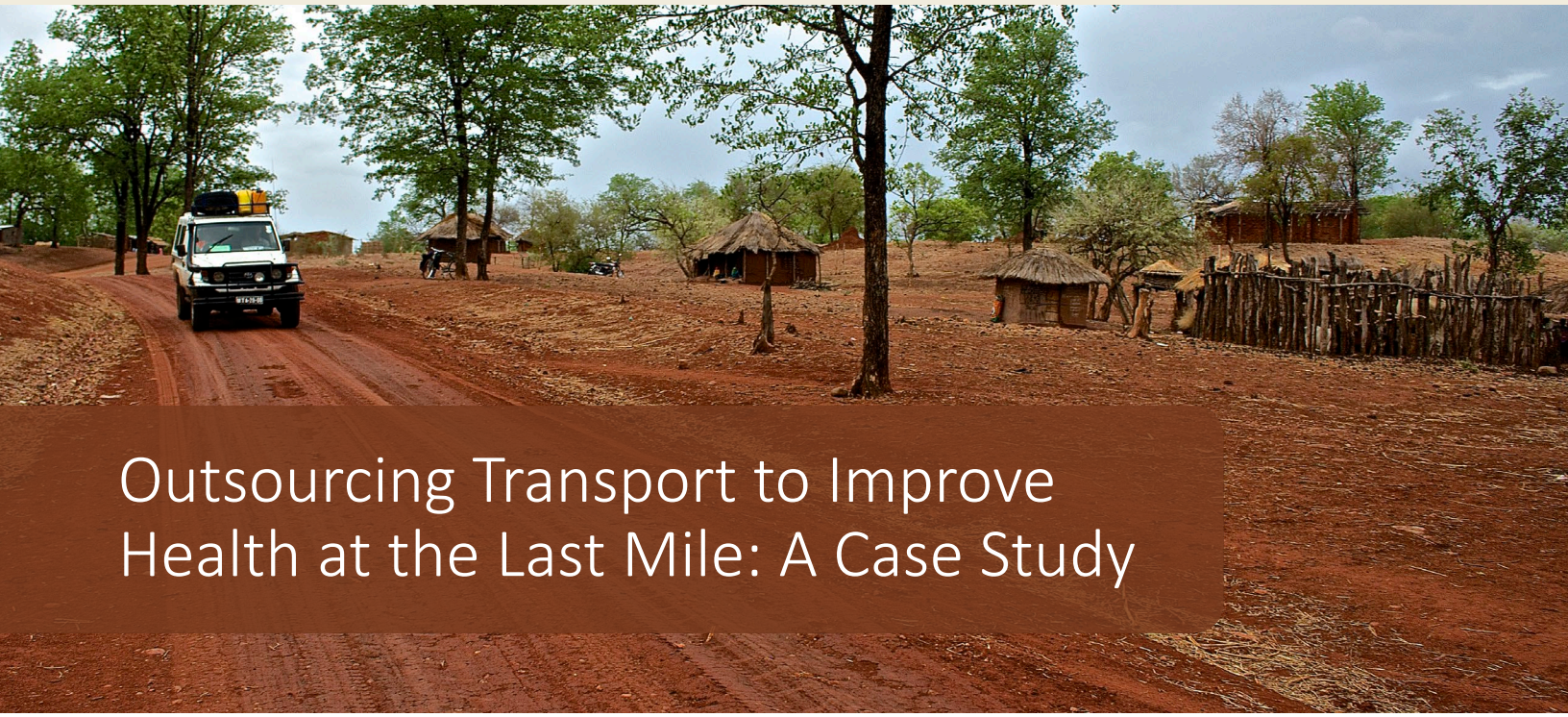


Outsourcing Transport to Improve Health at the Last Mile: A Case Study

Executive Summary

The vast geography and poor infrastructure in much of sub-Saharan Africa necessitates reliable vehicles to distribute essential medicines to rural health facilities. When transport is unavailable or insufficient, stockouts of vaccines, antiretrovirals (ARVs) and other life-saving products occur. The impact of these stock disruptions are significant: patient health suffers, trust in the health system erodes, and global health goals remain out of reach. Additionally government costs increase when patient care is interrupted. In response to rising occurrences of global shortages and stockouts, a resolution was passed at the 2016 World Health Assembly, calling on the Director-General, WHO member states and relevant stakeholders to tackle shortages and stockouts of medicines and vaccines, including through best distribution practices.[1]

A resolution was passed at the 2016 World Health Assembly, calling on the Director-General, WHO member states and relevant stakeholders to tackle shortages and stockouts of medicines and vaccines.

Like many countries in sub-Saharan Africa, most of the Mozambican population lives in rural areas. Medical products for communities at the last mile are transported from facilities located far from district storage facilities. Despite significant supply chain improvements in recent years, subnational levels of the health system still lack adequate vehicles and logistics capacity to support routine distribution.[2] The addition of new vaccines and expansion of treatment criteria for HIV will further strain the supply chain.[3]

Provincial health authorities in Tete, Mozambique, with support from VillageReach and Médecins Sans Frontières (MSF), are working to establish a reliable supply of medical products by evaluating the use of outsourcing and integration at the lower levels of the supply chain. The initiative combines VillageReach's experience in last-mile supply chain, MSF's experience in ensuring availability of ARVs, and the technical and financial resources of the private sector to meet the needs of people in remote and hard-to-reach communities.

This document summarizes the circumstances surrounding the opportunity to outsource, the process that was undertaken and the findings from an assessment of the first six months of operation. It presents the potential benefits of outsourcing in terms of 1) improved availability; 2) increased efficiency; 3) better data collection and reporting; and 4) enhanced trust in the system. Finally, this document outlines next steps and considerations for government authorities interested in outsourcing as a way to improve transport for vaccines and other essential medicines.

The Long Road to Health

When vaccines, ARVs and other health products are delivered on time and in the right quantities, health staff can remain on-site to support patients rather than travel to the next tier of the supply chain to collect products. Today, however, many health ministries struggle with the expertise and capital to maintain a well-resourced and reliable transport function, especially at the lower levels of the supply chain. Despite that vaccines are reported to be among the best investments in health, with every dollar invested returning more than $16 in economic benefits,[4] one quarter of low- and lower-middle-income countries reported immunization stockouts at the district level in 2014.[5] Similarly, stockouts of ARVs appear to be more frequent in sub-Saharan African countries, which host 70 percent of people living with HIV worldwide.[6] Delays in treatment initiation worsen adherence and increase interruptions in antiretroviral therapies (ART), in turn leading to treatment failure, opportunistic infections and death.[7, 8, 9, 10]

Difficult physical access to rural communities in sub-Saharan Africa is a major barrier to providing even the most basic healthcare. Health facilities serving rural communities are often located at considerable distance from district and regional storage facilities that supply them. Reducing the number of storage levels in the system has showed improved medicines availability in other settings.[11, 12] Yet many supply chains in low-income countries are multi-tiered and complex, with a limited and/or slow flow of data from the peripheral levels to adequately inform supply planning.[13] Vehicles operating in rural areas are subject to harsh use conditions and are often inoperable due to poor maintenance and slow approval systems for repairs and tire replacements. As a result, outsourcing to private sector third-party logistics providers (3PLs) is increasingly being considered to improve efficiency in the supply chain. This allows health ministries to focus on core functions related to the provision of clinical care.

> *"Once I was two weeks without my ARVs. No one at the health center found an alternative solution for me, so I went back home empty handed and desperate. I know that without drugs the virus will multiply in my body, I will get sick . . . [this] forces me to walk long distances to return to the health center again and again."*
>
> — Patient on antiretroviral therapy
> Tete, Mozambique

An Occasion to Outsource in Tete, Mozambique

Mozambique is a large country with 35,000 kilometers of roadways, nearly 80 percent of them unpaved. More than half of Mozambicans must walk an hour or more to their nearest health facility, and stockouts are common. Road conditions outside cities can be hazardous, and passage may be impossible on most roads during the rainy season. This difficult infrastructure increases wear and tear on vehicles, impacting both the reliability and the cost of delivery. The Ministry of Health oversees the use of government vehicles through dedicated fleet management

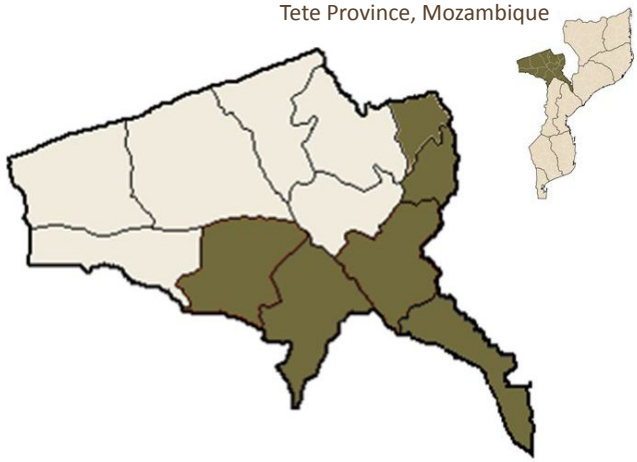
functions at both the national and provincial levels. In the districts, however, there are few formal fleet management practices leading to challenges including:

Chronic vehicle shortages. Many districts have no access to vehicles for distribution, and must use ambulances or other vehicles to distribute medical products.

Few personnel to support logistics. Most districts have no personnel devoted to logistics planning or management of transport assets.

Limited planning. Due to the scarcity of vehicles and logistics staff, optimized logistics planning is nearly impossible, with vehicle use based on immediate demand or ad hoc needs. Thus, health care professionals often use time and their own expenses to collect products.

Acknowledging these and other challenges, an ambitious national plan (Strategic Plan for Pharmaceutical Logistics, PELF in Portuguese) to restructure the entire supply chain systems was conceived by the Ministry of Health. The plan includes more autonomy for the central medical store (CMAM in Portuguese), reduction of the levels of warehousing in the supply chain, and a preference toward outsourcing transport.[14]



Active TSS Districts in Tete*

*At the beginning of the project, the three districts of Moatize, Changara, and Mutarara were subdivided and became five districts, adding Doa and Marara.

The Provincial Health Directorate (DPS in Portuguese) in Tete, Northern Mozambique was considering how to address its own distribution challenges in the context of this new plan. Tete has a population of 2.6 million people. Its health infrastructure is poor: only 53 percent of children are fully immunized,[15] the HIV prevalence rate is seven percent,[16] and there is only one doctor for about 30,000 people, a proportion among the lowest in the world. More than 40 percent of facilities in two separate reporting periods in 2015 suffered a stockout of ARVs or TB medicines[17] and nearly half of the facilities were stocked out of at least one vaccine.[18]

Due to its experience in supply chain design and logistics support in Mozambique, Tete provincial health authorities invited VillageReach to provide technical assistance to improve the availability of vaccines across the province. In the previous system, the DPS would deliver health products to districts, and districts were responsible for delivering them to health centers. However, capacity constraints often led to an unpredictable schedule, which led to stockouts. The DPS and VillageReach introduced the Transport Services Solution (TSS) in late 2015 to distribute health products directly from the province to health centers, starting with the districts of Moatize, Changara, Doa, Marara and Mutarara.[19]

The TSS was designed to establish a reliable monthly supply of vaccines by introducing a private sector provider charging a fee for services. During initial planning meetings, provincial and district administrators revealed strong interest in addressing large gaps in the access to other commodities such as antiretrovirals. Médecins Sans Frontières, an important player in ensuring HIV treatment access in Tete, joined as a partner and supported the addition of ARVs in the initial distribution plan.

A Well-Defined Multi-Stakeholder Partnership

Several factors contributed to setting up a successful outsourcing operation in Tete. First, the initiative reinforced the national objectives as outlined by the PELF. Second, the provincial health authority was progressive and open to including the private sector as part of a solution. This was due in part to the acknowledgment that new local transport providers were operating in Tete due to the region's growing extractives sector. (The strong desire was to provide the opportunity to a local organization rather than a multi-national.) Third, although the long-term plan was always to have the government manage the 3PL to ensure sustainability, there was a recognition that technical assistance was needed to help establish this new concept, monitor its effectiveness, and document costs. Technical assistance also was needed to help build the internal capacity of both the transport provider and the provincial health authority to manage this new relationship. Both VillageReach and Médecins Sans Frontières have worked in the country for more than a decade and have strong relationships with the government. Finally, the products that were included in the initial agreement—ARVs and vaccines—were both available in the country and guaranteed by donors.

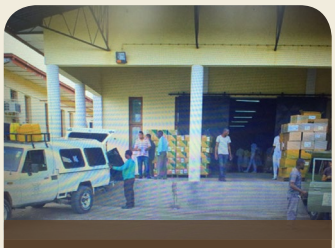
Key players and roles

DPS

- Project management
- Handling of medicines (delivery/receipt)
- Monitoring inventories and submitting freight change requests as needed

VillageReach

- General supervision
- Technical support
- Production of operational reports
- Financial support



Local 3PL
Confianca Absoluta

- Loading, unloading and transport
- Logistics data collection at the health facilities
- Capturing data in the system

MSF

- Oversight of ARV data collection & analysis
- Manage program allowing patients to report stockouts by phone
- Financial support

To identify the right 3PL, a Request for Proposals (RFP) was developed, considering the transport needs in each district. The government's first tender led to only one qualified bidder, so the RFP was re-advertised and rebid with one additional qualified bidder identified. Response bids were reviewed by the DPS and a local 3PL called Confianca Absoluta was selected.

VillageReach, the provincial government, and the 3PL developed a three-way agreement to outline roles and responsibilities during the first year of the initiative. At present, VillageReach provides contract administration and monitors the 3PL's distribution quality and performance. DPS is responsible for co-managing the contract, supervision, and making the commodities available and ready to hand off to the 3PL. The main activities of the 3PL include loading at Tete's provincial medical depot (DPM), distribution/transport to facilities, offloading at health centers, and recording of stock information and cold chain equipment at each health center. MSF contributes both financial support for the distribution of HIV treatment products and technical monitoring and evaluation support.

Once the 3PL was chosen, a consultant from Imperial Health Sciences (IHS) reviewed the 3PL's operations and recommended starting with a limited number of districts to demonstrate success before increasing to half the province. VillageReach conducted extensive training for DPS staff at the provincial, district and health center levels. The initial training was focused on proper protocols for data collection and reporting, and specific roles and responsibilities as described in the MOU. This helped the DPS ensure the 3PL could perform to required standards.

The combined VillageReach/DPS team worked with the 3PL to develop new route plans for the distributions based on a supply chain optimization modeling exercise. Before the trucks headed out on distributions, VillageReach and the DPS provided 3PL staff with essential training on how to handle vaccines as well on how to deal with cold chain, proper loading, unloading, data recording and reporting of the inventories. Distribution routing of the ARVs, which were previously set up in a parallel supply chain, were combined with vaccines. Each month, staff receive on-the-job coaching and mentoring as needed based on how they are carrying out the responsibilities in the MOU.

Timeline

July 2015:
Initial RFP Released

November 2015 – May 2016:
TSS in five districts of Tete Province

April 2016:
Independent assessment carried out

June 2016 – December 2016:
TSS in eight districts of Tete province.
Integration of medical kits.

The 3PL distributes only what they are contracted to carry to both district and individual health centers, ensuring a well-maintained fleet. Payment is based on completing the distributions as scheduled and documenting the deliveries. The 3PL is motivated to complete its distributions as efficiently as possible to limit its costs. Therefore, it maximizes its loads per trip and has introduced new route plans that cut across district boundaries. Payments are made monthly only after VillageReach, MSF and the DPS have reviewed the results of each distribution. To date, the 3PL has completed all distributions as required, and has received full compensation.

Key Findings from Initial Assessment

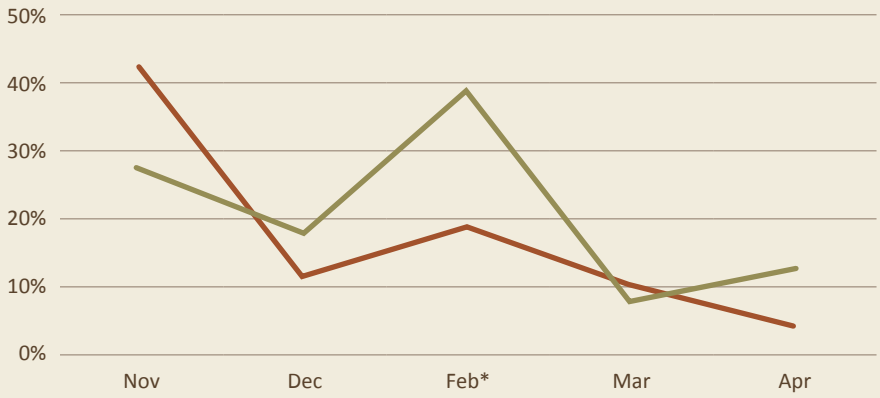
At the end of the first six months of operation, an assessment was conducted by the IHS consultant to help the DPS understand the impact, costs, and management requirements of an outsourced distribution project. IHS reviewed stock supply and usage data from 36 health centers in the five districts from the beginning of the program in November 2015 until April 2016. In addition, IHS interviewed a wide range of stakeholders from the provincial and district governments, health center staff, donor partners and the 3PL company to obtain additional feedback on the TSS implementation and results.

The TSS project shows initial evidence of improved transport capacity and efficiencies, with volumes of stock being more consistently available to support patient care. The assessment indicated benefits from TSS in four key areas:

1. **Increased availability of products at health centers.**
2. **Improved efficiency.**
3. **Better data collection and reporting.**
4. **Enhanced trust in the system.**

1 ***Increased Availability of Products at Health Centers.*** During the first six months of operation, 43 products were delivered by TSS (15 vaccines, 21 ARVs, 7 disposable products). Data was collected about each product's volume of stock on hand at the time of each distribution visit. The assessment revealed a direct correlation between an improvement in the reliability of the distribution and the availability of stock. As the TSS improved its operations, it could reliably and consistently distribute products to health centers. This led to significantly increased availability for all products, with the most dramatic improvements in both vaccine and ARV stocks. Stockouts of vaccines decreased from 42 percent in the first month (November) to 4 percent, and ARV stockouts decreased from 27 percent to 7 percent. Improvement is expected to continue, though at a slower rate, as more facilities are added and responsibilities for 3PL management are transferred from VillageReach to the DPS.

Percentage of Items Out of Stock at Time of Offloading



*No distributions were conducted during January 2016 – this was intentional and agreed with Tete DPS in advance to ensure distributions were not compromised during anticipated heavy rains.

The chart provides information on the percentage of items for which a replenishment activity occurred and that was out of stock ("zero stock") at the time of the offloading of the replenishment stock. This information was only recorded if a replenishment activity was undertaken (so as noted above, no data was collected during January 2016). It does not provide any insight as to whether the products that were in stock were available in sufficient quantity.

2 ***Improved efficiency.*** More efficient routes and better logistics planning have decreased the time and cost (vehicle, fuel, allowances) associated with freight delivery of health products. Distances traveled have been reduced by as much as 40 percent because of direct distribution from the DPM to health facilities and new route paths designed to cut across districts. Distribution times also have been reduced significantly; distributions from the province warehouse to health facilities in the initial five districts are being completed in one week, where it previously required a full month for the commodities to move from the warehouse to the health facilities in those same districts. VillageReach recently has worked with the 3PL to integrate GPS tracking into the program and support future route plan improvements.

Distributions from the province warehouse to health facilities in the initial five districts are being completed in one week, where it previously required a full month for the commodities to move from the warehouse to the health facilities.

3 ***Data collection and reporting.*** The TSS has led to improved data reporting of inventories and required stock levels, as well as the status of the cold chain. Both the 3PL and health center staff were trained over the course of the initial six months, and the 3PL was tasked with reviewing stock information reports while at each health center. While data collection was inconsistent through the first six months of implementation, much more information was known than prior to the start of TSS. The following data was collected for each product at the time the 3PL service provider visited a health center for a stock distribution:

- ✔ Existing stock at each health center;
- ✔ The quantity distributed to the health center;
- ✔ Damages encountered during transportation;
- ✔ The name of the health center and date of the visit;
- ✔ Health center time of arrival and time of departure;
- ✔ The condition, status and temperature of the vaccine fridge based at the health center.

In the first six months, most of the data collection from the health centers was done using paper. This left room for human error in the collection and aggregation of the data, and slowed the reporting time for documentation of the project. VillageReach addressed this by introducing digitization of the data at the point of care facility. The 3PL drivers have been given tablets to facilitate data collection during the distributions, which will be aggregated in logistics management tools that are already in use. Another concern raised from this analysis is that even though more than one in three health centers recorded non-working fridges during the six months of review, none of them received repairs during this time.

4 ***Enhanced trust in the system.*** Partners and healthcare staff valued a consistent and predictable process for replenishment, which led to increased product availability. Government stakeholders and their provincial partners appreciated that the 3PL was held accountable for certain aspects of supply chain performance, such as guaranteeing transport availability, ensuring product data would be reported to the province monthly and monitoring vehicle quality. They also welcomed increased transparency on stock inventories and the conditions of the cold chain. Personnel at the health centers trust the TSS intervention and express strong commitment to improving and expanding it both geographically and in of the range of commodities delivered.

Partners and healthcare staff valued a consistent and predictable process for replenishment, which led to increased product availability.

The intervention also has proven to be extremely flexible in responding to challenges. For instance, MSF's JAM (Juntos Pelo Acesso aos Medicamentos or Together for Access to Medicines in English) enables patients to report stockouts to a free phone number. Following stockout reports, VillageReach worked with the 3PL to prioritize the affected clinics for distribution in order to alleviate the stockouts. Patients are notified through JAM when their medicines arrive.

With the TSS outsourcing model, health workers based at health centers can devote more time to patient care and reduce the amount of time allocated to identifying vehicles or otherwise collecting commodities. Further, they no longer must supplement this process with their own personal funds. Thus, 100 percent of the health workers interviewed regarding their experience with TSS said that it should be continued.[20]

Unanswered Questions

The initial assessment of TSS shows strong support and results that indicate a dramatic increase in availability of life-saving products. Despite recognized performance improvements, some unanswered questions remain, particularly regarding the cost and sustainability of the system.

The cost of the TSS intervention for the original five districts is MZN186,000.00 (USD3,720[21]) per month. Total kilometers, driving time, handling time, total time and fuel all impact costs of the system in various ways. Although the TSS shows efficiency gains in all these areas, it was difficult at the time of assessment to directly compare the costs of the TSS intervention with the costs of the original DPS distribution system. In the original, multi-tier DPS distribution system, budget and costs were dispersed between the province, districts and health centers. In addition, the volumes delivered by TSS do not match the total volume handled by the multi-tiered DPS system.

Costs were predicted to scale-up the TSS to reach all health centers in Tete Province for two scenarios. Delivering the current product basket (vaccines and ARVs) to health centers in every district was estimated at MZN556,761.39 (USD11,135) monthly. The expected distribution cost to all districts for all DPM-stored commodities is estimated at MZN801,247.35 (USD16,025) monthly. Overhead costs, which comprise roughly half of the TSS costs currently, become more efficient at a larger scale.

	Monthly Costs (MZN)	Monthly Costs (USD)
Cost in the original five districts	**MZN186,000**	**USD3,720**
Expansion to the entire province with current products	**MZN556,761.39**	**USD11,135**
Expansion to the entire province with all DPM-stored commodities	**MZN801,247.35**	**USD16,025**

**USD1=MZN50 for the purposes of these calculations.*

Areas for Improvement

Along with the costing analysis, the assessment included a set of recommendations to help the DPS determine next steps in both improving existing TSS operations and determining whether and how to scale-up. Additional training of 3PL and health center staff would be required to ensure all forms are completed correctly and that personnel strongly support the monitoring and evaluation (M&E) efforts of the program. This includes training on data collection, stock management, quality control of vaccines, maintenance of equipment and more. While the private sector may provide higher-quality assets and supporting technology to improve logistics performance, governments must be adequately trained in management, including contracts and oversight of these resources. A comprehensive training plan also must be developed to build capacity for the Tete DPS staff to manage the 3PL contracts.

Challenges concerning storage space, availability of order forms and lack of communication about the timing and planning of distributions need more attention prior to scale-up. To respond to an immediate need in current districts, a WhatsApp group was created to keep all stakeholders informed. Ongoing maintenance of the cold chain was another challenge cited in the assessment. The 3PL has proposed to incorporate cold chain maintenance into their contract, which is being evaluated. It will also be important to continue to improve data sharing between the logistics team and maintenance team to address problems.

The Future of TSS

Beginning in June 2016, the TSS project scaled from five districts in November 2015 to all eight districts in the eastern half of Tete province. Medical kits containing 47 essential medicines including antibiotics, vitamins, ORS, pain relievers and medicines used in childbirth such as oxytocin have also been added. The decision has been made to scale the work to the whole province of Tete.

A longer-term analysis of TSS performance is needed to draw more significant conclusions about the impact of TSS on product availability, supply chain performance, and sustainability. Since the Mozambique Central Medical Store (CMAM, in Portuguese) is encouraging outsourcing and direct delivery to facilities as part of the national plan, they are watching the Tete TSS intervention closely. CMAM staff and their partners have decided to integrate the learnings from Tete as they start to implement their new strategy. In addition, the DPS is reviewing current sources of funding for supply chain, such as provincial government budgets and Gavi Health System Strengthening (HSS) funds, to help support TSS.

A longer-term analysis of TSS performance is needed to draw more significant conclusions about the impact of TSS on product availability, supply chain performance, and sustainability.

The program in Tete has already served as a model to other provinces in Mozambique and in other countries. DPS staff from a neighboring province, Inhambane, recently visited Tete to learn more about the TSS system. A delegation of high-level ministry officials from Togo also visited the province to determine whether the TSS could serve as a model in their country.

The Potential of Outsourcing

Adequate transportation for delivery of essential medicines is a prerequisite for the health of people in rural communities across sub-Saharan Africa. When governments lack the capacity and resources to reliably deliver health products, quality private sector providers may be able to play a lead role. The TSS intervention in Tete demonstrates that a 3PL can be used to provide reliable distribution services on behalf of the government.

In its initial six months of operation, TSS increased the capacity of DPS to provide access to healthcare, ensuring ARVs and vaccines are delivered on time and more readily available to support patient care. District ambulances are available to carry critically-ill patients, and healthcare workers can remain at the health clinic serving patients instead of collecting stocked out products. Additional benefits were realized in efficiency of the system, data collection and reporting, and increased accountability that comes from a paid third party provider. This increased performance does come at a price however. It is important that costs are better understood and evaluated as decisions are made about future scale-up.

Without overcoming transport challenges, Sustainable Development Goal 3, which includes access to safe, effective, quality and affordable medicines and vaccines for all, will remain out of reach.

Deficiencies in transport delivery must be overcome to prevent rural health clinics from running out of vaccines, ARVs and other essential health products. All those who walk many kilometers to receive life-saving products simply deserve better. Without overcoming transport challenges, Sustainable Development Goal 3, which includes access to safe, effective, quality and affordable medicines and vaccines for all, will remain out of reach. Health authorities in Tete should be commended for engaging the private sector to increase efficiencies in the distribution of medical products, and ultimately, to better their citizens' health.

Additional Information

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Alvaro Lopes (Mozambique) **alvaro.lopes@villagereach.org**.

www.villagereach.org

Related Content

MSF report: Empty Shelves, Come Back Tomorrow

VillageReach Report: Evaluation of Health System Transport Capacity and Demand – Mozambique Case Study.

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17. MSF, Empty Shelves Come Back Tomorrow, ARV Stockouts Undermine Efforts to Fight HIV. 2015.
18. VillageReach, baseline data collected in 2015.
19. At the beginning of the project, the three districts of Moatize, Changara and Mutarara were subdivided and became five districts, adding Doa, and Marara.
20. Health workers at two-thirds of the facilities (24 of 36) responded to the survey.
21. In this report, the dollar exchange rate applied is USD1 = MZN50. Mozambique has recently experienced significant fluctuations in its current value relative to USD.

VILLAGEREACH® *Starting at the Last Mile*

Appendix: Purpose and Methodology of the Assessment

VillageReach partnered with Imperial Health Sciences to conduct a six-month review of the data and operations of the TSS, from which the information in this report is based. The purpose of the assessment was to help the DPS answer three questions:

- Does the TSS improve access to commodities and logistics efficiency?
- What does it cost?
- What are the management considerations and recommendations on the steps that the DPS needs to take if it wants to continue and scale this intervention?

The following data was collected by the driver for each product at the time the 3PL service provider visited each health center for a stock distribution:

- Existing stock at each health center;
- The quantity distributed to the health center;
- Damages encountered during transportation;
- The name of the health center and date of the visit;
- Health center time of arrival and time of departure;
- The condition, status and temperature of the vaccine fridge based at the health center.

Data was only collected for products that were being replenished. A drivers' log sheet was also developed to record transport-related information such as kilometers traveled and times of departure and arrival.

Along with having complete access to all relevant data from the sources listed above, IHS also accompanied the 3PL on distributions in April 2016, and interviewed a wide range of stakeholders from the provincial and district governments, health center staff, donor partners and the 3PL company.

For the costing analysis, actual costs were taken from official records or documentation where possible. Where this was not possible, estimated costs were determined from the DPS Transport Department, the contracted service provider, DPM, VillageReach staff and data previously collected, and/or statistics from private sector work done in South Africa and Malawi.