARE

Medicines and medical supplies are essential components of health services. Well-supplied health programs can provide superior service, while poorly supplied programs cannot. Likewise, well-supplied health workers can use their training and expertise fully, directly improving the quality of care for clients. Customers are not the only ones who benefit from the consistent availability of commodities. An effective supply chain helps provide adequate, appropriate supplies to health providers, increasing their professional satisfaction, motivation, and morale. Motivated staff are more likely to deliver a higher quality of service.

SUPPLY CHAINS MATTER.

EFFECTIVE SUPPLY CHAINS IMPROVE COST EFFICIENCY AND EFFECTIVENESS

An effective supply chain contributes to improved cost effectiveness in all parts of a program, and it can stretch limited resources. Strengthening and maintaining the supply chain is an investment that pays off in three ways: (1) It reduces losses due to overstock, waste, expiry, damage, and pilferage; (2) it reduces costs due to inefficiency; and (3) it protects other major program investments.

SUPPLY CHAINS MATTER.

SUPPLY CHAINS SHOULD MATTER TO YOU!

It is not enough that supply chain managers know that public health supply chains provide commodity security and improve program impact, quality of care, and cost efficiency, we must convince policymakers and decision makers that investing in supply chains will increase overall program effectiveness and improve health outcomes. We must show them that for any public health program to deliver high-quality, comprehensive services (and ultimately improve health outcomes), a robust supply chain for managing health commodities must be in place. We must demonstrate to them that supply chains matter.

1.3 THE SUPPLY CHAIN AND THE SIX RIGHTS

Consider a public health supply chain in a developing country. It could include the following components:

- **Warehouses** — from central, intermediary (such as regions, provinces, or districts), down to the storeroom at the health facility—act as storage facilities, where health commodities are held until they are given to another facility or a customer
- **Transportation assets** — a variety of transportation means — from large trucks to smaller trucks to bicycles and canoes — move the products from the warehousing facilities to the health facilities or community health workers

The Six Rights of Logistics

The **RIGHT** goods
in the **RIGHT** quantities
in the **RIGHT** condition
delivered...
to the **RIGHT** place
at the **RIGHT** time
for the **RIGHT** cost.

- **Service delivery points** — where customers receive the products that they need. Service delivery points are health facilities, including hospitals, clinics, and health centers. Customers may also receive the products they need in the community, from a community health worker — at the last mile of the supply chain.

These components help make up the in-country supply chain (sometimes called the pipeline). It is the entire chain of physical storage facilities and transportation links through which supplies move from the manufacturer to the user, including port facilities, central warehouse, regional warehouses, district warehouses, all service delivery points, and transport vehicles.

The goal of the public health supply chain—improving health outcomes—is achieved by ensuring the six rights - that the right goods, in the right quantities, in the right condition, are delivered to the right place, at the right time, for the right cost.

Whether a supply chain supplies soft drinks, vehicles, or pens; or manages contraceptives, essential drugs, or other commodities, these six rights always apply.

WHAT IS THE RIGHT COST OF A DONATED GOOD?

In many health programs, health commodities are donated by multilateral or bilateral agencies, private foundations or charitable organizations, or paid for by grants from multilateral agencies. If an item is donated, does the sixth right, *at the right cost*, still apply?

Yes. Even if the product is donated, the program may still be responsible for paying the other supply chain costs — the cost of clearing, storing, and transporting the products, as well as collecting data and reporting on how the products are used.

1.4 THE ROLE OF THE SUPPLY CHAIN MANAGER

Supply chain managers have overall responsibility to ensure the continuous supply of health commodities wherever and whenever they are needed. The concepts described in this handbook will help supply chain managers that are responsible for improving, revising, designing, operating, and monitoring all or part of a supply chain.

Supply chain managers are often responsible for the following:

- Provide the stewardship function for the public health supply chain—providing vision and guidance for its design, operation, and oversight
- Develop and implement a supply chain strategy and system design(s)
- Identify the financing required for the commodities and supply chain operations, develop a strategy for ensuring adequate financing, and monitor the efficient and effective use of these resources

- Identify supply chain performance drivers and bottlenecks, and formulate actionable solutions to address challenges to ensuring product availability
- Leverage private sector capabilities of providing supply chain services
- Utilize state-of-the-art approaches/standards for supply chain design—whether the entire network from sourcing to last mile, or discrete system segments/components—with a focus on supply chain efficiency and performance, utilizing the levers of change, while understanding the political factors of design
- Provide overall direction and management to the public health supply chain and supply chain organizational structures (such as a logistics management unit)
- Establish and strengthen coordination among the Ministry of Health departments, programs, and agencies, the Central Medical Stores, private sector partners, funding agencies, and other supply chain actors, ensuring coordination on supply chain strengthening activities
- Develop annual workplans and budgets for the public health supply chain, and mobilize any necessary resources
- Measure and monitor the overall performance of the supply chain, using established key performance indicators
- Cultivate a capable supply chain workforce, implementing any capacity building strategies
- Advocate for the necessary resources to successfully operate the supply chain and highlight the supply chain's contribution to national public health objectives

Supply chain managers do not need to be expert in every aspect of supply chains; the topics covered in this handbook provide foundational knowledge for the supply chain manager, who can identify specialized technical resources when necessary.

STEWARDSHIP AND THE PUBLIC HEALTH SUPPLY CHAIN

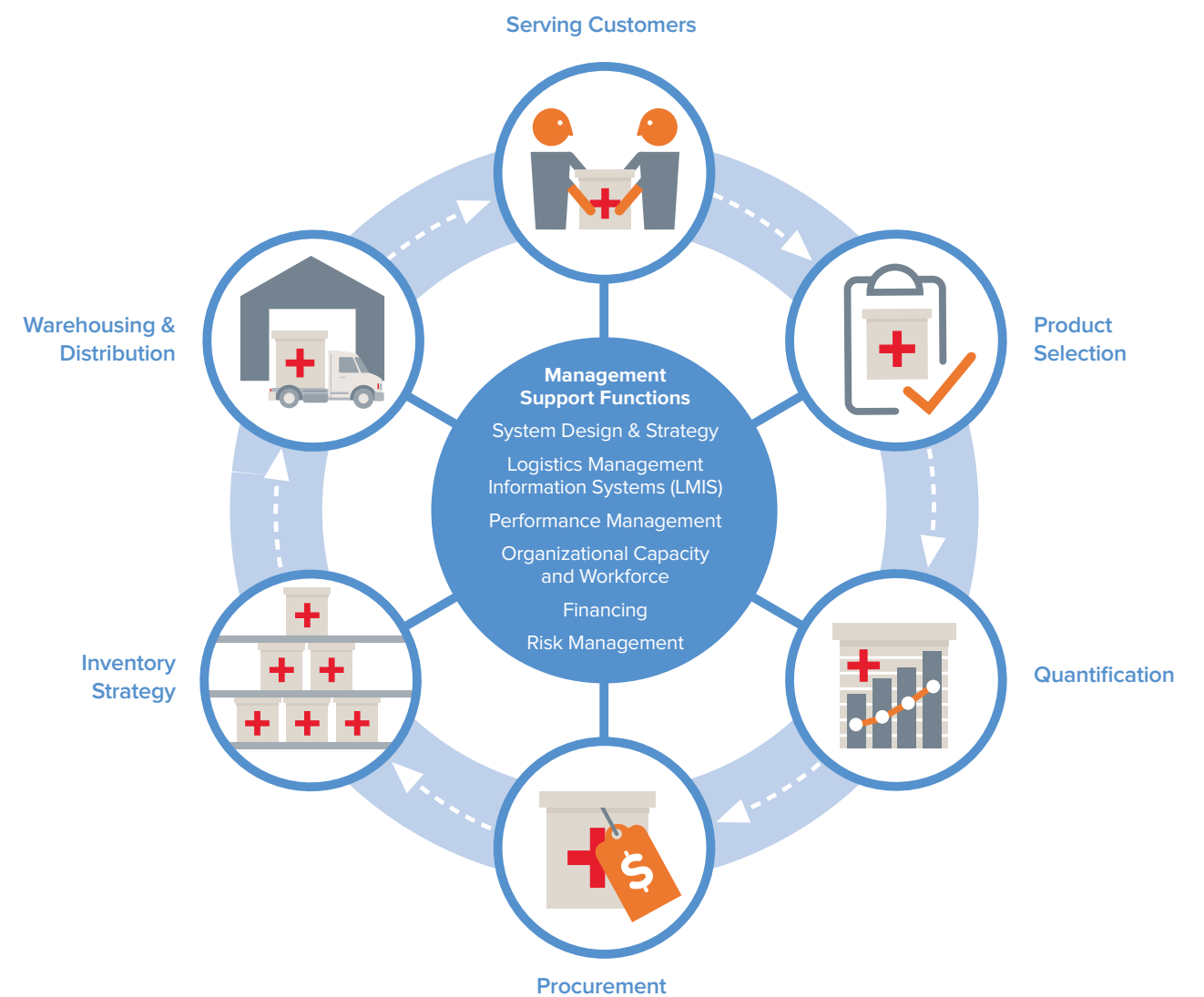
In many countries, governments have acted as operators of supply chains. However, governments should see themselves as stewards of the public health supply chain—providing vision, guidance, and oversight to ensure that supply chains achieve results—serving the needs of customers to improve and maintain people's health. As stewards, governments have the responsibility to take a holistic approach to the multiple players and various supply chain systems in country—to weave these into an integrated system,

reducing redundancy across supply chains, while minimizing supply disruption. Undoubtedly, strong public health systems and supply chains require mature and continuous stewardship, or oversight, from the public sector. The stewardship role of the state is designed to ensure that actors from all sectors—public, subsidized, and private/commercial—offer their products and services competently, equitably, and cost-effectively. The supply chain manager must take a lead role in the government's provision of this stewardship function and is responsible for its effectiveness.

I.5 LOGISTICS CYCLE: ORGANIZING LOGISTICS ACTIVITIES

As mentioned in the introduction, supply chain management is a system that integrates activities, people and partners to closely align supply and demand. Zooming in, we can consider logistics activities as the operational component of supply chain management. Figure 1-3 shows the logistics cycle, a model to illustrate the activities in a logistics system.

FIGURE I-3.
THE LOGISTICS CYCLE



You will first notice that the cycle is circular, which indicates the cyclical or repetitive nature of the various elements in the cycle. Each activity—serving customers, product selection, quantification, procurement, inventory strategy, warehousing, and distribution—depends on and is affected by the other activities.

The activities in the center of the logistics cycle represent the management support functions that inform and impact the other elements around the logistics cycle.

Below is a summary of the elements shown in the logistics cycle, including the:

- Major activities in the cycle
- Heart of the logistics cycle

1.5.1 MAJOR ACTIVITIES IN THE LOGISTICS CYCLE

Major activities in the logistics cycle include:

Serving customers. Everyone who works in supply chain must remember that they select, procure, store, distribute, or dispense products to meet customer needs, and that each customer receives the right product based on established protocols. In addition to serving the needs of the end customer—the customer seeking health services—each person in the process is also serving the needs of more immediate customers. Storekeepers provide customer service when they issue medicines to the health facility, and the central medical stores provide customer service when they issue commodities to the district. The supply chain ensures customer service by fulfilling the six rights. Each activity in the logistics cycle, therefore, contributes to excellent customer service and to ensuring better health outcomes.

Product selection. In any public health supply chain, health programs must select products. In most countries, a national formulary and therapeutics committee, with membership drawn from medicines regulatory agencies as well as pharmacy, medicine, and nursing professional practice regulatory bodies, and other government-appointed persons may be responsible for product selection. Most countries have developed essential medicine lists patterned on the World Health Organization (WHO) Model List. Products selected for use will impact the supply chain, so the supply chain requirements must be considered during the product selection. The output of product selection is a national essential medicines list that is guided by standard treatment guidelines and recommended protocols for service delivery.

Quantification. After products have been selected, the required quantity and cost of each product must be determined. Quantification is the process of estimating the quantity and cost of the products required for a specific health program (or service), and determining when the products should be procured and delivered to ensure uninterrupted supply of products.

Procurement. After a supply plan has been developed as part of the quantification process, products must be procured. Health systems and programs should be strategic about their

procurement activities, which should be carefully researched, planned, and monitored, all while abiding by the applicable rules and regulations. This will enable the procurement to be carried out in a timely manner, according to an open, fair, and competitive process and to ultimately supply quality-assured products for the best value of the program.

Inventory strategy. Inventory plays a key role in meeting the objectives of the supply chain, and it is the responsibility of the supply chain manager to ensure that inventory policies are in place to support the organization’s mission, goals, and objectives related to health. The decision to hold inventory provides organizations with a means to balance supply and demand. A cohesive inventory strategy will define policies that determine which products to hold in inventory, how much inventory to hold, and where to hold them, and ensures that inventory management decisions are documented and applied consistently across the system.

Warehousing and distribution. After an item has been procured, its physical management, through various levels of an in-country supply chain, must be carried out in a structured way to ensure that it will be protected from harmful environmental conditions or handling and is available, accessible, and in good condition while posing no risk of injury to workers. To meet this requirement a combination of interventions requiring both physical infrastructure and structured procedures must be maintained.

1.5.2 HEART OF THE LOGISTICS CYCLE

The center of the logistics cycle consists of management functions that support the operational components.

- **Logistics Management Information Systems (LMIS).** In the beginning of the cycle, supply chain workers and managers gather information about each activity in the system and analyze that information to make decisions and coordinate future actions. For example, information about product consumption and inventory levels must be gathered to ensure that a manager knows how much of a product to procure. An LMIS collects data about the supply of and demand for commodities and these are most often used for routine operations, such as ordering and replenishing supplies for health facilities. Logistics data are used for making informed decisions about activities within the logistics cycle.
- **Supply chain workforce.** The workforce employed to manage and operate the supply chain is its most important resource. To run effectively, a public health supply chain requires dynamic staff at all levels who are motivated and possess the competencies required to fulfill essential supply chain functions, whose performance is supported and improved through supervision, continuous learning, and opportunities for further development. Staff must also be empowered to make decisions and take action, positively impacting health supply availability and supply chain operations.
- **Financing.** Health commodities and the supply chains that deliver them need to be adequately resourced. Allocation and management of finances directly affect all parts of the logistics cycle, including the quantities of products that can be procured, the amount of

storage space that may be available, the number of vehicles that can be maintained, and the number of staff working in logistics. Mobilizing resources and securing a budget line item for health commodities and logistics activities is extremely important to ensure that products are available and that the logistics system operates effectively. Supply chain managers need to have a strategy and plan for ensuring the financing required for the commodities and supply chain operations, and for monitoring costs and funding to ensure viability of ongoing operations.

- **Performance management.** Routine monitoring of the supply chain's performance, including rigorously reviewing, analyzing, and fine-tuning key performance indicators, is necessary to determine the current status, effectiveness, and efficiency of supply chain operations. In the spirit of continuous improvement, performance data can indicate to supply chain managers whether adjustments in policies or procedures are warranted.
- **Risk management.** Risk management is a formal approach to identifying and mitigating sources of disruption and dysfunction within a public health supply chain, helping managers devote planning efforts and management attention where they're needed most.



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ENSURING PRODUCT QUALITY THROUGHOUT THE SUPPLY CHAIN

Products that are quantified should be on the national essential medicines list (EML), be approved and registered for use in the country, and be included in appropriate standard treatment guidelines (STGs). Also, service providers must be trained to correctly use the products before they are procured and distributed to facilities.

To ensure product quality, procurement documents must include detailed product and packaging specifications, and the expectations for quality at the time of receipt. After procurement, program managers must check that the procured commodities meet the requisite quality criteria before they enter the distribution system.

As products are received, stored, and distributed (and when customers receive them), it is important to monitor product

and packaging condition and shelf life, and that any special handling requirements, e.g., cold chain, are strictly adhered to. Furthermore, the quality of the storage facilities and transportation mechanisms should be articulated in policy documents and monitored using standard operating procedures. The inventory control system must be designed so that, if followed, customers will receive the products they need, at the time they need them, in the quality they need.

Health workers must adhere to standard treatment guidelines when serving clients, monitor product and packaging condition and shelf life, and observe all handling special requirements for the products they dispense. Quality monitoring of both the product and the service is critical to the success of efforts to promote the appropriate use of products.

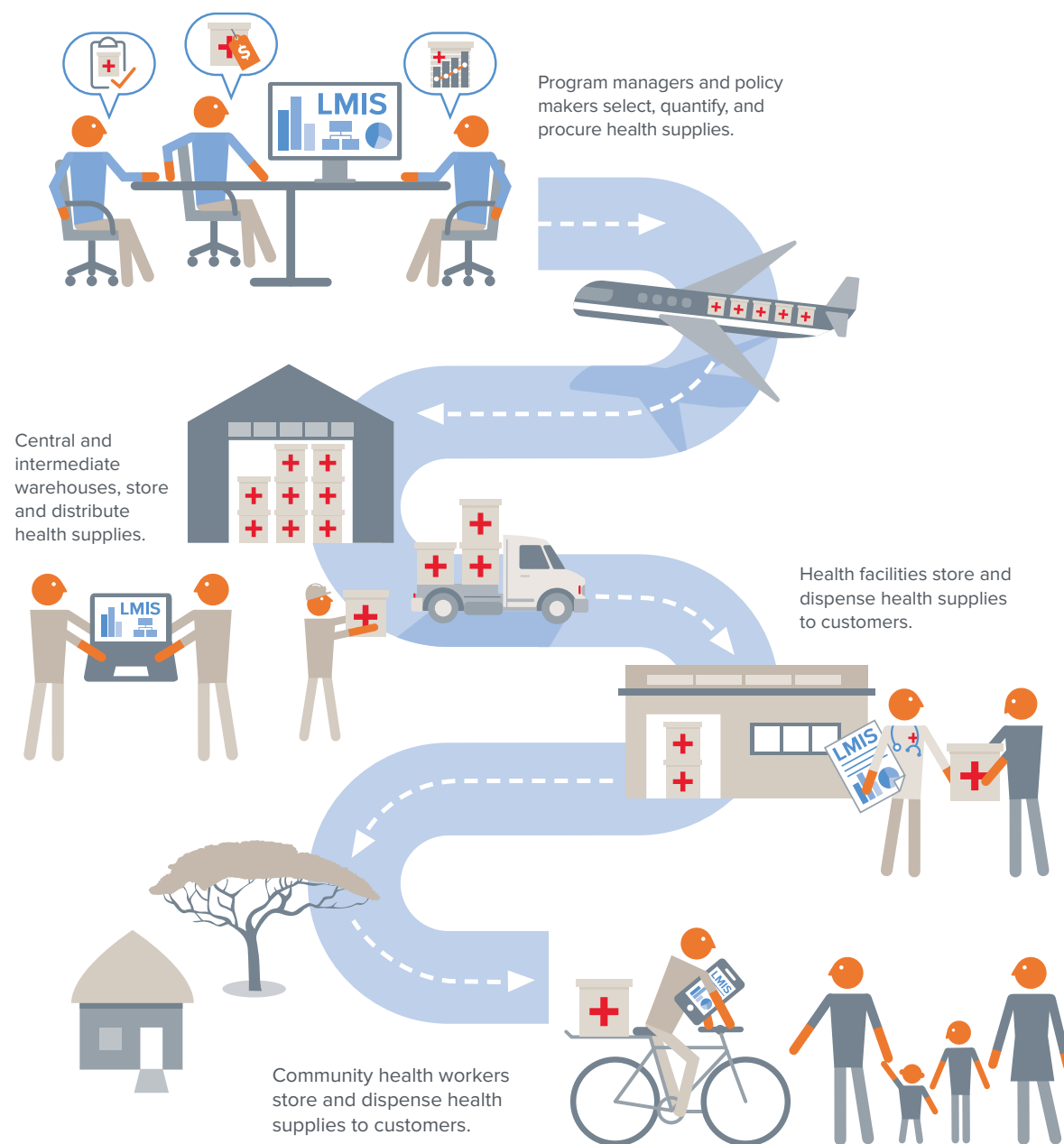
1.6 SUPPLY CHAIN INTEGRATION

Zooming out to supply chain management more broadly, an integrated supply chain has seamless links among the various actors, levels, and functions within a given supply chain to maximize customer service, to ensure that clients have access to quality health care services and supplies wherever and whenever they are needed. Information on supply and demand is visible up and down the chain; there are no redundant steps in its processes; and there is alignment of objectives, trust, communication, and coordination among all the levels and actors in the chain. Integration provides the framework for the activities in the logistics cycle to operate effectively. This kind of integration is different from the integration or combining of one or more functions of existing parallel supply chains to achieve efficiencies. See the segmentation section below for more on this.

An integrated supply chain management system has the capacity to learn from errors, self-assess, and adapt through continuous improvement processes. It leverages resources from all parts of the supply chain and enables rational implementation of innovations and new technologies.

People managing integrated supply chains use data about products, costs, and customers to make decisions and to optimize performance across functions, levels, and partners. Figure 1-4 shows the integrated public health supply chain.

FIGURE 1-4.
THE INTEGRATED PUBLIC HEALTH SUPPLY CHAIN



- Activities (as described in the logistics cycle) in an integrated supply chain (for example, product selection, procurement, warehousing, and distribution) are all steps in an

interconnected process. Program managers must use consumption data during the quantification process to procure the right quantities of products. Likewise, product selection can have an impact on warehousing and distribution, as the attributes of products can influence warehouse and transportation requirements.

- People at different levels of the system (central, region, district, health facilities, communities) carry out various supply chain management activities and must understand how they link to others in the supply chain. When central warehouse managers are aware of reporting and ordering processes carried out by personnel at the facility level, it helps them anticipate how and when they will receive orders and how order quantities reflect quantities delivered to customers.
- Partners across programs, organizations, and sectors must work together in a coordinated way. When international donors harmonize the data they require from national supply chain managers, it allows busy health system staff to streamline their information systems and focus on other important task.

An integrated approach to supply chain management takes a whole system perspective, rather than looking at separate activity, such as a LMIS or warehousing; or separate programs, such as HIV and AIDS or malaria; or separate levels, such as central or regional. Integration results in a more cost-effective, agile, and reliable supply chain, yielding lower stockout rates, reduced costs, and better order fulfillment rates.

Integrated supply chains demonstrate six key attributes:

- **Clarity of roles and responsibilities:** Roles, responsibilities, and processes are established and publicized throughout the supply chain
- **Agility:** The supply chain is able to respond and adapt quickly to changing demand or supply requirements and maintain an adequate flow of commodities to customers
- **Streamlined process:** Logistics functions are performed quickly, accurately, and effectively so products, information, and decisions can move swiftly throughout the supply chain to respond promptly to customer needs
- **Visibility of information:** Data are visible throughout the supply chain, so stakeholders at different levels can see where products are and what demand is, and use this information to better meet customers' needs
- **Trust and collaboration:** A collaborative environment exists that can help break down functional and organizational barriers to improve supply chain performance
- **Alignment of objectives:** organizations and levels have a compatible vision, goals, and objectives to ensure consistency in direction within the supply chain

With the right approach, integrated supply chains can be as transformative in the public health sector as they have been in the commercial sector, delivering greater coverage, better use of resources, and higher quality of care.

I.7 SUPPLY CHAIN EVOLUTION — THE PATH TO INTEGRATION

Countries typically move through an evolution process to achieve an integrated public health supply chain. While every country and supply chain is different, the path to integration generally goes through three sequential phases as illustrated in figure 1-5.

FIGURE I-5.
SUPPLY CHAIN EVOLUTION

Characteristics	Ad Hoc	Organized	Integrated
Clarity of roles and responsibilities	Roles are not clearly defined	Roles and responsibilities are clarified and documented	High performing teams are formed and supply chain managers are empowered
Agility and Responsiveness	The supply chain is inflexible, unable to respond to changes	The supply chain sometimes responds to changes in the environment	The supply chain responds rapidly to changes in the environment, the marketplace, and customer needs
Streamlined processes	Processes are undefined and undocumented	Processes are defined and well run	Processes are optimized and continually improved
Visibility of information	Logistics information is not available or shared	Essential logistics data are collected and reported	Supply and demand information are visible throughout the supply chain and used to make decisions
Trust and collaboration	Supply chain actors do not collaborate systematically	Supply chain actors value collaboration but it is not always achieved	Supply chain partners collaborate with and trust each other
Alignment of objectives	There is no consensus on a supply chain strategy	A supply chain strategy is under development	A comprehensive supply chain strategy is defined and implemented

Improved Supply Chain Performance →

- Ad hoc phase: Stakeholders have little common understanding of what the supply chain looks like and have no formal procedures for its operation, leading to fragmented supply chain efforts across various entities in the system
- Organized phase: Standard supply chain systems, including MIS, are designed and

implemented, roles and procedures for basic logistics functions are clarified, and sufficient financial and human resources are mobilized to operate the system

- Integrated phase: People, functions, levels, and entities of the supply chain are linked and managed under an interconnected supply chain organization. Supply chain managers are empowered and understand how to collect and use information to map the system and streamline processes, use resources more effectively and efficiently, monitor and improve performance, and align various supply chain partners to achieve common goals.

The supply chain manager should understand where their supply chain exists on the evolution continuum, and identify how to move the supply chain along this continuum, towards integration. Analysis can be conducted—whether singularly focused or multidimensional—to identify supply chain performance drivers and bottlenecks, and formulate actionable solutions.

I.8 SEGMENTATION IN THE PUBLIC HEALTH SUPPLY CHAIN CONTEXT

Public health programs handle thousands of products with many characteristics, going to a diverse group of clients through many different kinds of facilities. Many countries have several parallel logistics systems for selecting, procuring, and distributing different types of supplies to clients. Often health programs—family planning, maternal and child health, malaria control, TB control, or HIV and AIDS—each manage and distribute supplies for their programs. These programs are called disease-specific programs (sometimes called vertical programs) and, historically, have often had separate standard operating procedures and distribution channels and may be managed by separate management units at the central level.

Procuring, storing, or delivering all of these products in the exact same way does not make sense and will not achieve 100% availability. At the same time, it is important to attain efficiencies in the supply chain whenever possible, so that efforts are not duplicated and available resources can be used to their fullest.

Segmentation can help. It is the process of analyzing data on customers' needs and product characteristics to determine which segments—or groupings—of products make most sense to procure, store, or deliver together. Once defined, logistics processes are tailored to meet the needs of each segment. When you determine which logistics functions to combine, you need to consider and make trade-offs between the handling requirements of particular products (i.e., cold chain, short shelf life), the cost of the functions, and customer service (i.e., ensuring that merging the distribution of different products will not disrupt service).

The concepts presented in this chapter provide the framework for the rest of the handbook. Each chapter will discuss details of specific logistics activities, as depicted and described in the logistics cycle. When reading these chapters, the supply chain manager should consider these topics in the context of the integrated public health supply chain, and as the steward of the public health supply chain.