



USAID | DELIVER PROJECT

Strengthening Accountability of In-Country Malaria Supply Chains



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A charter flight carrying Coartem is bound for Angola.

The risk of leakage can be minimized—both through detection and deterrence.

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Since the outset of the Global Fund for AIDS, Tuberculosis and Malaria (GFATM) in 2002 and the start of the President's Malaria Initiative (PMI) in 2006, unprecedented investments have been made in malaria commodities—from long-lasting insecticide-treated bed nets (LLINs), to pesticides for indoor residual spraying, to antimalarial drugs and test kits to manage malaria cases. In fact, GFATM reports that it spends 39 percent of its funds on commodity procurement.¹ PMI, since its beginning, has spent \$223.9 million on LLINs and malaria case management commodities.

The relatively high value of these commodities has made them a target for leakage; i.e., loss, theft, or diversion of public health commodities from their established distribution channels or beneficiaries. Malaria control commodities—artemisinin-based combination therapies (ACTs), in particular—are highly susceptible to leakage. These drugs are in high demand and can be readily sold in the marketplace at a considerable profit. In most cases, every demographic group throughout the country needs these drugs and, often, they are not in full supply.

Leakage of life-saving commodities poses a significant risk to effectively implementing malaria control programs. Not only does it potentially reduce the availability of much-needed commodities; it also incurs costs along the supply chain, with serious financial and even political implications. In public sector supply chains where adequate controls are often not in place, leakage can be difficult to detect immediately. Therefore, pre-emptively detecting weaknesses in the systems and identifying indications of potential leakage can help to both minimize and deter leakage.

Organized to reflect the path that imported malaria commodities travel in a typical country, this brief examines potential areas of risk within the supply chain, offers methods for detecting leakage, and outlines steps to prevent or deter leakage from occurring by

¹Figure refers to all commodities, not just malaria-related products. (GFTAM 2012)

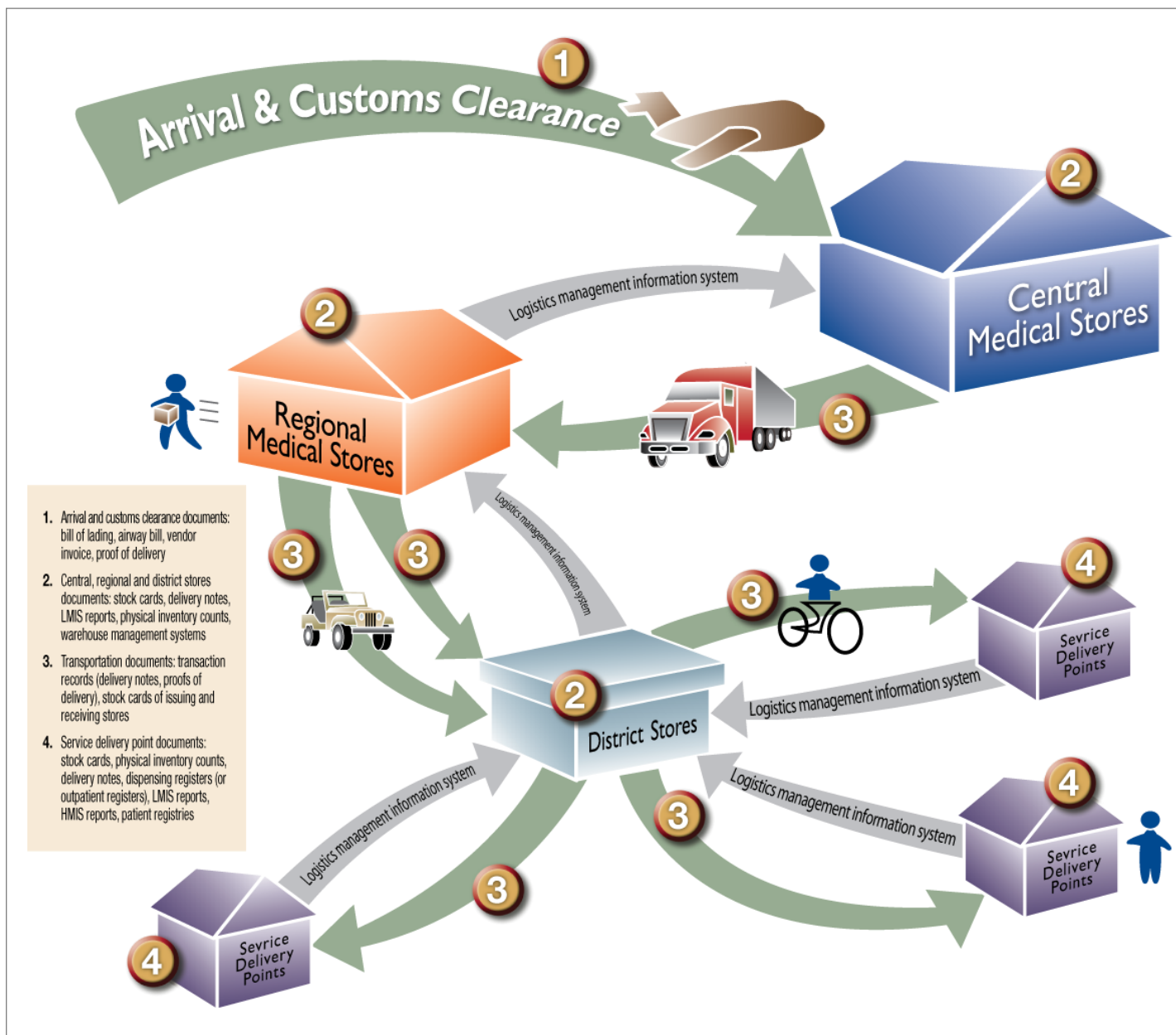


PRESIDENT'S MALARIA INITIATIVE



strengthening systematic weaknesses. Potential risk points include: (1) arrival at customs, (2) warehousing and storage, (3) transport to stores at each level in the system, and (4) travel to service delivery points (SDPs) where the supply chain's custody of the commodity ends (see figure 1). For each risk point, this brief also describes key documents that must be maintained to reconcile records, increase visibility of inventory, and improve monitoring and evaluation. It does not explain how to calculate the quantities and value of stolen products, a topic that is important but beyond the scope of this discussion. Although the information offered here focuses on a standard public sector pharmaceutical supply chain, it also applies to private or vertical supply systems, such as LLIN distribution systems.

Figure 1. Established Path in the Supply Chain for Commodities



Commodity Arrival and Customs

Imported products, even those imported duty-free, must clear customs before reaching the consignee, central warehouse, or distribution truck.

The theft of commodities during arrival and customs clearance is common, particularly in countries with weak governance structures. Key steps to identifying and documenting leakage at this stage center on comparing quantities shipped—documented on the bill of lading or invoice—with a physical stock count taken upon receipt at a warehouse. The physical stock count should also align with the amount noted as received on the proof of delivery and the amount entered into inventory at the first storage point (if applicable). Report all discrepancies to the shipper immediately for replacement (see figure 2).

Relevant documents: Bill of lading or airway bill, vendor invoice, proof of delivery

Minimizing risk: Risk during this period can be minimized by pre-clearing products, sending pre-alert notification to ensure the recipient is aware of the arrival, contracting an expeditor to stay with the products at all times, or taking other steps to shorten the amount of time the consignment is held before being released to the consignee. Often, pre-clearing a consignment will allow the product to be released upon arrival at the port of entry, minimizing the risk of leakage during the holding period.

Central, Regional, and District Stores

Depending on the supply chain structure, the product may be stored at various points: a central store; a regional store; and, possibly, a district-level depot, before reaching an SDP point where it will be dispensed to clients. The amount of product stored and the length of time spent at each store vary greatly, depending on the level in the system, the standard operating procedures (SOPs), and the product.

Warehouses, particularly those with a large number of staff, are vulnerable to leakage during offloading, loading, and storage. When assessing physical security at a warehouse, key comparisons can be made between standard documents to assess whether leakage may be occurring or has already occurred.

Regular physical inventories are the key to detecting leakage. A physical inventory involves counting all the stock on hand for a particular product of interest. This can be done monthly or using cycle counts, which are physical inventories of a rotating subset of products each month, ensuring all products are counted after the cycle is complete. (For more information on physical inventories, see *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities*.) Frequent physical inventories can narrow the period during which a loss has occurred. Physical inventory counts should be compared with quantities recorded on up-to-date stock cards. If product is missing, it should be noted in the *losses* column with comments that note the

Figure 2. Sample Requisition, Issue, and Receipt Voucher

REQUISITION, ISSUE, AND RECEIPT VOUCHER					
Issue Voucher No.: _____					
Date: _____		Ship to: _____			

ARTICLE		Quantity			REMARKS
		Requested	Issued	Received	
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Approved by: _____		Date: _____			
Shipped by: _____		Date: _____			
Received by: _____		Date: _____			

circumstances and details of the loss. Querying these discrepancies may lead to a better understanding of the cause of the loss.

If the warehouse uses an electronic warehouse management system, data from it should be included in this physical inventory. A warehouse management system should have updated data on stock on hand, as well as stock movements. These data can be compared with both the physical inventory and paper-based stock cards to look for discrepancies. If the warehouse management system is in place, but not regularly updated, this may be a source of discrepancy. If the current data has not yet been entered, historic data from a previous month can also be compared.

Transaction records, such as delivery notes or proofs of delivery (PODs), should also be compared to entries for receipts and issues on the stock card. Similarly, stock card counts at the close of the month should be compared to logistics management information system (LMIS) reports.

Relevant documents: Stock cards, delivery notes, LMIS reports, physical inventory counts, warehouse management systems

Minimizing risk: Basic steps to reduce exposure to risk at medical stores can include setting a reasonable maximum stock level to ensure that stock can be managed and consumed in a reasonable time, as well as ensuring monthly physical inventories and reconciling any differences.

Additional steps can be taken to ensure the physical security of stock, including locking storage areas at all times when not in use, using a two-key system with both keys needed for entry, and barring windows and other potential entry points. Appropriate alarm systems and security surveillance can both help prevent leakage from occurring and, in the case of theft, aid in investigations. Even instituting small steps, such as prohibiting personal bags in the stock holding areas and using clear plastic trash bags can help minimize the opportunity for leakage.

Limiting access to stores areas can help ensure that one or two individuals have responsibility for the stored commodities. When employees stop working at a particular warehouse or facility, their access to stock should be revoked systematically and within a reasonable time.

Finally, minimizing the time a product is stored can also help limit the risk of leakage.



Conducting routine physical inventories of products such as these LLINS is critical in managing commodities and reducing leakage.

Transportation

As a part of the distribution system, products travel between different levels of the supply chain—from central warehouses to peripheral stores and distribution points or health facilities.

Detecting leakage during transport is relatively straightforward, if the necessary documentation is available. In an ideal situation, the transaction record—a delivery note, proof of delivery, or other document—will list the quantity issued and the quantity received, with corresponding signatures. For accurate information, a physical stock count is required when the commodities are received; this should be standard practice.

By specifying issues and receipts, a records review can highlight any product that left the issuing store but did not arrive at its destination. Commodity tracking can also be verified by comparing the transaction record with the *Issues* on the issuing stock card and the *Receipts* on the receiving facility or warehouse stock card.

Relevant documents: Transaction records, such as delivery notes and PODs; stock cards of issuing and receiving stores

Minimizing risk: Periods of stock movement are often associated with an increased risk of diversion. The risk during this time can be minimized through a series of actions, beginning with the issuing warehouse sharing the delivery schedule with those on the receiving end, including the quantity of commodities to be expected. Risk control measures should be established in places that actively manage the flow of information within the supply chain. This can be done by controlling access to order and shipment information on a *need-to-know* basis. Each person working in a warehousing facility should only have access to the information they need to fulfill their own tasks; these staff should have clear assignments, with a minimum of overlap. For example, staff that pick and pack do not know the destination of the products. In addition, deliveries on weekends or after business hours should be prohibited, unless absolutely necessary. Limiting the number of overnights for a delivery truck before distributing goods can also lower the risk.

Service Delivery Points

SDPs, while usually holding only small quantities of stock, present the most complex operating environment in the supply chain; leakage detection at this level is also the most challenging.

At SDPs, the dual functions of both storing and dispensing commodities often lead to discrepancies in facility data. As a result, special care should be taken in attempting to assess leakage at the SDP because of the inherent complexity in both facility functions and recordkeeping. That being said, a records review at the SDP level can provide insight into the functioning of the facility and the potential areas for leakage.

At the most basic level, several key logistics documents can be compared: (1) regular physical inventories should match stock card data for stock on hand; (2) all delivery notes should be retained, and quantities listed as received on these delivery notes should match the receipts entry on the stock card; and (3) closing balances on the stock card should also correspond to the LMIS reports submitted.

All of these records reflect supply chain and logistics functions. Comparisons can also be made between supply chain records and clinical records. Many SDPs keep a dispensing record. After stock moves from the storeroom to the dispensary, it should be entered on the dispensing record to ensure that issues from the SDP storeroom match entries on the dispensing record. However, this may not always be the practice, depending on how facilities manage dispensing procedures and practices. On the clinical side, comparisons can also be made between the logistics and the dispensing records.

- The quantities of drugs reported as dispensed on the dispensing record (plus any remainders held at dispensing) should match the issues from the storeroom to dispensing.
- The quantities of drugs reported as dispensed on the dispensing record (plus any remainders held at dispensing) should match the LMIS report.

Ideally, all medicines would be in full supply so that quantities of products dispensed and reported in the LMIS report would also match the number of malaria cases treated, as included in the health management information system (HMIS) report. However, because of drug shortages, differences in treatment protocols,

Relevant documents: Stock cards, physical inventory counts, delivery notes, dispensing register (or outpatient register), LMIS reports, HMIS reports, patient registries (see figure 3)

Limiting physical access to stores areas can help ensure that one or two individuals are responsible for stored commodities. Particularly at the SDP level, ensuring that storerooms have a gatekeeper can help track products and maintain effective documentation. These individuals can be, but are not required to be, the authorized *receiver* for commodity shipments.

Figure 3. Sample Inventory Control Card

[illegible]

Several overarching actions should be taken in the supply chain system to both strengthen the system and, simultaneously, minimize the risk of leakage.

Another strategy is to limit the number of levels or *touches* that a commodity passes through before reaching its final destination. Reducing the number of steps, and the number of people involved in commodity storage and movement, can limit the opportunity for leakage.

Regular physical inventories should be included in the SOPs for warehousing. Physical inventories can help detect leakage, as well as damaged or excess products. SOPs should clearly state how to handle any discrepancies in stock card amounts compared with physical inventories. In addition, a list of active and functioning health facilities should be maintained. This enables quick identification of *ghost facilities*, where

commodities are shipped to nonexistent or nonfunctioning facilities. Ghost facilities can be identified by making site visits to all facilities.

Maintaining these systems requires well-trained and competent staff. Revealing leakage and other stock management problems, such as overstocking or stockouts, is significantly more difficult in a system with records that are routinely missing or poorly kept. Some methods, including monitoring, labeling, and bar coding, can help identify potentially leaked products that have been recovered elsewhere. While bar coding is used widely throughout the developed world, its promising implementation in resource-poor settings is not yet possible without adequate technology and investments.

What does this information mean?

When reconciling records, discrepancies will probably arise at one point or another. Stock cards may not match physical inventories; or delivery notes may not match stock card entries. While these discrepancies can cause concern, this does not mean there is incontrovertible evidence of leakage.

Inconsistencies in records—which can occur as a result of leakage but can also occur if recordkeeping or stockkeeping practices are not rigorous—make it difficult to trace stock. Indeed, what may appear as leakage from a health facility’s store room, could result from a forgotten issue to dispensing, or an expiry that was not noted in the stock card as a loss. A strengthened supply chain ensures that commodities get to the right place at the right time; it also shows us what things are going wrong. Without accurate supply chain data, leakage may go undetected for a significant period of time.

When records do not match, begin by asking questions: Who is responsible for the record management? Have they been trained? What else could explain the discrepancies? Reviewing and reconciling records, as outlined here, can help identify points in the supply chain where product might or could leak, but this is only a starting point. Maintaining a strong supply chain with regular oversight is the first and most critical step in averting leakage.

For more information about supply chain management for malaria, see *Guidelines for Managing the Malaria Supply Chain: A Companion to the Logistics Handbook*. Conducting a facility-based survey using the *Logistics Indicators Assessment Tool* can also help highlight areas of weakness within the supply chain.

Using supply chain oversight, supervision, and ongoing reconciliations, combined with any necessary external assessments, the risk of leakage can be minimized—both through detection and deterrence.

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