



USAID | DELIVER PROJECT

Malaria Logistics Highlights

Ensuring Supply Chain Integrity in Angola



USAID | DELIVER PROJECT 2009

Malaria commodities being loaded directly from aircraft into trucks for immediate distribution to provinces in Angola

The project improved supply chain integrity, and reduced costs and transport time for the provincial delivery of PMI commodities.

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The Problem of Theft

About 85 percent (or around 14.9 million people) of the population of approximately 17.5 million is at risk of malaria in Angola. Malaria accounts for an estimated 35 percent of mortality in children younger than five years old, 25 percent of maternal mortality, and 60 percent of hospital admissions for children younger than five.

Angola has been a focus country under the President's Malaria Initiative (PMI) since 2005. PMI supports Angola's national malaria strategy in prevention, diagnosis, and treatment. One of the most significant areas of support has been in the procurement of the commodities necessary to implement that strategy. PMI has procured long-lasting insecticide-treated nets; and products for diagnosis, including malaria microscopy kits (MMKs) and rapid diagnostic tests (RDTs). It has also procured artemether-lumefantrine (AL), an artemisinin-based combination therapy (ACT) for treatment of malaria.

A serious impediment to the provision of malaria commodities to clients in Angola has been theft. Four known thefts of PMI-financed ACTs occurred in the country between mid-2008 and May 2009. In total, about 535,000 treatments worth almost \$650,000 were stolen before they could be transferred to health facilities. The costs of those losses do not include the several hundred thousand dollars spent on formal police investigations and on technical assistance by PMI implementing partners and in-country counterparts.

As part of efforts by PMI and the Angola Ministry of Health (MOH) to remedy this issue, the USAID | DELIVER PROJECT assumed responsibility for provincial deliveries and later introduced freight consolidation measures that resulted in reduced costs and decreased delivery time.

Initial Interventions

Following discovery of the largest theft of ACTs in December 2008 (as well as Global Fund and MOH commodities) from Angomedica, the central storage facility in Luanda, the MOH made substantial changes to security and staffing at that facility. Despite these efforts, another theft of PMI-funded AL from Angomedica occurred in May 2009. Although police detained some Angomedica and National Essential Drugs Program staff members, the investigation did not result in the identification of the responsible parties.

To avoid further commodity losses, PMI instructed the project to stop handing over commodities at the Angomedica warehouse at the central level and begin transporting AL to the provincial level, from which point commodities could enter the public supply chain for distribution to the facility level. This has now been done four times, with two shipments in 2010 and most recently in February and June 2011. No further thefts have occurred prior to commodities being delivered to the provinces.

After the second successful provincial distribution, the project made changes to its freight forwarding process that improved the integrity of the supply chain for malaria products and significantly reduced delivery costs and the amount of time between commodity arrival in-country and provincial distribution being complete. The key elements of both the initial approach for provincial distribution and subsequent changes are described below—contracting a warehouse in Angola and then consolidating freight in Europe.

Contracting a Private Warehouse as a Transit Facility

For the first two provincial deliveries no changes were made to existing inbound air freight procedures. ACTs continued to be picked up from the manufacturer in Basel, Switzerland; trucked to Liege, Belgium; and from there flown to Luanda by air charter. When the ACTs arrived in Luanda, an independent security firm witnessed them being unloaded into trucks provided by United Parcel Service (UPS), a partner of the USAID | DELIVER PROJECT. But then, rather than completing the delivery at the Angomedica warehouse, as had been done in the past, the trucks traveled under security escort to a transit warehouse contracted by the USAID | DELIVER PROJECT.

At the transit warehouse, workers unloaded commodities and conducted a full piece count. Once UPS, the warehousing provider, the security company, and representatives of the USAID | DELIVER PROJECT agreed on the count, they transferred the chain of custody for the commodities to the warehousing provider. It took two days for the goods to arrive at the transit warehouse after the air charter landed. The security company guarded any vehicle parked overnight awaiting unloading.

Other PMI commodities, such as MMKs and RDTs, continued to be air-freighted from their manufacturers to Luanda using commercial airlines. UPS cleared and collected the commodities from the Luanda airport. Like the ACTs, rather than being delivered to the Angomedica warehouse, the commodities were transferred to the above-mentioned transit warehouse. In that warehouse, workers unloaded the commodities and the chain of custody passed to the warehousing provider.



Malaria commodities in the transit warehouse

According to distribution plans agreed upon by the USAID/Angola Mission and the National Malaria Control Program, once all commodities arrived in country, arrangements were finalized for their pickup and forwarding by UPS to pre-approved consignees at each of the 18 provincial MOH depots.

Consolidation of Freight in Europe

The use of the transit warehouse was necessary initially because it provided a central level site where the commodities from different suppliers could be consolidated, repacked into provincial consignments, and temporarily stored while transport was arranged. With the second provincial distribution various commodities arrived into Luanda within four days of each other and it only required three days to receive commodities into the warehouse and then three days to load all the vehicles destined for the provinces. Seeing the relatively short amount of time the transit warehouse was used, the USAID | DELIVER PROJECT analyzed the feasibility of eliminating the transit warehouse and altering its delivery approach to further streamline and strengthen the integrity of the supply chain. After initial estimates showed a potential cost savings and a shorter delivery time, the project decided to consolidate PMI commodities from different suppliers into preconfigured provincial consignments at the air charter's ground-handling agent in Belgium. Upon the charter aircraft's arrival in Luanda, the preconfigured orders are now loaded directly onto vehicles for subsequent delivery to the provinces, thus avoiding the use of a transit warehouse in Luanda.

With this newest intervention, ACTs continue to be picked up at their manufacturer in Basil, Switzerland; to be trucked to Liege, Belgium; and to be flown to Luanda later by air charter. But now, instead of other PMI commodities, such as MMKs and RDTs, being shipped directly from the manufacturer to Luanda, they are transported to Liege and then sent on the same air charter as the ACTs. Air freight rates are subject to significant fluctuations, but consolidating RDTs and ACTs into one chartered flight can be less costly than using both a charter for ACTs and a commercial flight for RDTs.

Before loading the charter, UPS works directly with the ground-handling agent to direct the sorting of individual pallets and cartons into larger, consolidated provincial consignments according to a truck-loading plan provided by UPS in Angola. That plan is based on the national distribution plan previously agreed to by the mission and the National Malaria Control Program. The key activity in Liege is to ensure that provincial consignments that would ultimately be transported on the same vehicle in Angola are properly combined. The procedure entails sorting the various presentations of ACTs and other commodities into the right quantities and ensuring that they are not mixed up within the aircraft. The process is facilitated by instructing the manufacturers in advance to label pallets and provide packing lists according to final provincial destinations. Once aircraft pallets containing the provincial consignments have been assembled, UPS assists the air charter loadmaster with designing a loading configuration that accommodates a sequential offloading of the aircraft. That procedure, in turn, benefits truck loading in Luanda.



Color-coding of cartons by province

Upon arrival in Luanda, the services of an independent security firm continue to be used to witness the unloading of the aircraft, to verify the piece count according to the airway's bills, and to oversee the process of loading commodities into trucks provided by UPS. However, under the new delivery system, trucks are loaded at the airport according to final destinations and are dispatched immediately to the provinces, rather than being driven to a transit warehouse.

As the delivery process has evolved, representatives of UPS continue to oversee the transfer of custody at each consignee location. They travel on air charter flights within Angola and then supervise the transfer of commodities from the provincial airport through delivery to the provincial MOH depot.

Beneficial Outcomes of Freight Consolidation

Freight consolidation has improved the delivery process in the following ways:

- **Overall costs for an average-size shipment of mixed PMI commodities were reduced for inbound freight and in-country technical assistance.**

See table 1 for the cost reductions realized through freight consolidation in Europe.

Under both the initial and newest delivery processes, an advisor of the USAID | DELIVER PROJECT has remained in-country from the arrival of the first commodities until delivery to the last provincial consignee is underway. However, with the newest process, the number of days required for an advisor to be in Angola has been significantly reduced.

It is customary for any products temporarily stored in the bonded warehouse of the air charter’s ground-handling agent in Liege not to incur warehousing charges while flights are being arranged. Conversely, contracting for the warehousing provider’s services in Luanda cost on average U.S.\$50,000 per round of receipt and provincial distribution. Eliminating the need for the transit warehouse has therefore resulted in significant cost savings.

Table 1. Supply Chain Cost Reductions for Malaria Commodities in Angola

Element	Cost Reduction
Inbound freight	\$11,882
Contracted transit warehousing	\$53,129
In-country transportation	\$10,400
Security	\$5,700
Total cost reduction	\$81,111

- **The time between commodity arrival in country and delivery to consignees was decreased by eliminating the use of a transit warehouse in Luanda.**

The previous experience with consolidating PMI commodities first in Luanda before initiating provincial distribution required some commodities to be stored in the transit warehouse from 10 to 25 days while inbound commodities arrived in the country and while provincial deliveries by road and air were dispatched. For both shipments in February and June 2011, the last of the 18 provincial consignments was delivered six days after the arrival of the air charter in Luanda.

- **Overall commodity security has been enhanced throughout the supply chain.**

Previously, with the use of the transit warehouse, the chain of custody (maintained by either the supplier or UPS) was transferred when goods were handed over to the control of the warehousing provider. With the staging and combining of commodity types in Europe, the chain of custody remains with UPS from Belgium through delivery at the provincial level in Angola. This method is preferable because the consequences of any risk (missing, lost, or damaged goods) are more straightforward to resolve when the chain of custody remains with one service provider. Furthermore, the procedure strengthens the overall accountability and integrity of this particular supply chain.

Further Considerations

In Angola, the project developed its methodologies over three years, first establishing procedures for handling receipt, then creating protocols for transit warehousing and provincial distribution. After additional adjustments to the process, commodities are now consolidated in Europe, eliminating the need for transit warehousing.

Public health logisticians considering applying procedural changes such as those described here must realize that an increased need exists for procurement activities to closely time the availability of commodities in Europe. Also, suppliers should be capable, if necessary, of preparing orders according to special instructions for consignee breakdowns, labeling, and shipping documents. Public health logisticians should also consider establishing backup plans in case the transport to final destinations cannot commence directly from the arrival port.

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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.

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