



District Logistics Capacity Study

Examining the Capacity of 53 Districts in Mozambique to Carry Out Health Logistics and Supply Chain Activities

April 2013

VILLAGE REACH.
X STARTING AT THE LAST MILE.

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Acronyms

APE	Agente Polivalente Elementar / Community Health Worker
DPS	Direcção Provincial de Saúde / Provincial Department of Health
LMU	Logistics Management Unit
MISAU	Ministério da Saúde / Ministry of Health of Mozambique
PAV	Programa Alargado de Vacinação / Expanded Programme on Immunization
RDT	Rapid Diagnostic Test
SDSMAS	Serviço Distrital de Saúde, Mulher, e Acção Social/ District Services of Health, Women, and Social Affairs
USAID	United States Agency for International Development
WHO	World Health Organization

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I. Executive Summary

The districts comprise an extremely important link in Mozambique's national supply chain system. In Mozambique's decentralized health sector, the districts are ultimately responsible for ensuring that the health centers receive their essential medicines, rapid diagnostic tests, and vaccine supplies. However, the observed challenge has been that many districts do not have sufficient capacity to manage health logistics, which leads to poor performing supply chains and a lack of product availability at the service delivery and community levels of the health system.

This report provides findings and recommendations from a study examining the health logistics capacity and performance of 53 districts in Mozambique. The study analyzes quantitative and qualitative evidence obtained through surveys with 114 Pharmacy, PAV (Expanded Programme on Immunization), and Management personnel in health facilities/medicine stores in all health districts across four provinces: Maputo, Gaza, Niassa, and Cabo Delgado. This survey sample represents just under 40% of all districts in Mozambique's health system.

The districts report limited human, technical, and financial resources and inadequate infrastructure capacity. **The key findings from the surveys include:**

- All district managers report that their districts have insufficient infrastructure for medicine/vaccine logistics.
- Only 6% of district pharmacy staff (who are responsible for medicine distribution) and 12% of district PAV staff (who are responsible for vaccine distribution) scored 100% on a basic logistics concepts oral quiz administered during the survey, a form of measuring district personnel's technical capacity to perform logistics activities.
- 19% of all closed vehicles (i.e. four-wheel vehicles with a roof such as cars, trucks, and ambulances) in the districts are unavailable due to damage and it takes on average 38 days for a broken vehicle to be repaired.
- Only 4% of districts have closed vehicles that are always available for medicine/vaccine distributions.
- No district pharmacies and only 8% of district PAV programs report that their districts have a budget for medicine/vaccine distributions.
- Only 21% of districts have adequate storage space in the medicine/vaccine stores.

In general, the district pharmacies demonstrate higher, though some limited capacity, to manage health logistics than the district PAV programs. For example, 74% of district pharmacies have at least one staff 100% dedicated to logistics activities versus only 36% of district PAV programs. While 27% of district pharmacies have a contingency plan for accessing hard-to-reach health clinics during distributions, only 22% of district PAV programs have a similar formal plan. Moreover, 94% of district pharmacies keep record of requisitions for essential medicines whereas only 74% of district PAV programs keep record of vaccine requisitions.

Overall, the districts also displayed some positive results, particularly the regularity with which they are performing inventories (91%) and updating stock records (84%) and a sufficient understanding how to collect data and place orders for supplies by calculating supplies needed through a formula (98%). Furthermore, the majority of districts are including logistics in their supervisions to the health centers (91%) and in their recommendations for improvement to the health centers (94%).

In light of the identified gaps in district logistic capacity revealed through the study, the report lays out **four major recommendations to improve the districts' supply chain performance:**

1. Conduct more research in order to define the optimal quantities of time, personnel, transport, and funds needed at the district level to ensure that medicine/vaccine distributions to all health centers happen consistently.
2. Increase financial support to the districts in the area of health logistics and increase their capacity to adequately budget for logistics tasks.
3. Improve the technical capacity of health center workers performing logistics activities.
4. Effectively motivate health workers while building their technical capacity to perform logistics duties through improved, regular supportive supervisions.

These strategic long-term investments in district infrastructure, budget support, technical capacity and supportive supervision could certainly improve the district's supply chain performance. However these recommendations also underscore the enormous amount of time, human and financial resources that would be necessary to bring the districts up to standard. Alternative methods for achieving results in the short-term within the environment of limited resources should be explored. **Short-term solutions – such as targeted capacity building, task shifting, creating logistics management units, outsourcing, and logistics system redesign – should be examined to improve the performance of the supply chain today while building capacity for the future.**

II. Overview of Study

INTRODUCTION

Mozambique has been supporting an overall government process of decentralization for over a decade, and this process also applies to health logistics (Gimbel et al, 2011; Massuangange, 2006). As such, health logistics systems follow the general health system structure. Commodities move from the national level, to provincial depots, and then to the districts. The districts are ultimately responsible for ensuring that the health centers in the country receive their medicines and supplies.

The challenge has been that districts do not have sufficient capacity to manage health logistics, which leads to poor performing supply chains and a lack of product availability at the service delivery and community levels of the health system. Many districts lack specific capacities, resources, and infrastructure to carry out health logistics activities such as adequate transport, sufficient staff, planning and management skills, and understanding of logistics concepts.

To define the gaps in district-level capacity, this study collects and analyzes quantitative and qualitative data about the capacity of districts to manage the timely and efficient distribution of commodities to their health centers. The study evaluates the degree to which the districts are capable of managing health logistics. It looks at whether the districts are equipped with the necessary resources and infrastructure to perform critical logistics tasks.

Over the last several years VillageReach, the government of Mozambique, and other partners have worked together to build the capacity of the districts to carry out health logistics activities. VillageReach has also worked with the provincial governments to design logistics systems that decrease the burden of logistics activities on districts. These supply chain systems are sometimes seen as contrary to national decentralization process. By identifying the gaps in district-level capacity for medicine and vaccine logistics, this study seeks to quantify the resources needed to address identified gaps in district logistics capacity.

Mozambique's Medical Supply Chains and the Role of the Districts

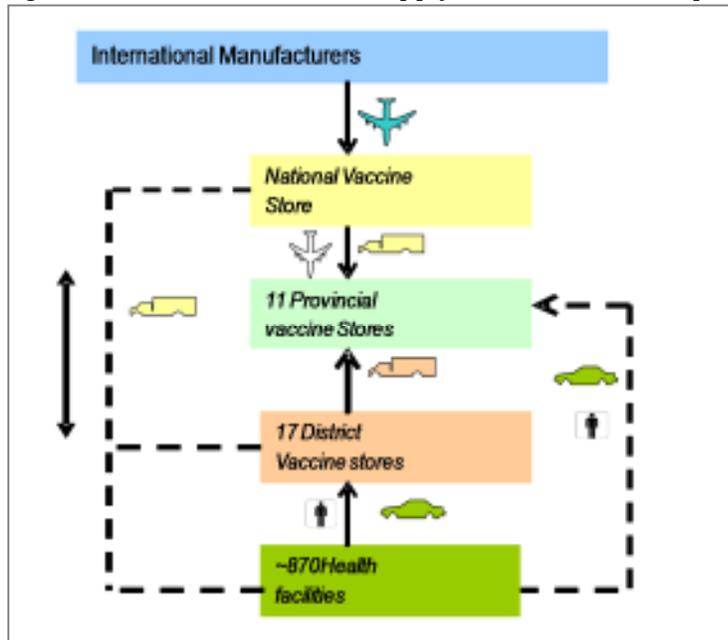
A comparison of Mozambique's supply chain for vaccines (*Programa Alargado de Vacinação (PAV)*; Expanded Programme on Immunization) and essential medicines (*Via Classica*) establishes the critical role that districts play in delivering essential medicines and vaccines to their local communities. Most essential medicines run through Mozambique's dual logistics system, which covers about 1,300 health facilities, 10 provincial warehouses, and three central hospitals. The first system provides pre-packaged kits to only the health centers and the *Agentes Polivalentes Elementar da Saúde (APEs)*, Mozambique's cadre of community health workers who each have their own essential medicines kit and work at the community level to provide preventive health and basic treatment services. The second logistics system, known as *Via Classica*, is a pull system that delivers medicines and commodities on a quarterly basis from the Central Medical Store (CMS) down to the 10 provincial depots. The provincial depots distribute the supplies on a monthly basis to the district-level warehouses, rural hospitals, general hospitals, and provincial hospitals, either by provincial vehicles or if available, district trucks. The district warehouses then either distribute medicine to health centers when they have the fuel and transport available or notify health centers to pick them up. *Via Classica* requires health facilities to request commodities based on consumption.

Mozambique's vaccine supply chain has four main levels: National, Sub-National, Lowest Distribution, and Service Delivery (see *Figure 1*), which correspond to different levels of government health

institutions: National, Provincial, District, and Health Facility. The national vaccine store gets its supplies from pharmaceutical manufacturers on either a quarterly or bi-annual basis. Traditional vaccine distribution in Mozambique follows a decentralized model whereby the central-level MISAU (Ministry of Health) delivers to the 11 provinces using cold boxes and conditioned ice packs. Distribution to seven of the provinces is done by air delivery whereas the remaining four provinces are reached by road delivery. The provincial health authority (DPS) is then responsible for distributing vaccines to the districts and districts are responsible for distribution to the health centers.

However, due to lack of physical and human resources, districts are sometimes unable to complete distributions to the health centers. Instead, frontline health workers from the districts' respective health centers must travel to their district medicine store to collect vaccines and related supplies they need to administer their immunization programs (see *Figure 1*). A VillageReach cost study (2009) comparing two provinces operating Mozambique's traditional vaccine logistics system and a dedicated logistics system¹. The study observed frontline workers in the province with the traditional logistics system having to leave their health posts to collect vaccines. If the sample health centers in the province using the traditional vaccine distribution system represented the entire province, this translated to **348 staff days allocated to logistics instead of health service provision for one province for just one month**. The cost study found that compared with the dedicated logistics system, the traditional vaccine logistics system was 17% less cost-effective and 21% more expensive per vaccine dose delivered, due mainly to the province's lower coverage rate, higher vaccine wastage rates, and the system's higher personnel and cold chain maintenance costs. The traditional system cost \$1.50 per dose delivered versus only \$1.18 per dose delivered in the dedicated system. The province operating the dedicated logistics system had higher transport costs but significantly reduced the amount of time spent by frontline workers in search of vaccines and supplies.

Figure 1: Traditional Vaccine Supply Chain in Mozambique



Source: 2012 WHO Mozambique Effective Vaccine Management Assessment Report

¹ A dedicated vaccine logistics system comprises dedicated personnel and vehicles allocated 100% to vaccine logistics.

The districts act as the critical middle step through which medicines and vaccines pass from the provinces. They also serve as the link between health centers and the provincial warehouse for supply requests. Districts have to effectively manage both these roles simultaneously. They constantly depend on the supply levels below and above them for information to facilitate their job. Mozambique's logistics systems ultimately place a large burden of responsibility on the district to receive and manage the medical supplies they need for providing primary health care services. *This study aims to evaluate the capacity of the districts to carry out these essential logistics functions and quantify any gaps in information, training, and resources for health logistics at the district level—critical information that is needed to consider a better way forward.*

STUDY OBJECTIVES

The objectives of this study are:

1. To identify gaps in *logistics capacity* and *infrastructure* at the district level in Cabo Delgado, Niassa, Gaza and Maputo provinces of Mozambique.
2. To identify logistics capacity characteristics affecting logistics outcomes for PAV and Rapid Diagnostic Tests (RDTs), and essential medicines supply chains in Maputo, Gaza, Niassa, and Cabo Delgado provinces of Mozambique.
3. To identify priority areas for strengthening district logistics capacity to achieve positive results for logistics systems in Maputo, Gaza, Niassa, and Cabo Delgado provinces of Mozambique.

STUDY METHODOLOGY

The data for this study was collected through one-on-one structured interviews with pharmacy store and immunization program staff responsible for the following activities in their districts: requisitions, receiving supplies, stock management, quantification, order processing, logistics supervision, distribution, transport and capacity planning. The surveys included open-ended and closed questions to guide health facility observations and document identified patterns. The study team used three surveys to collect information on logistics capacity:

- *PAV Logistics*. This survey was administered to the person responsible for PAV logistics in the district and covers information related to the supply chain for vaccines in the district. The survey for the PAV personnel assessed the fulfillment of the district health logistics capacity criteria defined in the study's theoretical framework, particularly the practice of logistics activities and available resources and infrastructure to support logistics.
- *Pharmacy/Via Classica Logistics*. This survey was administered to the person from the pharmacy department responsible for the RDT supply chain in the district. The survey for the Pharmacy personnel assessed the fulfillment of the district health logistics capacity criteria defined in the study's theoretical framework, particularly the practice of logistics activities and available resources and infrastructure to support logistics.
- *District Management*. This survey covered general logistics capacity and outcomes from a management perspective and was targeted to the director or medical director in the district. The survey asked for broad input on the foremost weaknesses in the district supply chain system and its infrastructure and recommendations for improvement.

The district PAV and Pharmacy program staff were interviewed separately because the programs deal with different supply chain systems.

The fieldwork for the study took place in July and August 2012. The field research team was comprised of four VillageReach Field Officers, one VillageReach National Program Officer, and one graduate student intern from the University of Michigan's William Davidson Institute who assisted with survey design. The VillageReach Field Officers were trained by the National Program Officer on how to use the

questionnaires, conduct a structured interview and to interpret and report their observations and interviews. The study team interviewed available relevant staff at every district visited.

In total, the team visited 53 district health centers/medicine stores in all 53 health districts in the four provinces included in the study. A total of 114 questionnaires were completed, including 50 surveys for Pharmacy staff, 50 for PAV personnel, and the remaining 14 surveys were administered to Management/Leadership staff at the district level. All questionnaires were conducted and recorded the same day.

The theoretical framework for the study involved a review of the literature on medical supply chain management best practices, which informs our general definition of “district health logistics capacity” that guides our analysis of the data collected by the study. A short note about decentralization in Mozambique’s health system is also included, since this helps explain some of the logistics capacity gaps identified by the study, and has some implications for the political efficacy of proposed recommendations to address any identified gaps.

Please see *Appendix A* for more information on the study methodology, including the specific health districts visited, training details for the Field Officers administering the surveys and collecting data, and the questionnaires used in the surveys.

STUDY LIMITATIONS

Translation/Piloting

This study was limited by translation problems from English to Portuguese, Mozambique’s official language. An American graduate student intern with limited Portuguese skills was primarily responsible for survey design. A VillageReach Mozambican employee spent over two full days on improving the questionnaires, before most of the survey made sense to native Portuguese/non-English-speaking members. Despite multiple edits and feedback from field tests during the Field Officer/data collector training and two days of piloting, some questions still seemed to generate confusion amongst survey participants. Therefore, the majority of survey participants did not respond to all questions they were asked. Furthermore, this study would have been improved if more time were spent piloting much earlier in the process. In the future, focus groups with participants and piloting during the survey development process would probably improve the quality of the data collected and the ease of implementation. *Appendix A* explains the limitations of specific survey questions, stemming mostly from translation confusion or the irrelevance of some survey questions to the types of work situations confronted by the district health workers.

Ad Hoc Nature of District Health Logistics Limits Participant Understanding of Survey Questions

The ad hoc nature of health logistics performed at the district level impacted the relevance and understanding of all survey questions administered by the study. Therefore, it was difficult to ask the district staff about the general or typical process for performing logistics, when accomplishing these tasks depends on adapting to changing circumstances (often on a daily or monthly basis), and there is no uniform standard or policy for carrying out logistics at the district level.

Accuracy of Data

The validity of the data relies on the memory, knowledge, and accuracy of the respondents. Furthermore, staff change frequently in the district health positions, and as staff change, the logistics knowledge and practices also change so the study results will represent a point in time, rather than a defined capacity over a period of time.

Some Logistics Capacity Criteria Excluded from the Study

In the following section, we describe our definition of district health logistics capacity. Not all criteria included in our definition of district health logistics capacity were covered by the surveys. *Appendix C* outlines the specific logistics capacity criteria that were not analyzed by the study.

THEORETICAL FRAMEWORK

Defining District-Level Health Logistics Capacity

In order to evaluate the capacity of districts to meet the logistics and infrastructure needs of Mozambique's Pharmacy and PAV programs, it is important to first define our understanding of logistics capacity. Our definition is based largely on the criteria laid out in the Logistics System Assessment Tool developed by the USAID|DELIVER Project (2009); *The Logistics Handbook: A Practical Guide for the Supply Chain Management of Health Commodities* also developed by the USAID|DELIVER Project (2011); People that Deliver's Workforce Excellence in Health Supply Chain Management: Literature Review (Brossette, 2011); and Yadav (2010) "Improving public health in developing countries through operations research" and Yadav, Tata, and Babaley (2011) "Storage and Supply Chain Management" from the 2011 World Health Organization World Medicines Situation Report. These resources lay out the requirements or best practice standards for medical supply management in resource-limited countries like Mozambique.

Based on the literature, a complete definition of district-level health logistics capacity includes the following *health logistics capacity components*:

1. **Personnel** – Health logistics require a sufficient number of adequately trained personnel. They should have the technical capacity and resources to carry out logistics tasks effectively, thus ensuring that medicines and vaccines are regularly present at the health centers so that patients can receive the health services they need.
2. **Organizational Support for Health Logistics Activities** – This corresponds to formal protocols and guidelines to facilitate health logistics activities, and mechanisms to continually evaluate and improve the performance of health workers conducting logistics duties so that medicine/vaccine supplies are effectively managed and administered to patients.
3. **Information System** – The districts should have an organized system for tracking information on medicine/vaccine supplies delivered, used, and requested. Depending on the context and available resources, this information system can be electronic or paper-based or a combination of both. The information system is critical for accurate forecasting of supplies, so that the medicines/vaccines at the health centers are meeting the demand in the community for health services.
4. **Transport** – Medicine/vaccine deliveries to the health centers cannot happen without some form of transport. Without transport, the supplies cannot reach the health facilities and communities that need them. Ideally, health facilities would have reliable access to a sufficient number of properly functioning closed vehicles (cars, trucks, or ambulances) to carry out deliveries on a regular basis.
5. **Funding** – Adequate funding is necessary to cover fuel for transporting vaccines and to pay the per diems for the personnel involved with logistics activities. Moreover, timely access to funds facilitates regular distributions. Absent sufficient resources and/or access to funds, all health logistics activities can halt, leading to stockouts at the health centers.
6. **Storage/Warehousing and Inventory Control** – Medicines/vaccines should be properly stored to prevent wastage. Some products, like vaccines, require functioning, temperature-controlled cold chain equipment (refrigerators, freezers) at the district store and ice boxes for storing supplies while they are being delivered to the next supply chain level.

7. **Forecasting and Procurement** – Health logistics personnel at the national and subnational levels should know how to calculate medicine/vaccine supply needs for their health system and the health centers in their area, based on consumption and the population size. If personnel forecast too much, this could lead to supply wastage; if personnel forecast too few supplies, stockouts can occur, thus limiting the health services the health center can provide and the number of people who can receive these services.

We analyze the data collected by the study against these general requirements. However, **determining logistics capacity gaps means first knowing the targets.** The literature we reviewed does not specify targets but rather lays out general standards that are applicable to various contexts. Some targets are clear, such as 100% of districts should have adequate storage capacity for medicines and vaccines. Other targets are less clear, and dependent on more information about the district facility and setting, for example: the number of personnel at the district level who should be 100% dedicated to health logistics.

Appendix B provides a complete table outlining these components and their accompanying criteria that form the general standards for measuring health logistics capacity; the corresponding survey indicators measured; the importance of these components to the district supply chain's performance; and the components' implications for resource-limited countries like Mozambique.

Decentralization in Mozambique's Health Sector

For over a decade, Mozambique has been in the process of decentralizing some public services to lower levels of government, including health logistics. The rationale is that local governments have a better idea of community priorities and needs than the central government (Cuereneia, 2001). The central government has not devolved all health-related responsibilities to the districts, mainly because of the costliness of health services and the relatively limited revenue-raising powers retained by these local authorities.

The literature states that **effective health service provision in decentralized health sectors requires: clear guidelines; continuous monitoring; sufficient, timely supply of financial and human resources; and well-managed health information systems that collect relevant information for local decision-making and are easy to use by the main system users and data collectors at the service delivery level** (Prud'homme, 1995; Saide & Stewart, 2001; Kimaro & Nhampossa, 2000; Braa et al, 2001; Mosse & Sahay, 2005). The decentralization of health logistics tasks—just like the decentralization of health service provision—also requires these same criteria. These standards are incorporated in the study's definition of district-level health logistics capacity.

Furthermore, it is important to stress that poor medical supply chain management cannot be attributed to a decentralization policy or process alone. Other critical factors, like limited public resources, are often more direct constraints to effective health services provision. A review of properly functioning decentralized health systems in Norway and Sweden for example (Mills, 1994) suggests that decentralizing the health sector is not, in and of itself, the chief factor attributing to the existing health logistics problems in Mozambique's supply chains.

A more critical issue to explore is the *appropriate* level to which health logistics can and should be decentralized to within Mozambique's health system. What is feasible – financially, operationally and politically – currently, and in the future, to ensure effective medical and vaccine supply chain management? This is an important question that this study will try to answer, if not completely, at least partially, based on our study findings.

III. Study Findings and Discussion

PHARMACY AND PAV SURVEYS

As mentioned previously, the study includes all 53 district health facilities in the four provinces we visited. This represents just under 40% of facilities in all health districts in Mozambique’s health system. Not all relevant district personnel were available at every health center we visited.

Table 1 presents key findings from the Pharmacy and PAV surveys conducted in all district health facilities visited. The findings are organized by the health logistics capacity category and by overall result and program-specific results. The results are disaggregated by Pharmacy and PAV programs because these programs work with different supply chain systems. The results are also shown in aggregate because these programs often compete for the same limited resources in the same district, such as funding, personnel, and transport.

It is important to note that most survey participants did not answer every question. Therefore, the results and percentages presented below correspond to the total number of responses to the relevant specific survey question and not out of the total number of districts surveyed.

Please see Appendix D for the full table of study findings, the corresponding question(s) and survey indicator(s) used to determine the finding, and the number of reporting districts for each indicator.

Table 1: Key Study Findings from the Pharmacy and PAV Surveys

District Health Logistics Capacity Category and Criteria	Survey Indicator	Percent of Districts		
		Overall (n)	Pharm	PAV
Personnel				
Staff should exist in adequate staff numbers to meet logistics needs	Average number of staff performing logistics duties	2.9 (100) ²	2.3	3.5
The existence of dedicated logistics staff	Percent of staff in all districts conducting 3 or more logistics duties	85% (100)	83%	86%
The existence of dedicated logistics staff	Number of different position titles for people carrying out logistics	23 (100)	9	17
The existence of dedicated logistics staff	Districts with a minimum of 1 staff 100% dedicated to logistics activities	58% (88)	74%	36%
Staff should be trained and capable of logistics tasks	Districts that scored 100% on the basic logistics concepts quiz ³	9% (99)	6%	12%
Organizational Support for Health Logistics Activities				
Formal procedures/guidelines exist for delivery	Districts with a formal plan for accessing hard to reach health clinics for distributions	24% (98)	27%	22%
Supervision has established protocols for addressing knowledge gaps	Conduct supervisions to the health clinics	92% (100)	84%	100%
Supervision has established protocols for addressing knowledge gaps	Perform dedicated supervisions ⁴	31% (26)	0%	53%
Supervision has established protocols for addressing knowledge gaps	Include logistics capabilities in supervisions	91% (93)	88%	94%
Information System				
Regular inventories are performed	Perform inventories regularly	91% (99)	98%	84%

² In total, 50 district pharmacies and 50 district PAV programs were included in the study. Where n=100, all district programs responded to the corresponding survey question.

³ We tested district personnel’s knowledge and application of basic logistics concepts through an oral quiz, to evaluate overall technical capacity with regards to health logistics. Appendix A contains the quiz questions and acceptable answers.

⁴ Dedicated supervisions are supervisions conducted at the health centers that do not coincide with distributions. If the supervision is only conducted during distribution, then it is usually not given the time and attention it deserves, unless the districts also have strong protocols in place for supervising logistics tasks.

District Health Logistics Capacity Category and Criteria	Survey Indicator	Percent of Districts		
		Overall (n)	Pharm	PAV
System for managing logistics data	Update stock cards (records)	84% (95)	86%	83%
System for managing logistics data	Keep record of requisitions for medicines/vaccines	84% (99)	94%	74%
Reliable flow of information between levels in the supply chain	Understand all columns on requisition form	88% (95)	94%	83%
Reliable flow of information between levels in the supply chain	Understand no columns on requisition form	9% (95)	4%	15%
Reliable flow of information between levels in the supply chain	Know what to do with requisitions from health clinics	91% (78)	91%	90%
System for managing logistics data	Demonstrate stock card and inventory concordance for Determine (HIV rapid diagnostic test)	95% (38)	95%	-
System for managing logistics data	Demonstrate stock card and inventory concordance for BCG vaccine	58% (43)	-	58%
Transport				
Sufficient transport including functioning vehicles	Average number of currently functioning closed vehicles ⁵ (cars, trucks, ambulances) at the district	2.3 (99)	2.2	2.4
Sufficient transport including functioning vehicles	Percent of closed vehicles that are allocated 100% to vaccine distributions	4% (99)	7%	1%
Sufficient transport including functioning vehicles	Percent of total closed vehicles unavailable due to damage	19% (99)	18%	20%
Sufficient transport including functioning vehicles	Average time in days to repair a broken vehicle	38.3 (81)	36.2	40.2
Distributions follow existing schedules	Scheduled distributions	22% (96)	31%	10%
Distribution schedules exist and are documented	Keep record of distribution schedules	37% (54)	25%	50%
Procedures exist for product delivery between health system levels	Gap in the length of time in days that a closed vehicle is available for the district to use for distributions and length of time district needs to distribute to all health centers	1.7 (93)	1.7	1.6
Funding				
Dedicated budget for logistics activities	With a budget for medicine/vaccine distributions	4% (97)	0%	8%
Adequate funds for transport	Funding for fuel always available when needed	24% (74)	23%	26%
Adequate funds for staff pay	Funding for per diems always available for distribution team when needed	0% (55)	0%	0%
Storage and Inventory Control				
Adequate storage capacity	Adequate storage space in the medicine/vaccine store	21% (91)	22%	20%

Personnel

The study findings indicate that on average, the districts have at least two individuals performing logistics duties. There is no single standard for the optimal number of staff that is needed at each district level to carry out logistics activities. The number needed will vary depending on the size of the district, the number and size of health facilities in the district, the size of the population being served, and the types of health services provided by the district and corresponding logistics needs.

A People that Deliver⁶ literature review (Brossette, 2011) on the status of human resource capacity in medical supply chain management in developing countries summarized key findings and trends that

⁵ Our analysis focuses on closed vehicles (four-wheel vehicles with a roof) because they can carry larger amounts of supplies in order to visit multiple health centers in one trip.

are also supported by this study. The literature review found that in health centers lacking dedicated personnel with a logistics background or supply chain management competence, logistics tasks often are performed by other existing staff, including clinicians, pharmacists, or drivers. Doctors and nurses in health centers in developing countries are also often responsible for many non-clinical responsibilities and spend significant amounts of time on administrative and logistics activities, reducing the time they spend with patients. Furthermore, health facility personnel in decentralized health sectors usually lack specific logistics qualifications and dedicate a limited amount of time to supply chain management (Dicko, 2010, as cited in Brossette, 2011). The literature also concludes that more robust research is needed in order to quantify the value and impact of increased human resource capacity in medical supply chain management on health outcomes.

The study findings show that overall, 58% of districts have a minimum of one staff that is dedicated 100% to logistics activities, which is a fairly good percentage. However, a much lower proportion of district PAV programs (36%) versus district pharmacies (74%) have personnel who are 100% dedicated to logistics activities. This indicates that many district personnel, particularly PAV personnel, are juggling logistics duties in addition to their normal job responsibilities. The study also found that many district personnel with various position titles— including clinicians, pharmacists, and drivers—are carrying out health logistics activities. *Appendix E* outlines all the different position titles held by district staff performing health logistics. The high degree of variation in personnel performing logistics confirms the literature review findings that the health centers often do not have a formal, standard training level or experience requirement for staff handling logistics tasks. Due to limited human resources and staff dedicated exclusively to logistics, many districts are forced to use any available person to carry these duties out and may split responsibilities across different staff. Some personnel end up taking on complex logistics duties that may not be suited for people without formal logistics training.

The study findings also imply that district pharmacy staff training in logistics may be more limited since logistics does not take up 100% of their job. There is currently no formal career path for logisticians in developing countries so there is no incentive for health center staff to undertake specific logistics training (Brossette, 2011). Usually what ends up happening, which the study also found, is that existing health center personnel end up assuming additional logistics functions without developing specialized expertise in logistics or supply chain management. Some countries have implemented innovative initiatives to develop, train and maintain a cadre of logisticians for medical commodities through targeted trainings, improved supervisions, increased advocacy to recognize health logistics as a profession in developing countries (Silve 2009a, as cited in Brossette, 2011), and creation of logistics-focused job opportunities. However, these efforts have not been consistent across countries exploring this strategy for improving health system performance, and the financial sustainability of these efforts remains an unresolved challenge (Brossette, 2011).

Finally, study findings found that only 6% of district pharmacy personnel and 12% of district PAV personnel correctly answered all basic logistics concepts questions on the oral quiz administered during the surveys. This means that there is a lack of technical capacity at the district level and a need for training or re-training on basic logistics principles for staff involved in logistics duties or that the training that the health workers received may not have been as relevant, effective, or conducive to the learning styles of health workers tasked with logistics. Brown (2010a, as cited in Brossette, 2011) concludes that frontline health workers endorse an interactive, cultural-based training approach for learning essential medicine supply chain management.

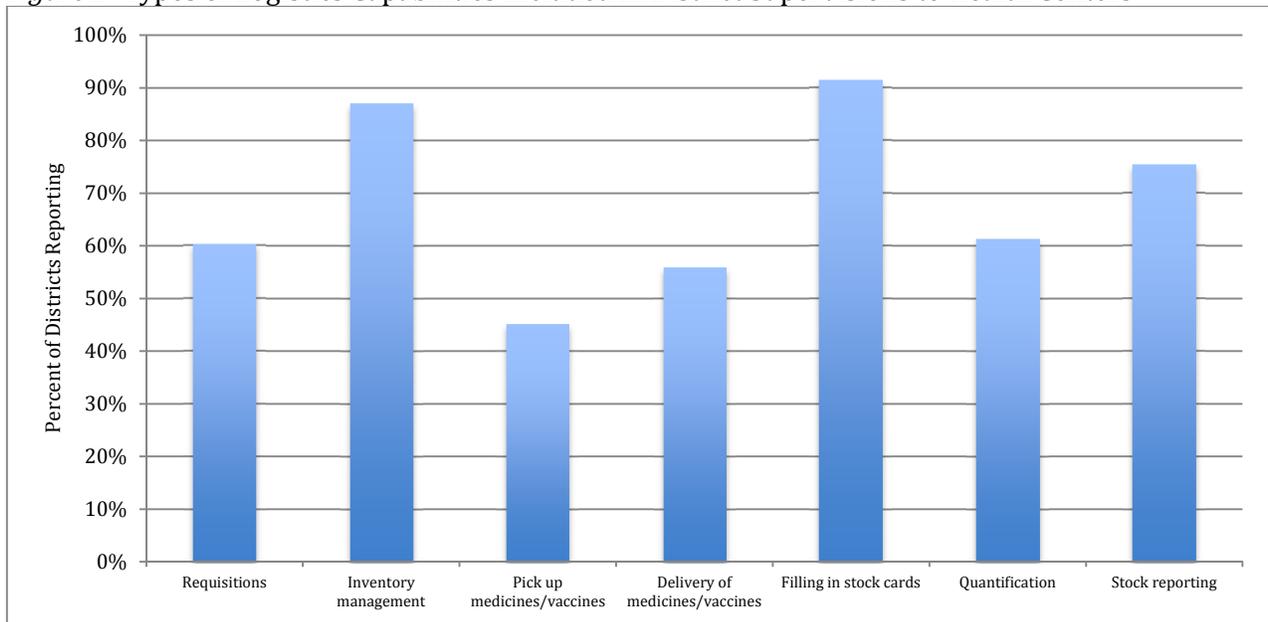
⁶ The People that Deliver initiative is a broad global coalition of organizations working to improve the medical supply chain workforce in developing countries.

Organizational Support for Health Logistics Activities

Study findings indicate that most districts do not have formal plans to distribute medicines/vaccines to hard-to-reach health centers. This suggests that the districts are not equipped with sufficient resources to reach them, or they believe that the public infrastructure prevents them from being able to accomplish these deliveries. If the districts have no plans to reach the remote clinics, health workers from these locations must then travel to the district stores to get the supplies they need.

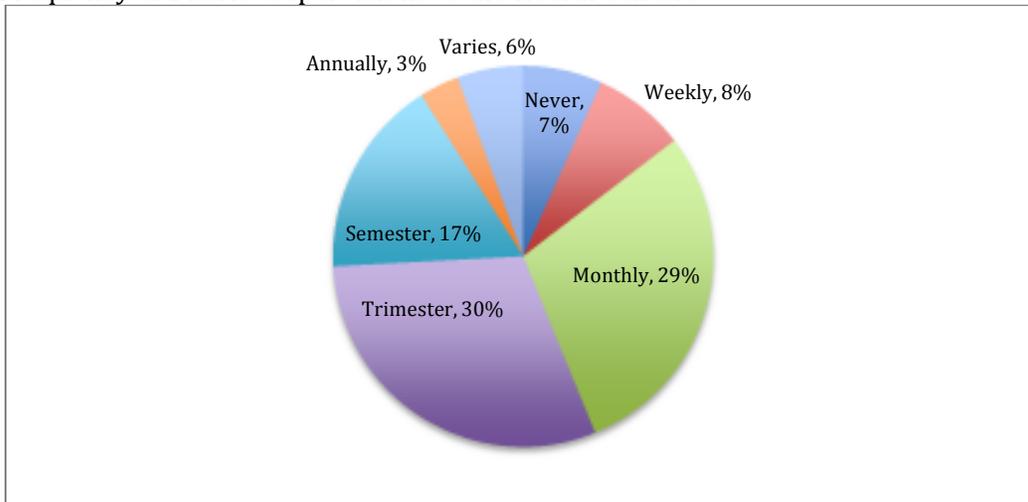
Systematic means for addressing logistics knowledge gaps through routine, supportive supervisions helps motivate and improve the ability of health workers to carry out logistics tasks. Supervisions can also increase health workers' job satisfaction (Brossette, 2011). As the key findings table indicates, the majority of districts are including logistics in supervisions. The following graph shows the percent of districts that cover specific logistics tasks during these supervisions. Quantification of supplies used and needed and verifying requisitions are logistics activities that the districts should better focus on during the supervisions.

Figure 2: Types of Logistics Capabilities Included in District Supervisions to Health Centers



While the majority of districts are conducting supervisions to the health centers, the frequency of supervisions varies greatly as *Figure 3* shows below. **Seven percent of districts reportedly never perform supervisions.** On the whole, district pharmacies are conducting supervisions less regularly and less frequently than the district PAV programs. Please see *Appendix F* for graphs comparing PAV and Pharmacy survey findings across key logistics capacity criteria.

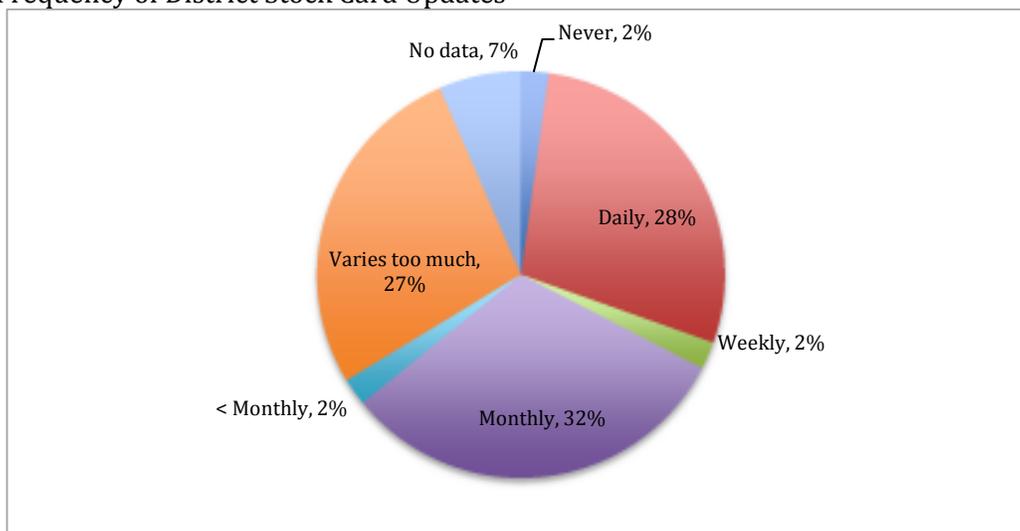
Figure 3: Frequency of District Supervisions to the Health Centers



Information System

A positive finding is that the majority of districts are regularly performing inventories and maintaining stock cards. Without up-to-date information about supplies used, it would be difficult for district managers to accurately forecast how many supplies are needed for the following month. Study findings show that the stock card update frequency varies across districts, with 28% updating stock cards daily, 32% monthly, and 27% reporting that the frequency varies too much to definitively state how often updates typically occur. In Mozambique, the policy around stock card updates is that they should occur any time that product quantities shift.

Figure 4: Frequency of District Stock Card Updates



Regarding the ability of districts to accurately request supplies, most districts are calculating all parts of their requisitions correctly (85%) and determining the amount of vaccines to request based on a formula (98%). Moreover, while the majority of districts (88%) understand all five columns on the requisition forms, about 4% and 15% of district Pharmacy and PAV staff respectively do not understand any sections on the forms, but they are still filling out the forms every month. This is a

concern since incorrect supply requests can lead to stockouts of medical commodities or extra supplies that cannot be adequately stored at the district level and are left prone to wastage.

Finally, during the surveys we asked Pharmacy personnel to show us the stock card for Determine and PAV personnel to show the stock card for the BCG vaccine. We checked the records' concordance with inventories at the district store and found that while Determine had a 95% concordance rate, BCG only had a 57% concordance rate, indicating the district PAV programs are incorrectly recording the information or infrequently updating the records.

Transport

At the district level, an average of two closed vehicles (i.e. four-wheel vehicles with a closed roof, specifically cars, trucks, or ambulances) are available for medicine distributions. Our analysis focuses on closed vehicles because they can carry larger amounts of the supplies needed in order to visit multiple health centers in one trip.⁷ Across the districts surveyed, 19% of all closed vehicles were unavailable due to damage. It takes about 35-36 days for a broken vehicle to be repaired. While broken vehicles are being repaired, health center distributions are often cancelled or delayed, which may result in vaccine or medical commodity stockouts at the health centers.

Furthermore, only 4% of districts have closed vehicles that are 100% allocated to medicine/vaccine distributions. There is almost a two-day gap between the time districts have to use a vehicle for distributions and the time they need to deliver to all health centers in the district. If districts have access to vehicles for a longer amount of time, more health centers are able to receive supplies they need to perform health services.

It is likely that two available closed vehicles is an insufficient amount of vehicles at the district level since supervisions are not occurring on a routine basis, districts must rely on a mix of methods to deliver to all health centers, and district vehicles are often spread thin across various programs.

Fuel availability is also a major concern at the district level. Only 19% of districts always have funding for fuel available for distributions; therefore, even when a vehicle is functioning and available for use, without fuel for transport, deliveries to the health clinics cannot happen.

We also looked at how districts receive or collect medicines/vaccines for health center distributions and how the districts distribute medicines/vaccines to the health clinics. *Figures 6 and 7* below show that the districts often rely on a mix of transportation methods or a combination of vehicles to collect medicines/vaccines and carry the distributions out, since the districts' access to closed vehicles varies so much from month to month. In general, the distribution of vaccine supplies between the provincial and district levels is more organized whereas distribution from the districts down to the health center level is much more ad hoc. This points to a less organized system with fewer resources available to manage logistics at the district level and below.

⁷ Motorcycles may be as effective in reaching hard to reach areas during the heavy rainy season for some districts. In general though, closed vehicles are preferable for most of the year.

Figure 5: Types of Transport Used to Collect/Receive Medicines/Vaccines from DPS

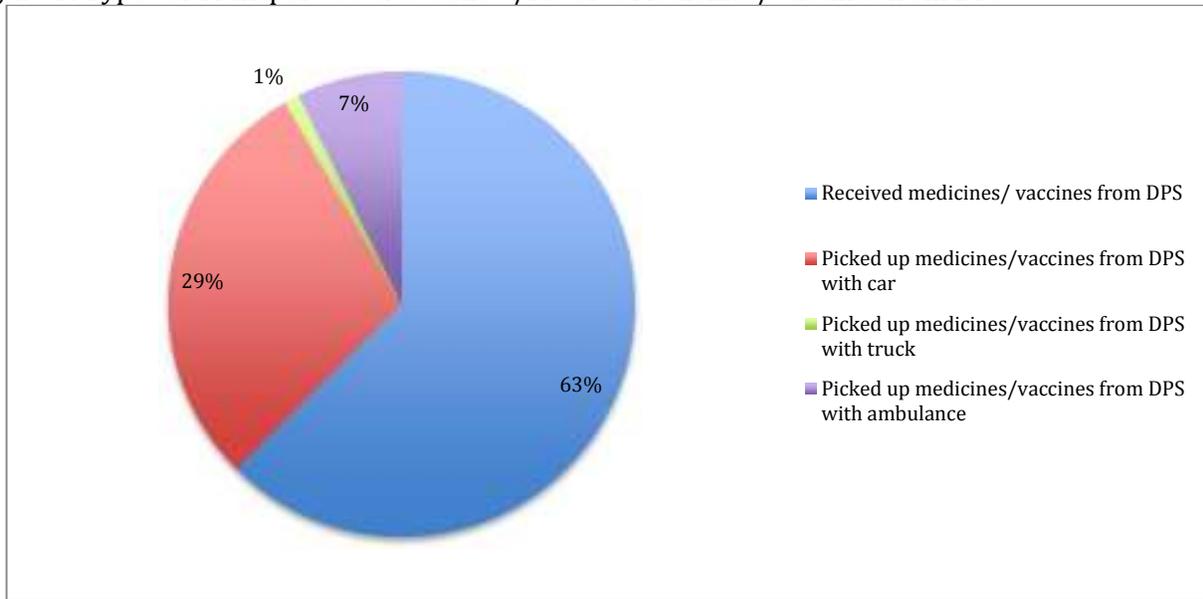
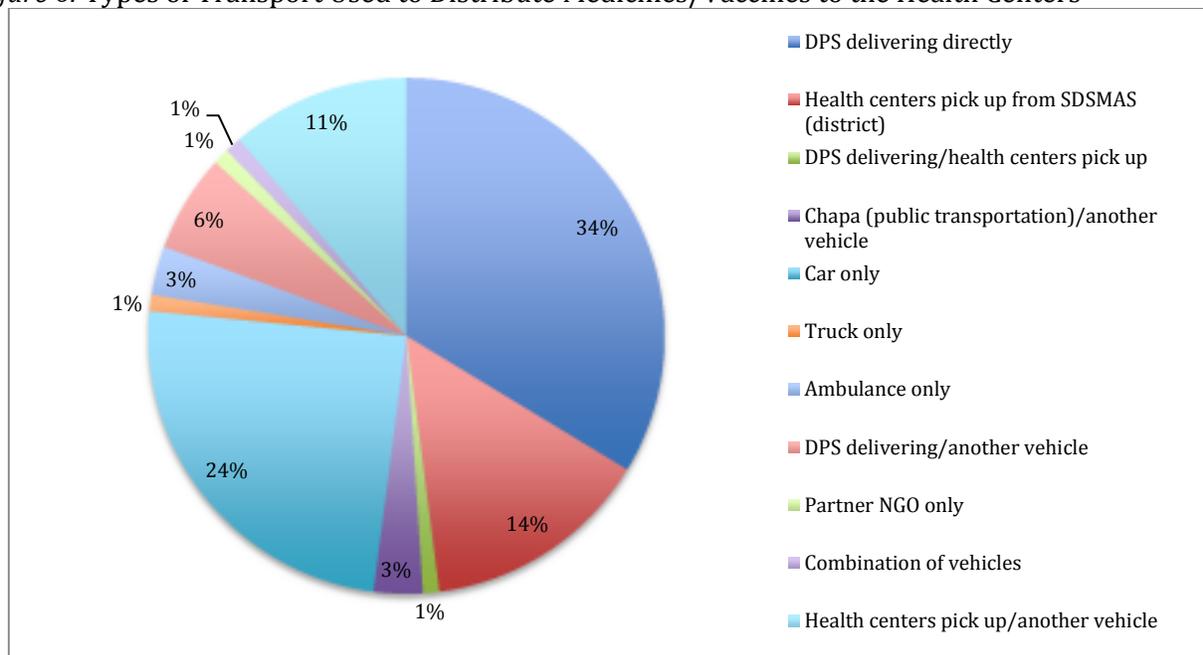


Figure 6: Types of Transport Used to Distribute Medicines/Vaccines to the Health Centers



Finally, regarding vehicle availability, most districts (87%) reported that the reason why a vehicle was not available for distributions was because there simply were not enough vehicles. Funding for vehicle use was another commonly cited problem (71% of districts). Moreover, 30% of district Pharmacy staff voluntarily reported that their districts did not have enough fuel to carry out distributions, even when a functioning vehicle was available for distributions.

Funding

Overall, 4% of districts (0% of district pharmacies and 8% of district PAV programs) have a budget for medicine/vaccine distributions. Districts make budgetary decisions based on changing program

priorities and do not consistently set aside the funds that are needed for distributions to happen. The lack of dedicated funding can increase the risk of stockouts. Without funds dedicated to logistics, the districts run the risk that any available funds that could be allocated to distributions are instead used by other programs. Furthermore, a low proportion of districts always have funding for fuel and per diems for distribution staff when needed.

We also asked the districts why funding for medicine/vaccine distributions are sometimes or often not available at the district. Limited funding issues at SDSMAS (the District Services of Health, Women, and Social Affairs) were cited as the main reasons for the lack of access to funds for distributions. Only 3% of districts reported difficulty in getting authorization signatures for the release of funds.

Storage and Inventory Control

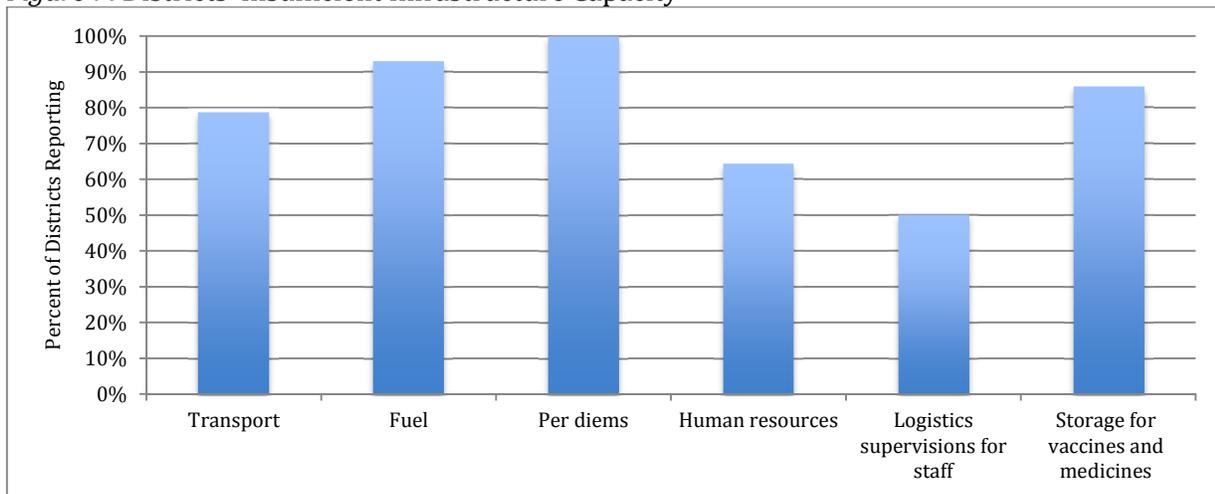
As mentioned previously, the majority of districts regularly perform inventories. However, only 21% of districts have adequate storage space in the medicine/vaccine stores, which implies that many commodities cannot be stored and therefore are left prone to rapid expiry.

MANAGEMENT SURVEY

We surveyed 14 available district managers about their own respective districts’ ability to manage the medical supply chain and health logistics for their respective health centers. A complete table of the findings from the Management surveys can be found in *Appendix G*.

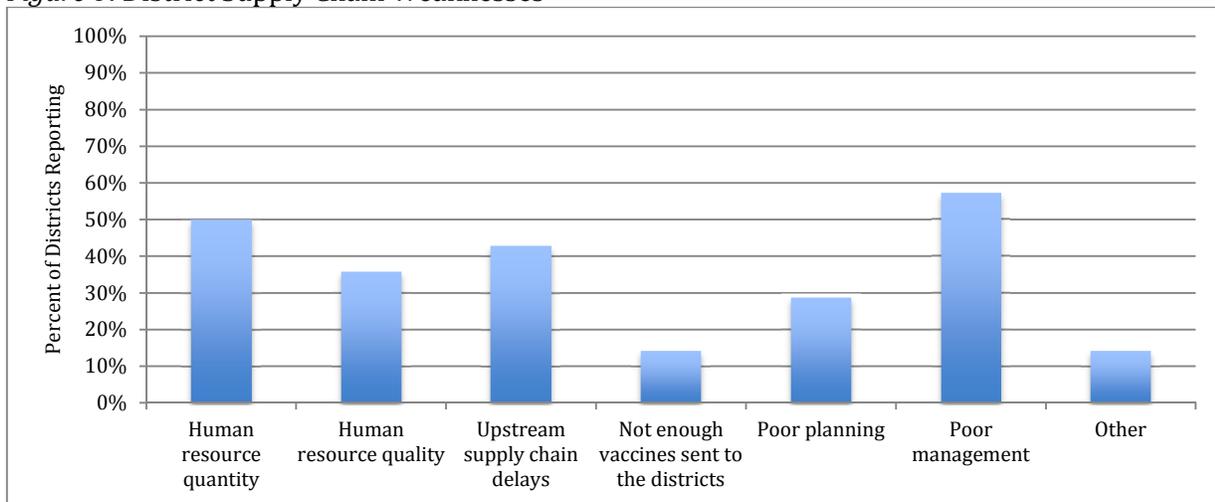
The findings from the Management surveys reveal that district managers – the Chief Medical Directors – are aware of the infrastructure challenges related to and feel these infrastructure challenges negatively impact their districts’ ability to effectively conduct health logistics activities. The following graph shows that according to the district managers, essential resources – human, financial, and technical – are lacking at the district level, contributing to their limited logistics capacity.

Figure 7: Districts’ Insufficient Infrastructure Capacity



The managers surveyed also reported supply chain weaknesses affecting the district supply chains.

Figure 8: District Supply Chain Weaknesses



During the survey, we asked the district managers how they would fix the supply chain and improve logistics for vaccines and medicines in their respective districts. **To improve supply chain and logistics for vaccines, district managers said they would:**

- Allocate more vehicles (trucks and motorcycles) for PAV
- Allocate funds specifically for fuel and allowances (per diems) for workers carrying out distributions
- Build the capacity of PAV personnel at the periphery level through in-service trainings
- Construct district deposits for vaccines
- Ask VillageReach to distribute vaccines instead of DPS

To improve supply chain and logistics for medicines, district managers provided the following recommendations:

- Construct or rehabilitate district or regional medicine stores
- Increase the availability of essential medicines
- Allocate more district Pharmacy personnel
- Allocate trucks for medicine logistics
- Build the capacity of Pharmacy personnel from the periphery health centers through on-the-job training

In short, the Medical Directors are asking for *more resources* (human, technical, and financial), *more vehicles* for distributions, *more storage capacity*, and *logistics training opportunities* for health workers.

IV. Recommendations

The districts comprise an extremely important link in the medicine and vaccine supply chain system in Mozambique. However, study findings point to a broken system—a system where the districts lack sufficient resources and infrastructure capacity to effectively ensure prompt, reliable, and universal access to medicines and vaccines at their health centers. Gaps across all health logistics capacity components (Personnel, Organizational Support for Health Logistics Activities, Information System, Transport, Funding, and Storage and Inventory Control) have negatively impacted health clinic workers' ability to provide critical public health services to their communities.

The following recommendations focus on priority areas for strengthening the district capacity to carry out logistics. They aim to address the major gaps identified by the study. These recommendations build upon those provided by the district managers overseeing all health activities in their districts, including logistics.

- 1. Conduct more research in order to define the optimal quantities of time, personnel, transport, and funds needed at the district level to ensure that medicine/vaccine distributions to all health centers happen consistently.** Upon analyzing the results in the study, it became clear that the general health logistics capacity criteria to which we compared the study findings were not specific enough to definitely determine all the gaps in district logistics capacity. In order for the criteria to be applied in a more meaningful way, more research should be done to quantify the necessary number of personnel, transport, and funds that should be supplied to the districts. Modeling tools such as University of Pittsburg Vaccine Modeling Institute's HERMES software or Llamasoft's Supply Chain Guru could be useful to better quantify some of the resource needs. Furthermore, this study did not examine other important aspects of logistics capacity, such as the performance of the cold chain at the district level, which should be assessed and taken into account in order to develop a more holistic and clear understanding of specific gaps in district logistics capacity.
- 2. Increase financial support to the districts in the area of health logistics and increase their capacity to adequately budget for logistics tasks.** The introduction to this study helped explain some of the challenges confronted by overburdened health workers carrying out multiple responsibilities related to various health priorities determined by the central-level MISAU. Study findings show that none of districts always have access to per diems when needed and only 4% have access to funding for fuel for transport. 79% of district health managers believe they do not have enough closed vehicles to carry out deliveries on a consistent basis. If districts are going to be expected to carry out logistics activities, their budgets needs to include sufficient funding for fuel and per diems for distribution team members and more vehicles to carry out medicine/vaccine deliveries to all the health centers.
- 3. Improve the technical capacity of health center workers performing logistics activities.** Health center personnel need trainings or re-training on basic logistics skills. We found that a total of 293 personnel in 53 districts are performing some logistics activities. However, the formal logistics training and experience of these personnel varies greatly, including individuals who have never received training, have only received on-the-job training, and those who have participated in formal logistics training. Through an oral assessment of their knowledge and practice of basic logistics concepts, only 6% of district Pharmacy staff and 12% of district PAV staff correctly answered all questions, revealing a lack of technical capacity on behalf of most staff performing logistics in the districts.
- 4. Effectively motivate health workers while building their technical capacity to perform logistics duties through improved, regular supportive supervisions.** This study found that supervisions are not happening on a routine basis. Also, the majority of district supervisions are not covering all essential logistics activities. Thirty nine percent of districts are not assessing quantification of supplies used and needed and 40% of districts are not verifying requisitions during supervisions. Health workers' technical knowledge about logistics and their performance of logistics duties could be improved through routine, supportive supervisions. However, many of the district personnel also demonstrated a lack of technical capacity with regards to basic logistics concepts. They first need to be effectively trained and

motivated, before they can be tasked with teaching and improving the logistics skills of the health clinic workers.

These recommendations focus on methods to improve the districts' capacity to carry out logistics, but these recommendations are long-term investments that also underscore the enormous amount of funding, time, and dedicated logistics personnel at the district level needed to carry out these recommendations. When taken together, it is clear that the response required to bring district logistics capacity up to the minimum necessary to function effectively is enormous. However the reality of the limited resources available and the competition for those resources in the health sector forces governments and their partners interested in increasing the performance of health logistics systems to consider alternative models. Strengthening these systems for the long-term also cannot be done at the expense of treating patients now.

Alternative methods for achieving results in the short-term within the environment of limited resources should be explored. Such potential solutions include task shifting, targeted capacity building, dedicated logistics management units, outsourcing, and a logistics system redesign. These alternative short-term solutions would help reduce the burden on the districts of managing health logistics.

Many countries have adopted variations or combinations of these short-term solutions to improve overall medical supply chain performance. The government of Nepal partnered with USAID to implement a **targeted capacity building** strategy to improve district logistics performance. They worked together to develop two logistics programs for community and district health workers focused on community logistics and web-based logistics management information systems. As a result, after 25 of the worst performing districts in logistics participated in these trainings, stockouts of key commodities in their health facilities, including condoms, vitamin A capsules, cotrimoxazole, oral rehydration salt, and oxytocin decreased, while product availability for the communities increased (USAID|DELIVER, 2009).

The literature has shown that **task shifting** can be an effective strategy for addressing human resource shortages in the health sector, particularly for HIV treatment and care programs (ECSA-HC, 2010). Task shifting in the context of medical supply chain management entails shifting specific logistics responsibilities from clinical or pharmacy staff to dedicated supply chain management staff. Zimbabwe, Zambia, and Mozambique are countries that have utilized task shifting in the management of essential medicines and vaccine supplies with positive results (Brossette, 2011) by allocating specific stock analysis, transport, and supply chain oversight responsibilities to dedicated teams or individuals at the district and provincial levels. Furthermore, the establishment of a **logistics management unit** (LMU) – management structure that organizes, monitors, and supports all activities performed by a health logistics system – in multiple countries has helped to drastically improve overall health logistics performance and product availability at health facilities in diverse settings. In Zambia for example, the LMU has drastically improved medical product availability in the country by decreasing the proportion of health centers experiencing stockouts of key antiretrovirals from 50% in 2007 to less than five percent at the end of 2008 (USAID|DELIVER, 2010). The specific functions, placement, and staff of LMUs have varied across these countries. LMUs are most often located at the central level, though there are examples of countries, for example Mozambique, that has established LMUs at regional or provincial sites in order to improve communication and supervision to health facilities at the district and service delivery levels. The LMUs include a variety of staff allocated 100% to supporting the logistics performance, from logisticians and data analysts to information system managers and drivers.

Outsourcing specific logistics or supply chain management tasks to external and private institutions is another potentially viable short-term solution for countries that currently lack the capacity to manage logistics on their own. Outsourcing is meant to increase the supply chain performance of an existing supply chain; but it is by no means a long-term, comprehensive solution and often presents an additional set of challenges. In the case of Tanzania, the Ministry of Health outsourced the transport component of its HIV drug treatment supply chain to the Coca-Cola Company. They found that drug delivery times were reduced from 30 days to 5 days (ELI, 2012) and overall availability of these drugs at the health centers improved population access and operational costs substantially. The Western Cape of South Africa outsourced specific supply chain tasks – vaccine procurement, warehouse management, inventory management, and vaccine distribution directly to health centers – to the Biovac Institute, a third-party private sector company, which led to a streamlined three-level vaccine supply chain in the province. Outsourcing showed some improvements in vaccine logistics performance and lower operational costs overall, but also produced challenges that South Africa needed to examine and plan for effectively before decided to outsource in other provinces. Major challenges and lessons learned for other countries considering an outsourcing approach included an identified need to train the private logistics operators in how to deal with temperature-sensitive products like vaccines; how to clarify the roles of the public and private partners in the contract agreement; and how to effectively measure the impact of outsourcing on health service delivery and overall public health logistics performance (Lydon, 2011).

Finally, **logistics system redesign** involves changing the supply chain structure and the health system level chiefly responsible for major health logistics tasks. Over the last twelve years, VillageReach has partnered with four provincial governments in Mozambique to streamline the supply chain so that the provinces are responsible for distributing vaccines and some medical commodities directly to the health centers. Program data shows remarkable results achieved in the area of health logistics within a three-year time frame, including dramatic reductions in stockouts and consistent distributions to all health centers in the provinces (Kane, 2008). Mozambique’s vaccine logistics system redesign integrates elements of other key proposed short-term solutions; it incorporates the LMU’s focus on establishing dedicated personnel to provide key oversight, monitoring, and supervision support; shifts specific logistics tasks (transport and logistics data collection) from district health workers to dedicated personnel; and targets and builds the capacity of health workers to perform these functions through logistics trainings and regular, supportive supervisions. Most logistic system redesign strategies involve cost-effectiveness analysis of alternative supply chain models to determine important measures like cost per dose delivered for non-vaccine products. As mentioned above, modeling tools such as University of Pittsburg Vaccine Modeling Institute’s HERMES software or Llamasoft’s Supply Chain Guru could be useful to better quantify some of the resource needs.

Mozambique could adopt one of these proposed short-term solutions, combine elements of these solutions into a comprehensive strategy, or even expand and adapt the remarkable supply chain redesign efforts that the government has already undertaken in some provinces to the essential medicines, RDT and vaccine supply chains in the country’s remaining provinces.

Some may argue that the short-term solutions contradict the government’s overall decentralization process. The purpose of decentralization is to give the local governments, in this case the districts, the authority to respond to the changing local needs of their communities. However, for decentralized health sectors to work effectively, the districts need to be equipped with adequate resources to address the problems they identify in their communities. Since sufficient resources do not yet exist in Mozambique to provide all the districts with the means to resolve all the local priorities, short-term solutions are needed to address current gaps. Furthermore, we recognize that the methods limit the supply chain responsibilities of the districts to an extent. The districts certainly offer critical, local

perspective to the supply chain challenges facing their areas and therefore must continue to be an active participant and key stakeholder in logistics oversight and management. Therefore, whatever short-term or long-term strategy is chosen to address the district logistics capacity gaps identified by this study, the districts' involvement and role must be clear and support for the strategy must be firm.

V. Conclusion

This study examined the capacity of the districts to perform health logistics activities. Our survey findings reveal large gaps in the technical capacity of district personnel currently performing logistics duties, insufficient number of vehicles to perform distributions to all health centers, lack of funding for fuel and per diems, and limited storage capacity at the district medicine stores. The districts perform a critical role in the health system supply chain in Mozambique, but this study has highlighted their inability to perform that critical role. While strategic long term investments in district infrastructure, budget support, technical capacity and supportive supervision could improve the supply chain performance, alternative options should be examined to improve the performance of the supply chain today while building capacity for the future.

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Appendix A: Additional Study Methodology and Implementation Details

SUMMARY OF DISTRICT HEALTH FACILITIES VISITED

Province	District Health Facilities Visited		Team Composition
Maputo	Boane Matituine Namaacha Matola	Moamba Marracuene Manhiça Magude	Margarida Matsinhe Aida Coelho Lilly Connett
Gaza	Bilene Chibuto Chokwé Guijá Manjacaze Xai-Xai	Cidade de Xai-Xai Chicualacuala Chigubo Massingir Massangena Mabalane	Margarida Matsinhe Alberto Mabote Aida Coelho Lilly Connett
Niassa	Cuamba Marrupa Maúa Mecanhelas Mecula Metarica Nipepe Lago	Lichinga Cidade Lichinga Distrito Majune Mandimba Mavago Muembe N'gaúma Sanga	António Gaspar Tomboloco
Cabo Delgado	Mocímboa da Praia Mueda Muidumbe Nangade Palma Ibo Macomia Mecufi Meluco	Pemba Cidade Pemba Metuge Quissanga Ancuabe Balama Chiure Montepuez Namuno	Alfredo Durão Saháte Nunleque António Gaspar Tomboloco Aida Coelho Lilly Connett

PREPARATION FOR STUDY IMPLEMENTATION: TRAINING DETAILS

Two VillageReach Field Officers who support DPS vaccine distributions in Maputo and Cabo Delgado travelled to Maputo for a 3-day training on survey implementation. The training included one day of training in VillageReach's Maputo office and two days of practice with the survey in the field in the districts of Maputo province. The in-office training consisted of an overview of the surveys, a question-by-question explanation of the surveys, and troubleshooting and discussions about questions that were confusing or challenging. Specific issues that were covered during that training included:

- Directions not to skip questions or leave them blank;
- Directions to check only one answer per question unless the survey directions specify otherwise;
- Portions of the survey that are shaded in gray that are not meant to be read out loud by the data collector;

- Directions to wait for respondents to volunteer answers, before choices are read and if the respondent needs help, then answer options could then be read (unless they are shaded gray);
- Trouble shooting and practice around more complicated questions/observations
 - Review of how to identify if a stock card is correctly filled out
 - Review of how to identify if a requisition is correctly filled out
 - Explanation and practice of questions involving logistics concepts

During the two practice days in the field, surveys were administered in groups of 3, with a mix of Field Officers and VillageReach Maputo staff in each group. After both days in the field, both Field Officers serving as data collectors and the VillageReach Maputo staff discussed challenges of implementation and gave feedback about how to improve questions that were confusing, poorly worded, or too long. The survey was updated accordingly.

In addition to the Maputo training, VillageReach’s National Program Officer Aida Coelho and William Davidson Institute graduate student intern Lillian Connett accompanied the Field Officer/data collector going to Gaza for the first three days of data collection in the field and they accompanied the data collector in Cabo Delgado for the first week of data collection in the field. The Cabo Delgado Field Officer/data collector did not attend the Maputo training. However, he participated in a half-day training in Cabo Delgado that mirrored the Maputo training before beginning data collection.

SURVEY QUESTIONNAIRES

Pharmacy Survey

	District Code:
	Date of Interview:
	Interviewer:
	Participant aware of confidentiality and signed consent form: Yes/No
Transport	
Question Number	
1	How many of each type of transport is available at the district?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
2	Of the forms of transport listed above, how many are currently functioning?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
3	Of the forms of transport listed above, how many are sometimes or always available for the distribution of medicines?
	Bicycle

	Motorcycle
	Car
	Truck
	Ambulance
4	How many of the vehicles from the question above are allocated 100% to medicine distribution?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
5	If a vehicle needs to be fixed how long does it typically take before it is available again?
6	How many of each type of vehicle is available to the district from a partner organization (vehicle not owned by SDSMAS)?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
7	Who is responsible for the transport of medicines to the health units in your district?
8	Is there someone responsible for managing the availability of transportation for the distribution of medicines to the health units in your district?
Medicines from the Province	
9	Last month how did you receive medicines at the district capital?
	DPS delivered
	Picked up from DPS using chapa
	Picked up from DPS using motorcycle
	Picked up from DPS using a car
	Picked up from DPS using a truck
	Picked up from DPS using ambulance
	I don't remember
	I don't know
10	Is this usually the way you receive medicines at the district?
11	In a typical month, how many times do you need to replenish medicines from DPS?
12	For each time that you need to pick up medicines from DPS, how long does it take from the time you leave SDSMAS to the time you return to SDSMAS?
Delivering Medicines to the Health Centers	
13 a	Last month how did you distribute Medicines to the health units in your district?
	DPS delivered to the US
	Delivered to US using chapa
	Delivered to US using motorcycle
	Delivered to US using a car
	Delivered to US using a truck
	Delivered to US using an ambulance
	US picked up from SDSMAS
13 b	If more than one form of transport was used for the distribution last month, is it because the transport available from the district wasn't available for the full required time?

13 c	If you didn't use the form of transport you wanted last month (delivering Medicines to the US with a truck or motorcycle), what were the reasons?
14	Is this (the answer from #13) normally how you distribute medicines to health units in your district?
15	In a typical month, how many days does it take you (or would it take you) to distribute meds to the US in your district?
16	In a typical month, how many days is the vehicle available for you to use for the distribution of Medicines to health centers?
17	How many days do you NEED to distribute medicines to all the health centers.
18	If the vehicle you need often isn't available for sufficient time for medicine / medicine distribution, what do you think are the reasons?
	SDSMAS doesn't have sufficient quantity of vehicles
	SDSMAS doesn't maintain existing vehicles for lack of funding
	SDSMAS doesn't maintain existing vehicles for lack of management
	SDSMAS doesn't have sufficient funds for vehicle use
	Road conditions are too difficult to maintain a vehicle
	Other
Finance for Logistics	
19 a	Is there a budget for medicine distribution?
19 b	Is the budget with separate line items or combined with other items? For example, is there a budget for fuel for logistics or is the budget for fuel for all of SDSMAS?
20 a	Is funding for fuel generally available for distribution?
20b	Is funding for fuel available when you need it?
21 a	Is funding for per diems generally available for your needs?
21 b	Is funding for per diems generally available when you need it?
22	If the funds you need for medicine distribution aren't generally available, why are they not available?
	Not enough money at SDSMAS
	Funds are finished when my request is received
	Difficult to get authorization signatures for the funds
	The budget line is finished
	Other (explain)
23	When you request funds for distribution of medicines for fuel or per diems, on average how long does it take before the funds are available?
24	What are the reporting requirements once you have used funds for distributions of Medicines?
	Provide Receipts
	Written report
	Guia de Remessa showing what was delivered
	Other
	Don't know
Distribution System Design in the District	
25	When you receive Medicines, how much notice do you receive about when they are arriving?
26 a	Do distributions of medicine to health units occur according to a schedule?
26 b	Do you keep documentation of the schedule for distributions?
27	How often do distributions of Medicines to health units occur in your district?
28	Is the distribution of Medicines planned at the same time every month/week/year (whatever the unit of time was mentioned above)?
29	What happens if you cannot complete the distribution as planned?
	Inform health centers to come pick them up
	Health centers will come to pick up more as they need it
	Other
30	If you are not here for a distribution, is there someone else trained to do the distribution?
31	How do you plan to distribute Medicines to health centers that are difficult to access?
32	When do distributions of Medicines generally occur?
33 a	Do you keep records of quantities distributed to facilities

	Write the last three dates
33 b	Are the receipts accessible?
33c	Are receipt records filled out correctly?
Logistics staffing	
34	How many staff at the district perform logistics activities during any given month?
35 a	Title
	Training
	Requisitions
	Inventory Management
	Pick up medicines
	Delivery of Medicines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
35 b	Title
	Training
	Requisitions
	Inventory Management
	Pick up medicines
	Delivery of Medicines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
35 c	Title
	Training
	Requisitions
	Inventory Management
	Pick up medicines
	Delivery of Medicines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
35 d	Title
	Training
	Requisitions
	Inventory Management
	Pick up medicines
	Delivery of Medicines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other

35 e	Title
	Training
	Requisitions
	Inventory Management
	Pick up medicines
	Delivery of Medicines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
36	About how many of the above staff have duties that are other than logistics?
Requisitions	
37	Do you submit requisitions for Medicines? How often do you submit requisitions generally? How do you determine the amount of Medicines to requisition?
38	Ask them to explain each column on a requisition. Which ones did they understand? List how many they understood and put any they did not understand in the observations
38 b	Do they have records of the requisitions?
38 c	Do they appear to be placed on a regular schedule?
38 d	What is the date of the last 5 requisitions?
38 e	Do the requisitions appear to be calculated correctly?
39 a	Do you maintain stock cards?
39 b	How often do you update your stock records?
40	Do you perform inventories regularly?
41	When was the last inventory performed?
42	Do you keep copies of receipts when you receive?
43	Do you RECEIVE requisitions from health centers in your districts?
43 b	When you receive a requisition from a health center, how quickly do you respond to the requisition?
43 c	Do you keep records of the requisitions you receive from health centers?
43 d	If yes, may we see a copy of the requisitions?
43 e	When you receive the requisition, what do you do with it? Check to see if I have enough stock Verify that is the stock amount they need If I don't have enough stock, I adjust the amount I can give them Other (explain)
43 f	Does the interviewer judge that analysis is done?
Supervision	
44 a	Do you supervise any logistics tasks?
44 b	If yes, what tasks do you perform supervision for? Requisitions Inventory management Pick up of Medicines Delivery of Medicines Filling in stock cards Quantification Stock reporting other
44 c	When was the most recent supervision you provided?
44 d	How often do you perform supervision?
44 e	Do you keep records of the supervision you perform?

44 f	Look at the supervision records and answer the following questions.
44 g	Do the recommendations include logistics recommendations?
Basic Logistics Concepts	
45	If you used 100 Medicines this month, how many would you receive next month? Assume a full supply at the province level.
46	And if you used less in the next month, would you receive more or less the next time?
47	What happens to your supply if the province doesn't have enough Medicines?
48	What happens to the health center supply if the province doesn't have enough Medicines?
49	Is there anything you can do to make sure you have enough?
	I can increase my quantity used
	I can increase my requested quantity
	I can decrease my existing stock
	I can fill out my requisition as normal
	There is nothing I can do
50	If you receive your stock late, what will happen to the stock at the health centers?
	There will be stock outs
	They will request more from me to protect themselves from delay
	Other
	No consequences
51	What happens if your requisition is sent late to the province?
52	Imagine you receive 10 requisitions per week of varying quantities from 10 facilities spread across the district and you need to deliver to them by the end of the following week. You have only 1 truck. Please describe how you would manage this situation.
	Populations
	Consumption, see a lot of patients, High flux
	Distance
	Access
	Close to stock out/stock outs
	Other
Storage and Inventory Control	
53	Is there enough space in the depository
54	Is the depository well organized?
	<i>Cortamoxazol</i>
55	Are the stock cards for Corimoxazol accessible?
	Are they updated?
	Are they correctly filled out?
56	Are the stock cards for AL accessible?
AL	Are they updated?
AL	Are they correctly filled out?
	<i>Paracetamol</i>
57	Are the stock cards for Paracetamol accessible?
	Are they updated?
	Are they correctly filled out?
	<i>Determine</i>
58	Are the stock cards for Determine accessible?
	Are they updated?
	Are they correctly filled out?
	Do the stock cards correspond to the inventory?
	<i>TDR</i>

59	Are the stock cards for TDR accessible?
	Are they updated?
	Are they correctly filled out?
	AZT
60	Are the stock cards for AZT accessible?
	Are they updated?
	Are they correctly filled out?
	TB
61	Are the stock cards for TB accessible?
	Are they updated?
	Are they correctly filled out?

PAV Survey

	District Code
	Date of Interview
	Interviewer
	Participant aware of confidentiality and signed consent form
Transport	
Question Number	
1	How many of each type of transport is available at the district?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
2	Of the forms of transport listed above, how many are currently functioning?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
3	Of the forms of transport listed above, how many are sometimes or always available for the distribution of Vaccines?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
4	How many of the vehicles from the question above are allocated 100% to vaccines distribution?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
5	If a vehicle needs to be fixed how long does it typically take before it is available again?

6	How many of each type of vehicle is available to the district from a partner organization (vehicle not owned by SDSMAS)?
	Bicycle
	Motorcycle
	Car
	Truck
	Ambulance
7	Who is responsible for the transport of vaccines to the health units in your district?
8	Is there someone responsible for managing the availability of transportation for the distribution of Vaccines to the health units in your district?
Receiving Vaccines from the Province	
9	Last month how did you receive vaccines at the district Sede?
10	Is this usually the way you receive vaccines at the district?
11	In a typical month, how many times do you need to replenish vaccines from DPS?
12	For each time that you need to pick up vaccines from DPS, how long does it take from the time you leave SDSMAS to the time you return to SDSMAS?
Delivering Vaccines to the Health Centers	
13 a	Last month how did you distribute Vaccines to the health units in your district?
13 b	If more than one form of transport was used for the distribution last month, is it because the transport available from the district wasn't available for the full required time?
13 c	If you didn't use the form of transport you wanted last month (delivering Vaccines to the US with a truck or motorcycle), what were the reasons?
14	Is this (the answer from #13) normally how you distribute vaccines to health units in your district?
15	In a typical month, how many days does it take you (or would it take you) to distribute Vaccines to the US in your district?
16	In a typical month, how many days is the vehicle available for you to use for the distribution of Vaccines to health centers?
17	How many days do you NEED to distribute medicines to all the health centers.
18	If the vehicle you need often isn't available for sufficient time for vaccine / medicine distribution, what do you think are the reasons?
	SDSMAS doesn't have sufficient quantity of vehicles
	SDSMAS doesn't maintain existing vehicles for lack of funding
	SDSMAS doesn't maintain existing vehicles for lack of management
	SDSMAS doesn't have sufficient funds for vehicle use
	Road conditions are too difficult to maintain a vehicle
	other
Finance for Vaccine Logistics	
19 a	Is there a budget for vaccine distribution?
19 b	Is the budget with separate line items or combined with other items? For example, is there a budget for fuel for logistics or is the budget for fuel for all of SDSMAS?
20 a	Is funding for fuel generally available for distribution?
20b	Is funding for fuel available when you need it?
21 a	Is funding for per diems generally available for your needs?
21 b	Is funding for per diems generally available when you need it?
22	If the funds you need for medicine distribution aren't generally available, why are they not available?
	Not enough money at SDSMAS

	Funds are finished when my request is received
	Difficult to get authorization signatures for the funds
	The budget line is finished
	Other (explain)
23	When you request funds for distribution of vaccines for fuel or per diems, on average how long does it take before the funds are available?
24	What are the reporting requirements once you have used funds for distributions of Vaccines?
	Provide Receipts
	Written report
	Guia de Remessa showing what was delivered
	Other
	Don't know
Distribution System Design in the District	
25	When you receive vaccines, how much notice do you receive about when they are arriving?
26 a	Do distributions of medicine to health units occur according to a schedule?
26 b	Do you keep documentation of the schedule for distributions?
27	How often do distributions of Vaccines to health units occur in your district?
28	Is the distribution of vaccines planned at the same time every month/week/year (whatever the unit of time was mentioned above)?
29	What happens if you cannot complete the distribution as planned?
	I inform the health facilities to come to pick up
	Health facilities come to pick up as they need more
	Other (explain)
30	If you are not here for a distribution, is there someone else trained to do the distribution?
31	How do you plan to distribute vaccines to health centers that are difficult to access?
32	When do distributions of vaccines generally occur?
33 a	Do you keep records of quantities of vaccines distributed to facilities?
33 b	If yes, may we see copies of the records? <i>Interviewer write down the last 3 dates of distribution.</i>
34	Are the receipts accessible?
35	Are receipt records filled out correctly?
Logistics Staffing	
36	How many staff at the district perform logistics activities during any given month?
a	Title
	Training
	Requisitions
	Inventory Management
	Pick up vaccines
	Delivery of Vaccines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
b	Title
	Training
	Requisitions

	Inventory Management
	Pick up vaccines
	Delivery of Vaccines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
c	Title
	Training
	Requisitions
	Inventory Management
	Pick up vaccines
	Delivery of Vaccines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
d	Title
	Training
	Requisitions
	Inventory Management
	Pick up vaccines
	Delivery of Vaccines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
e	Title
	Training
	Requisitions
	Inventory Management
	Pick up vaccines
	Delivery of Vaccines
	Fill out stock cards
	Quantification
	Stock Reporting
	Other
38	About how many of the above staff have duties that are other than logistics?
Requisitions	
39	Do you submit requisitions for vaccines?
	How often do you submit requisitions generally?
	How do you determine the amount of vaccines to requisition?

40	Ask them to explain each column on a requisition. Which ones did they understand? List how many they understood and put any they did not understand in the observations
40 b	Do they have records of the requisitions?
40 c	Do they appear to be placed on a regular schedule?
40 d	What is the date of the last 5 requisitions?
40 e	Do the requisitions appear to be calculated correctly?
41	Do you maintain stock cards?
41 b	How often do you update your stock records?
42	Do you perform inventories regularly?
43	When was the last inventory performed?
44	Do you keep copies of receipts when you receive?
45	Do you RECEIVE requisitions from health centers in your districts?
45 b	When you receive a requisition from a health center, how quickly do you respond to the requisition?
45 c	Do you keep records of the requisitions you receive from health centers?
45 d	If yes, may we see a copy of the requisitions?
45 e	When you receive the requisition, what do you do with it?
	Check to see if I have enough stock
	Verify that is the stock amount they need
	If I don't have enough stock, I adjust the amount I can give them
	Other (explain)
45 f	Does the interviewer judge that analysis is done?
Supervision	
46	Do you supervise any logistics tasks?
46 b	If yes, what tasks do you perform supervision for?
	Requisitions
	Inventory management
	Pick up of Vaccines
	Delivery of Vaccines
	Filling in stock cards
	Quantification
	Stock reporting
	other
46 c	When was the most recent supervision you provided?
46 d	How often do you perform supervision?
46 e	Do you keep records of the supervision you perform?
46 f	List the 5 dates more recent that supervision was administered.
46 g	Do the recommendations include logistics recommendations?
Logistics Concepts	
47	If you used 100 Vaccines this month, how many would you receive next month? Assume a full supply at the province level.
48	And if you used less in the next month, would you receive more or less the next time?
49	What happens to your supply if the province doesn't have enough Vaccines?
50	What happens to the health center supply if the province doesn't have enough Vaccines?
51	Is there anything you can do to make sure you have enough?

	I can increase my quantity used
	I can increase my requested quantity
	I can decrease my existing stock
	I can fill out my requisition as normal
	There is nothing I can do
52	If you receive your stock late, what will happen to the stock at the health centers?
	There will be stock outs
	They will request more from me to protect themselves from delay
	Other
	No consequences
53	What happens if your requisition is sent late to the province?
54	Imagine you receive 10 requisitions per week of varying quantities from 10 facilities spread across the district and you need to deliver to them by the end of the following week. You have only 1 truck. Please describe how you would manage this situation.
	Population
	Consumption
	Distance
	Access
	Close to stock out/stock outs
	Other
Storage and Inventory Control	
55	Is there enough space in the depository
56	Does the district have a refrigerator solely for the storage of vaccines?
57	Is the depository well organized?
58	Are the stock cards for BCG accessible?
BCG	Are they updated?
	Are they correctly filled out?
	Do the stock cards correspond to the inventory?
59	Are the stock cards for Polio accessible?
Polio	Are they updated?
	Are they correctly filled out?
	Do the stock cards correspond to the inventory?

Management Survey

	District Code
	Date of Interview
	Interviewer
	Participant aware of confidentiality and signed consent form
Question Number	
1	Do you feel you have sufficient infrastructure at your district for vaccine and medicine logistics?
2	If the infrastructure isn't complete, what is not sufficient?
	Transport _____
	Fuel _____
	Per diems _____
	Human resources _____

	Logistics supervision for your staff _____
	Storage for vaccines and medicines _____
3	Do you feel your staff understand well logistics processes?
4	Do you feel your staff understand well logistics concepts?
5	Do you feel your staff know how to meet the needs of the supply chain?
6	Do you feel your staff know how to problem solve in supply chain?
7	Do you feel your staff need additional training in supply chain?
8	What do you feel are the weaknesses in the supply chain in your district?
	Human resource quantity _____
	Human resource quality _____
	Upstream supply chain delays _____
	Not enough vaccines / medicines sent to my district _____
	Poor planning _____
	Poor management _____
	Other (explain) _____
	Are there any particular vaccines or medicines that have supply chain problems in your district?
	What would you do to fix the supply chain and logistics for vaccines in your district?
	What would you do to fix the supply chain and logistics for medicines in your district?

LIMITATIONS OF SPECIFIC PHARMACY AND PAV SURVEY QUESTIONS

These limitations are explained from the perspective of Lillian Connett, the graduate student intern from the William Davidson Institute who was accompanying the VillageReach study team on some visits to the field to conduct the surveys.

12: For each time that you need to pick up medicines from DPS, how long does it take from the time you leave SDSMAS (the district) to the time you return to SDSMAS?

If the respondent was used to DPS delivering supplies directly, the respondent had a hard time answering this

13c: If you didn't use the form of transport you wanted last month (delivering medicines/medicines to the health center with a truck or motorcycle), what were the reasons?

In general, questions such as this one that asked the respondent to explain how things/processes worked at that district level were met with blankness or confusion. This may have stemmed from confusion, lack of understanding that providing their opinion was acceptable, or hesitancy to attribute blame to problems. Most of the respondents I witnessed answered, "I do not know" and then only reluctantly chose an answer if prompted with the answer options from the data collector (and only some answered then). In some cases I believe data collectors sought answers to these questions from the administration as a result.

18: If the vehicle you need often isn't available for sufficient time for medicine / medicine distribution, what do you think are the reasons?

22: If the funds you need for medicine distribution aren't generally available, why are they not available?

For districts who are used to DPS delivering, the found it hard to estimate the time needed to distribute medicines to the health centers (my understanding of this was that it was due not to lack of knowledge of time required for distributions, but unwillingness/ inability to discuss hypothetical situations.

15: In a typical month, how many days does it take you (or would it take you) to distribute medicines/medicines to the health centers in your district?

16: In a typical month, how many days is the vehicle available for you to use for the distribution of medicines/medicines to health centers?

17: How many days do you NEED to distribute medicines/medicines to all the health centers?

I found the distinction of these 3 questions confusing at first. 17 was added after field tests with data collectors per their request. 15 asks how long it actually takes them to do a distribution 16 asks about vehicle availability and 17 asks how long, in an ideal world, would it take them to make the distribution (for example, if they only have a vehicle available for 1 day they may take 1 day for distributions, but they start very early and do distributions until late at night, In answer 17 they would say they would want 2 days for distributions).

23: When you request funds for distribution of medicines for fuel or per diems, on average how long does it take before the funds are available?

The use of the word “funds” frequently caused confusion for this question. The district workers never request funds specifically. They request fuel or transport that would come with fuel.

29: What happens if you cannot complete the distribution as planned?

This question caused confusion because sometimes it was interpreted to mean what if a distribution stops mid way through as opposed to what if a distribution could not be completed from start to finish as planned. I think something might have been lost in translation – specifically around the use of the English word “completed”. This problem was identified in initial field training and the wording was changed and specific training was done with the data collectors around it, however, I am not convinced that they all understood.

46e: Do you keep records of the supervision you perform?

46g: Do the recommendations include logistics recommendations?

There seems to be some mix up in the supervision questions between dedicated supervision and supervisions conducted while on distribution. Usually the answer to 46e is for dedicated supervision, while 46g is supervision done while on distribution, although sometimes it is hard to tell which form of supervision the answers refer to.

47: If you used 100 medicines/vaccines this month, how many would you receive next month? Assume a full supply at the province level.

This caused a lot of confusion because this question never matched the reality of the district and thus confused the respondent. The number given in the question was too big or too small. Furthermore, the answer apparently (according to many of the respondents) would also rely on other factors such as their existing stock and recent consumption. I am not sure if the confusion stems from an inability to think theoretically or hypothetically or if the question was just confusing. I think in most cases, the data collector had to adapt the numbers and background info (assume your existing stock is xyz) of the questions to make it real to the respondent

48: And if you used less in the next month, would you receive more or less the next time?

This caused some similar confusion as above, but much less.

BASIC LOGISTICS CONCEPTS QUIZ

This quiz was part of the Pharmacy and PAV surveys. Acceptable answers are in bold.

1. If you used 100 medicines/medicines this month, how many would you receive next month? Assume a full supply at the province level.

- a. **Staff knows correct answer (100 unless the previous month's stock wasn't up to the ideal/maximum stock level)**
 - b. Staff does not know correct answer
 - c. Staff does not know
2. And if you used less in the next month, would you receive more or less the next time?
 - a. More
 - b. **Less**
 - c. Same
 - d. Don't know
3. What happens to your supply if the province doesn't have enough medicines/medicines?
 - a. **Won't receive enough**
 - b. Will receive enough
 - c. Will receive nothing
 - d. Don't know
4. What happens to the health center supply if the province doesn't have enough medicines/medicines?
 - a. **They won't receive enough**
 - b. They will receive enough
 - c. They will receive nothing
 - d. Don't know
5. Is there anything you can do to make sure you have enough?
 - a. **I can increase my quantity used**
 - b. **I can increase my requested quantity**
 - c. **I can decrease my existing stock**
 - d. I can fill out my requisition as normal
 - e. There is nothing I can do
6. If you receive your stock late, what will happen to the stock at the health centers?
 - a. **There will be stock outs**
 - b. **They will request more from me to protect themselves from delay**
 - c. **Other: Would have to be evaluated on a case-by-case basis**
 - d. No consequences
7. What happens if your requisition is sent late to the province?
 - a. Nothing/I will not get resupply
 - b. **Reduced or less/I will get less resupply late/ I will receive it late**
 - c. No consequences
 - d. Other
8. Imagine you receive 10 requisitions per week of varying quantities from 10 facilities spread across the district and you need to deliver to them by the end of the following week. You have only 1 truck. Please describe how you would manage this situation.
 - a. Population
 - b. **Consumption, see a lot of patients, High fluxo**
 - c. **Distance**
 - d. **Access**
 - e. **Close to stock out/stock outs**

- f. **Other: Best looked at on a case-by-case basis too. They should be looking at a combination of these factors.**

Appendix B: Defining District-Level Health Logistics Capacity

District Health Logistics Capacity Component	Logistics Capacity Criteria	Importance of the Component	Implications for Resource-Limited Settings
Personnel	<p>Staff should exist in adequate staff numbers to meet logistics needs</p> <p>Staff should have specific logistics training</p> <p>Staff should be trained and capable of the following:</p> <ul style="list-style-type: none"> • Quantify needs for health products • Order products • Receive products • Properly store products • Record inventories <p>Staff should receive ongoing training through, at minimum, supervisions that cover logistics.</p> <p>Incentives should exist for staff to complete logistics activities through:</p> <ul style="list-style-type: none"> • The existence of dedicated logistics staff <p>Incentives should exist for staff to complete logistics activities through:</p> <ul style="list-style-type: none"> • The existence of documented logistics activities that are measured in performance reviews of not dedicated logistics staff 	<p>Meeting personnel requirements lays the foundation for meeting all other logistics capacities. Personnel are essential in managing and administering medicines/medicines and accurately recording and transferring consumption data—information that impacts all higher level planning.</p>	<p>Personnel performing health logistics duties are often allocated to other non-logistics responsibilities at the health center. Some supply chain tasks, such as picking up a new shipment at the nearest district warehouse, require time and money that the health center cannot afford to expend. Moreover, the time personnel spend travelling to pick up medicines/vaccines could otherwise be spent on health services provision.</p>
Organization Support for Health Logistics Activities	<p>Formal procedures/guidelines exist for:</p> <ul style="list-style-type: none"> • Data management • Inventory management • Delivery • Supervision • Staffing • Budgeting <p>Supervision has established protocols for:</p> <ul style="list-style-type: none"> • How to perform supervision, including how to address knowledge gaps • The expected schedule of supervision • Inclusion of the task of 	<p>Organizational support for health logistics activities ensures that health logistics are appropriately managed at different supply chain levels. Formal procedures reduce confusion around the logistics tasks for which personnel at different supply chain levels are specifically responsible.</p>	<p>New formal procedures and protocols are often poorly communicated to the lower supply chain levels because the communication infrastructure is often weaker in resource-limited settings. Furthermore, if the guidelines themselves are unclear, it may be difficult for personnel to follow. Also, some national protocols require an organizational culture change. If most people at a rural health center have been performing specific logistics tasks a certain way for a long time, it is less likely they would be motivated to adopt a new practice or perform the new practice well</p>

District Health Logistics Capacity Component	Logistics Capacity Criteria	Importance of the Component	Implications for Resource-Limited Settings
	<p>supervision in job descriptions</p> <ul style="list-style-type: none"> Personnel in charge of logistics have same level of authority as peer activities 		without adequate understanding regarding its importance and sufficient, appropriate training for implementation.
Information Systems	<p>System for managing logistics data for (at the district level):</p> <ul style="list-style-type: none"> Stock records (stock cards) Requisition records Delivery records Consumption data Losses/adjustments <p>Reliable flow of information between levels in the supply chain (Central, Province, District, Clinic)</p> <ul style="list-style-type: none"> Information that is shared is received in time to impact decision making Information that is shared is what is needed for decision making Information is consistently shared 	Pharmacy and PAV program managers at all supply chain levels use the health logistics information systems to improve performance and decision-making around medicine administration, forecasting, and distribution. The information system should include operations-related documentation (delivery schedules, receipts from deliveries) and key performance indicators that are consistently monitored, such as stockout rates.	Computer based information systems frequently transfer the burden of calculating needs from the staff to computers. While in theory computer-based systems can help reduce human error, in reality, in many resource-limited settings, introducing health center workers to unfamiliar technology can also increase the likelihood of data entry errors. Paper records are more often used in resource-limited settings where electricity is irregular and where personnel have limited computer skills. Paper records are sufficient in these settings and information from these paper forms should be regularly collected and passed on to higher levels in the supply chain. Some countries are also adopting mobile, web-based systems to facilitate data collection and information transfer and sharing. Implementing all types of information systems requires appropriate training.
Transport	<p>Sufficient transport including</p> <ul style="list-style-type: none"> Functioning vehicles Necessary fuel <p>Distribution schedules exist and are documented (for every level- central to clinic)</p> <p>Distribution follow existing schedules</p> <p>Sufficient transport including</p> <ul style="list-style-type: none"> Associated personnel <p>Procedures exist for product delivery between health levels</p>	Without sufficient transport, medicines/vaccines cannot be passed through from one supply chain level to the next.	At the district level, vehicles are often allocated to many different programs. In some settings, the roads are poor, increasing the likelihood that vehicles will break down and need repairs.
Funding	<p>Adequate funds must exist for</p> <ul style="list-style-type: none"> Transport Staff pay Logistics information systems 	Adequate funding is needed to incentivize people to carry out logistics tasks; to buy fuel and pay for repairs for vehicles for medicine deliveries; and to pay for related	In some countries, higher levels must approve funds release before lower levels can use them. This can causes major delays in scheduled medicine distributions. The

District Health Logistics Capacity Component	Logistics Capacity Criteria	Importance of the Component	Implications for Resource-Limited Settings
	There must be a dedicated budget for logistics activities	costs to running a logistics information system that operates with computer or mobile device.	requirements for funding medicine deliveries also vary. The national government provides funding for health activities but these funds can be released late if there are other competing programs or if the central government is also running into delays with justifying and receiving funds from international donors and/or bilateral partners.
Inventory and Storage	<p>Adequate storage capacity should exist Inventory should be maintained between established maximum and minimum product levels (determined based on multi-year forecasting against updated target population numbers) FEFO guidelines (first expiry, first out) are implemented Expired stock is:</p> <ul style="list-style-type: none"> • Physically separated • Recorded in information system <p>All losses/adjustments to stock levels are recorded Guidelines for storage and disposal of products should exist Regular inventories are performed</p> <ul style="list-style-type: none"> • Minimum of one annual inventory of all physical stock <p>Regular visual inspections of products</p>	Adequate storage capacity ensures that the quality of the medicines is properly maintained. Inadequate storage capacity often leads to medicine wastage. Sufficient inventory levels ensure that the supply of medicines is fulfilling population demand for the products.	Depending on the country, storage capacity at various supply chain levels can be sufficient or insufficient. In Mozambique for example, the central level storehouses have adequate capacity whereas at lower levels, there is often inadequate capacity to store medicines.
Procurement and Forecasting	Procurement and forecasting and important aspects of the medicine logistics system and are defined as the processes for procuring the medicines used by the health care system.	Forecasting is done at all supply chain levels, but the central level plays a vital role. If there are problems at the highest level in the supply chain in procuring sufficient quantities of specific essential medicines/medicines, all lower levels are impacted.	Forecasting is an ability that often requires additional training for lower level supply chain participants. A WHO-recommended formula is often used, but this formula may not be easily understood and applied by district and health center personnel who are performing logistics tasks who are inexperienced or untrained.

Appendix C: Logistics Capacity Components and Criteria Not Analyzed by the Study

As mentioned in the report, the main reason why these criteria were not included in the survey is because the theoretical framework for the study was completed after survey design and data collection in the field.

District Health Logistics Capacity Component	Logistics Capacity Criteria Not Analyzed in this Study
Personnel	Incentives should exist for staff to complete logistics activities through: <ul style="list-style-type: none"> • The existence of documented logistics activities that are measured in performance reviews of not dedicated logistics staff
Transport	Sufficient transport including <ul style="list-style-type: none"> • Associated personnel (This is not covered, but lack of people to drive vehicles never was referenced as a problem) Procedures exist for product delivery between health levels
Funding	Adequate funds must exist for <ul style="list-style-type: none"> • Logistics information systems
Inventory and Storage	Inventory should be maintained between established max and min product levels FEFO guidelines (first expire, first out) are implemented Expired stock is: <ul style="list-style-type: none"> • Physically separated • Recorded in information system All losses/adjustments to stock levels are recorded Guidelines for storage and disposal of products should exist Regular inventories are performed <ul style="list-style-type: none"> • Minimum of one annual inventory of all physical stock • Regular visual inspections of products

Appendix D: Complete Table of Pharmacy and PAV Survey Findings

N = number of districts reporting

Q = corresponding Pharmacy/PAV survey question

Survey Indicator	Overall (Total Reporting Districts)	Pharmacy	N1	Q1	PAV	N2	Q2
Personnel							
Average number of staff performing logistics duties	2.9 (100)	2.3	50	34	3.5	50	36
Minimum number of staff performing logistics duties	1 (100)	1	50	34	1	50	36
Maximum number of staff performing logistics duties	12 (100)	12	50	34	10	50	36
Percent of staff in all districts conducting 3 or more logistics duties	85% (100)	83%	50	35	86%	50	36
Percent of districts with staff conducting 3 or more logistics duties	100% (100)	100%	50	35	100%	50	36
Number of different position titles for people carrying out logistics	23 (100)	9	50	35	17	50	36
Average number of district staff 100% dedicated to logistics activities	1.2 (88)	1.8	50	35, 36	0.5	38	36, 38
Percent of all district staff that are 100% dedicated to logistics activities	48% (88)	69%	50	35, 36	34%	38	36, 38
Districts with a minimum of 1 staff 100% dedicated to logistics activities	58% (88)	74%	50	35, 36	36%	38	36, 38
Districts with a minimum of 1 person responsible for managing transport	91% (99)	92%	50	8	90%	49	8
Percent of district staff with at least 3 years of formal training	65% (100)	47%	50	35	82%	50	36
Percent of district staff with at least 2 years of formal training	90% (100)	76%	50	35	100%	50	36
Average number of district staff with at least 3 years of formal training	2.0 (100)	1.1	50	35	2.9	50	36
Average number of district staff with at least 2 years of formal training	2.7 (100)	1.8	50	35	3.5	50	36
District scores on the logistics concepts quiz							
100%	9% (99)	6%	49	45-52	12%	50	47-54
> 80%	38% (99)	37%	49	45-52	40%	50	47-54
60-80%	49% (99)	53%	49	45-52	46%	50	47-54
< 60%	12% (99)	10%	49	45-52	14%	50	47-54
Organizational Support for Logistics Activities							
Contingency plans							
<i>When there is a change in expected distribution</i>	51% (82)	51%	43	29	50%	39	29
<i>When primary distribution staff is unavailable</i>	90% (98)	82%	49	30	98%	49	30
<i>For accessing hard to reach health clinics</i>	24% (98)	27%	49	31	22%	49	31
Conduct supervisions to the health clinics	92% (100)	84%	50	44a	100%	50	46

Survey Indicator	Overall (Total Reporting Districts)	Pharmacy	N1	Q1	PAV	N2	Q2
Frequency of supervisions							
<i>Never</i>	7% (89)	16%	42	44d	0%	47	46d
<i>Weekly</i>	8% (89)	2%	42	44d	13%	47	46d
<i>Monthly</i>	29% (89)	16%	42	44d	40%	47	46d
<i>Trimester</i>	30% (89)	32%	42	44d	30%	47	46d
<i>Semester</i>	17% (89)	22%	42	44d	13%	47	46d
<i>Annually</i>	3% (89)	6%	42	44d	0%	47	46d
<i>Varies</i>	6% (89)	6%	42	44d	4%	47	46d
Perform dedicated supervisions	31% (26)	0%	11	44c, f	53%	15	33b, 46f
Include logistics capabilities in supervisions	91% (93)	88%	43	44b	94%	50	46
Include logistics in supervision recommendations	94% (36)	100%	17	44g	89%	19	46g
Types of logistics capabilities included in supervisions							
<i>Requisitions</i>	60% (93)	67%	43	44b	53%	50	46b
<i>Inventory management</i>	87% (93)	93%	43	44b	81%	50	46b
<i>Pick up medicines/medicines</i>	45% (93)	44%	43	44b	45%	50	46b
<i>Delivery of medicines/medicines</i>	56% (93)	63%	43	44b	49%	50	46b
<i>Filling in stock cards</i>	91% (93)	98%	43	44b	85%	50	46b
<i>Quantification</i>	61% (93)	63%	43	44b	60%	50	46b
<i>Stock reporting</i>	75% (93)	84%	43	44b	67%	50	46b
Information System							
Perform inventories regularly	91% (99)	98%	49	40	84%	50	42
Update stock cards (records)	84% (95)	86%	49	39a	83%	46	41
Frequency of stock card updates							
<i>Never</i>	2% (92)	4%	48	39b	0%	44	41b
<i>Daily</i>	28% (92)	22%	48	39b	34%	44	41b
<i>Weekly</i>	2% (92)	2%	48	39b	2%	44	41b
<i>Monthly</i>	32% (92)	40%	48	39b	22%	44	41b
<i>< Monthly</i>	2% (92)	2%	48	39b	2%	44	41b
<i>Varies too much</i>	27% (92)	30%	48	39b	26%	44	41b
<i>No data</i>	7% (92)	0%	48	39b	14%	44	41b
Submit requisitions for medicines/medicines	86% (100)	96%	50	37	76%	50	39
Requisition submission frequency							
<i>Monthly</i>	84% (88)	82%	49	37	87%	39	39
<i>Weekly</i>	1% (88)	2%	49	37	0%	39	39
<i>2-3 times monthly</i>	7% (88)	10%	49	37	3%	39	39

Survey Indicator	Overall (Total Reporting Districts)	Pharmacy	N1	Q1	PAV	N2	Q2
<i>Varies too much to say</i>	8% (88)	6%	49	37	11%	39	39
Keep record of requisitions	84% (99)	94%	49	38b	74%	50	40b
Do not place requisitions on a regular schedule	22% (78)	5%	42	38c	42%	36	40c
Calculate requisitions correctly	85% (74)	89%	45	38e	80%	29	40e
Use a formula for determining the amount of medicines/medicines to request	98% (88)	100%	47	37a	95%	41	39
Understand all columns on the requisition form	88% (95)	94%	48	38a	83%	47	40
Understand none of the columns of on the requisition form	9% (95)	4%	48	38a	15%	47	40
Receive requisitions for medicines/medicines from the health centers	79% (98)	94%	48	43	64%	50	45
Keep record of requisitions received from the health centers	88% (86)	92%	49	43c	84%	37	45c, 45d
Know what to do with requisitions received from the health clinics	91% (78)	91%	47	43 e,f	90%	31	45f
Average notice time in days that a district receives before a delivery	3.7 (97)	3.7	48	25	3.7	49	25
Average response time in days for district response to a health center requisition	2.9 (83)	3.9	44	43b	1.8	39	45b
Keep records of quantities distributed to health centers	81% (96)	88%	49	33a	74%	47	33a
Have receipts accessible	87% (87)	96%	45	33b	79%	42	34
Receipt records all filled out correctly	74% (82)	64%	44	33c	87%	38	35
Demonstrate stock card and inventory concordance, by product							
<i>Determine</i>	95% (38)	95%	38	58	-	-	-
<i>BCG</i>	58% (43)	-	-	-	58%	43	58
<i>Polio</i>	65% (43)	-	-	-	65%	43	58
Transport							
Average number of currently functioning closed vehicles (cars, trucks, ambulances) at the district	2.3 (99)	2.2	49	1	2.4	50	1
Minimum number of closed vehicles available at the district	1 (98)	1	48	1	1	50	1
Maximum number of closed vehicles available at the district	6 (98)	5	48	1	6	50	1
Percent of total closed vehicles unavailable due to damage	19% (99)	18%	49	2	20%	50	2
Average number of damaged closed vehicles	0.5 (99)	0.5	49	2	0.6	50	2
Average time in days to repair a broken vehicle	38.3 (81)	36.2	38	5	40.2	43	5
Percent of districts with access to vehicles outside the district	52% (100)	62%	50	6	42%	50	6
Fuel availability							
<i>Always</i>	19% (83)	16%	44	20a,b	24%	39	20b
<i>Sometimes</i>	37% (83)	44%	44	20a,b	32%	39	20b
<i>Never</i>	22% (83)	10%	44	20a,b	36%	39	20b

Survey Indicator	Overall (Total Reporting Districts)	Pharmacy	N1	Q1	PAV	N2	Q2
Percent of closed vehicles that are currently functioning	81% (99)	82%	49	2	80%	50	2
Average number of currently functioning closed vehicles per district	2.3 (99)	2.2	49	2	2.4	50	2
Percent of closed vehicles that are sometimes or always available for medicine distributions	43% (100)	54%	50	3	34%	50	3
Average number of vehicles that are sometimes or always available for medicine distributions	1.23 (100)	1.4	50	3	1.0	50	3
Percent of all vehicles that are allocated 100% to medicine distributions	4% (99)	7%	49	4	1%	50	4
Average number of closed vehicles that are allocated 100% to medicine distributions	0.1 (99)	0.2	49	4	0.0	50	4
Ratio of total closed vehicles versus open vehicles (motorcycles, bicycles)	0.6 (99)	0.9	49	2	0.5	50	2
Transport methods used for receiving medicines/medicines for health center distributions							
<i>Received medicines/ medicines from DPS</i>	63% (96)	36%	47	9	88%	49	9
<i>Picked up medicines/medicines from DPS with car</i>	29% (96)	51%	47	9	8%	49	9
<i>Picked up medicines/medicines from DPS with truck</i>	1% (96)	2%	47	9	0%	49	9
<i>Picked up medicines/medicines from DPS with ambulance</i>	7% (96)	11%	47	9	4%	49	9
Average number of times that a district needs to replenish medicines from DPS	1.3 (99)	1.4	49	11	1.1	50	11
Average length of time needed in days to pick up medicines from DPS	1.6 (90)	1.9	49	12	1.4	41	12
Scheduled distributions	22% (96)	31%	48	26a	10%	48	26a
Keep record of distribution schedules	37% (54)	25%	28	26b	50%	26	26b
Transport methods used for distributing medicines/medicines to the health centers							
<i>DPS delivering directly</i>	34% (98)	2%	48	13a	64%	50	13a
<i>Health centers pick up from SDSMAS (district)</i>	14% (98)	25%	48	13a	4%	50	13a
<i>DPS delivering/health centers pick up</i>	1% (98)	0%	48	13a	2%	50	13a
<i>Chapa (public transportation)/another vehicle</i>	3% (98)	2%	48	13a	4%	50	13a
<i>Car only</i>	24% (98)	38%	48	13a	12%	50	13a
<i>Truck only</i>	1% (98)	2%	48	13a	0%	50	13a
<i>Ambulance only</i>	3% (98)	6%	48	13a	0%	50	13a
<i>DPS delivering/another vehicle</i>	6% (98)	0%	48	13a	12%	50	13a

Survey Indicator	Overall (Total Reporting Districts)	Pharmacy	N1	Q1	PAV	N2	Q2
<i>Partner NGO only</i>	1% (98)	0%	48	13a	2%	50	13a
<i>Combination of vehicles</i>	1% (98)	2%	48	13a	0%	50	13a
<i>Health centers pick up/another vehicle</i>	11% (98)	23%	48	13a	0%	50	13a
Average length of time in days that it takes for the district to distribute medicines/medicines to the health centers	2.5 (94)	2.9	45	15	2.1	49	15
Average length of time in days that the vehicle is available for the district to use for medicine/medicine distributions to the health centers	2.5 (81)	3.1	41	16	2.0	40	16
Average length of time in days that the district needs in order to distribute medicines/medicines to all health centers	4.2 (93)	4.9	45	17	3.6	48	17
Gap in the length of time in days that a vehicle is available for a district for distributions and the time needed to distribute to all health centers	1.7 (81/93)	1.8	41,45	16,17	1.6	40,48	16,17
Reasons why a vehicle was not available for previous month's distributions							
<i>SDSMAS doesn't have sufficient quantity of vehicles</i>	87% (95)	96%	46	18	80%	49	18
<i>SDSMAS doesn't maintain existing vehicles due to lack of funding</i>	15% (95)	13%	46	18	16%	49	18
<i>SDSMAS doesn't maintain existing vehicles due to lack of management</i>	7% (95)	7%	46	18	8%	49	18
<i>SDSMAS doesn't have sufficient funds for vehicle use</i>	71% (95)	74%	46	18	67%	49	18
<i>Road conditions are too difficult to maintain a vehicle</i>	9% (82)	3%	33	18	12%	49	18
<i>Other</i>	13% (79)	11%	46	18	15%	33	18
Volunteered "lack of fuel" as a reason that a vehicle was unavailable for the previous month's distributions		30%	13	18, 13c	2%	49	18
Frequency of medicine/medicine distributions to the health centers							
<i>Monthly</i>	94% (97)	91%	47	27	96%	50	27
<i>Weekly</i>	2% (97)	2%	47	27	2%	50	27
<i>Twice monthly</i>	2% (97)	2%	47	27	2%	50	27
<i>Three times monthly</i>	0% (97)	0%	47	27	0%	50	27
<i>Varies</i>	2% (97)	4%	47	27	0%	50	27
Plan for distributions at the same time every month/week/year they typically occur	31% (97)	33%	49	28	30%	48	28
Time of the month that districts conduct distributions							
<i>Beginning</i>	38% (97)	48%	48	32	29%	49	32
<i>Middle</i>	14% (97)	6%	48	32	22%	49	32
<i>End</i>	24% (97)	27%	48	32	20%	49	32
<i>Varies depending on when they receive supplies from the province</i>	24% (97)	19%	48	32	29%	49	32
Funding							

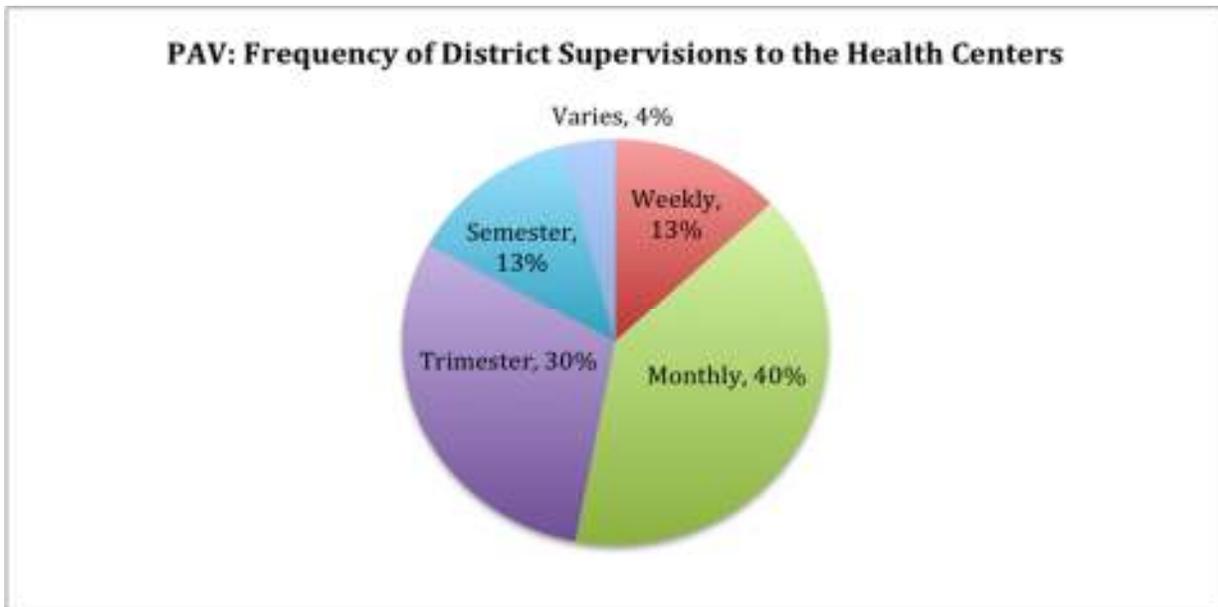
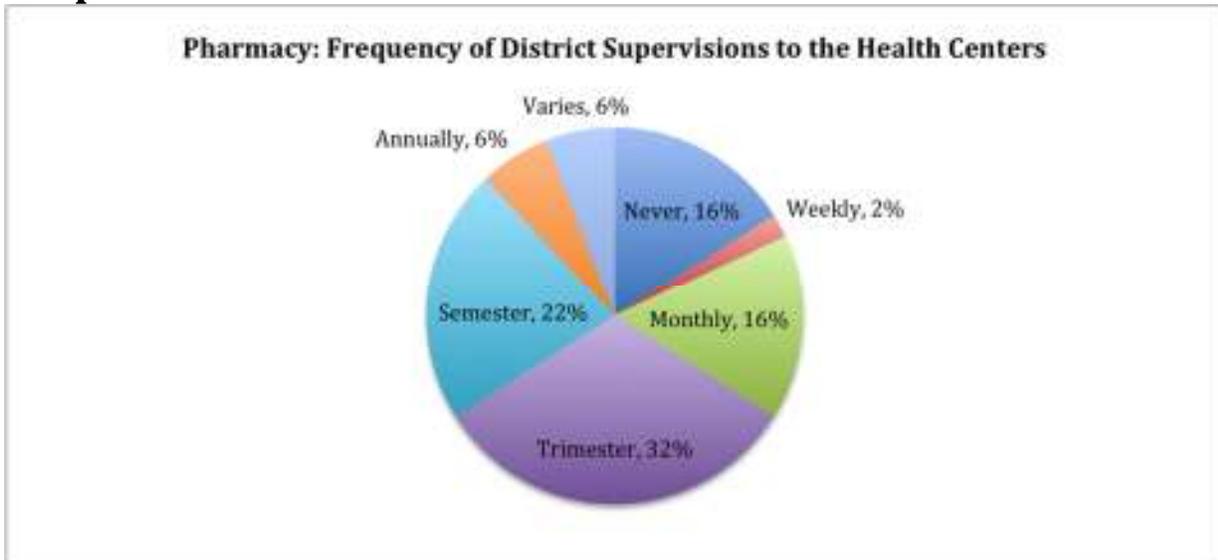
Survey Indicator	Overall (Total Reporting Districts)	Pharmacy	N1	Q1	PAV	N2	Q2
Without a budget for medicine/medicine distributions	67% (97)	68%	47	19a	66%	50	19a
With a budget for medicine/medicine distributions	4% (97)	0%	47	19a	8%	50	19a
Do not know if they have a budget for medicine/medicine distributions	29% (97)	32%	47	19a	26%	50	19a
Separate line items for the budget for medicine/medicine distributions	0% (42)	0%	21	19b	0%	21	19b
Combined line items for the budget for medicine/medicine distributions	25% (44)	24%	21	19b	26%	23	19b
Do not know if the budget has separate or combined line items for medicine/medicine distributions	75% (44)	76%	21	19b	74%	23	19b
Reasons why funding for medicine/medicine distributions was not available							
<i>Not enough money at SDSMAS</i>	76% (91)	72%	46	22	80%	45	22
<i>Funds are finished when my request is received</i>	13% (91)	13%	46	22	13%	45	22
<i>Difficult to get authorization signatures for the funds</i>	3% (91)	2%	46	22	4%	45	22
<i>The budget line is finished</i>	10% (91)	11%	46	22	9%	45	22
<i>Don't know</i>	21% (91)	26%	46	22	16%	45	22
Funding for fuel always available when needed	24% (74)	23%	35	20b	26%	39	20b
Funding for per diems always available for distribution team when needed	0% (55)	0%	27	21b	0%	28	21b
Average time in days for districts to receive funds for logistics activities	2.5 (55)	2.6	27	23	2.5	28	23
Follow reporting requirements for the use of funds	99% (97)	98%	48	24	100%	49	24
Types of reporting requirements for using funds for medicine/medicine distributions							
<i>Provide receipts</i>	7% (96)	11%	47	24	4%	49	24
<i>Written report</i>	82% (96)	79%	47	24	86%	49	24
<i>Guia de Remessa showing what was delivered</i>	56% (96)	53%	47	24	59%	49	24
<i>Guia de Marcha showing transport route</i>	38% (96)	36%	47	24	39%	49	24
Inventory and Storage							
Adequate storage space in the medicine/vaccine store	21% (91)	22%	46	53	20%	45	55
Well-organized medicine/vaccine store	58% (83)	62%	45	54	53%	38	57
Refrigerators designated solely for vaccine storage	56% (45)	-	-	-	56%	45	56

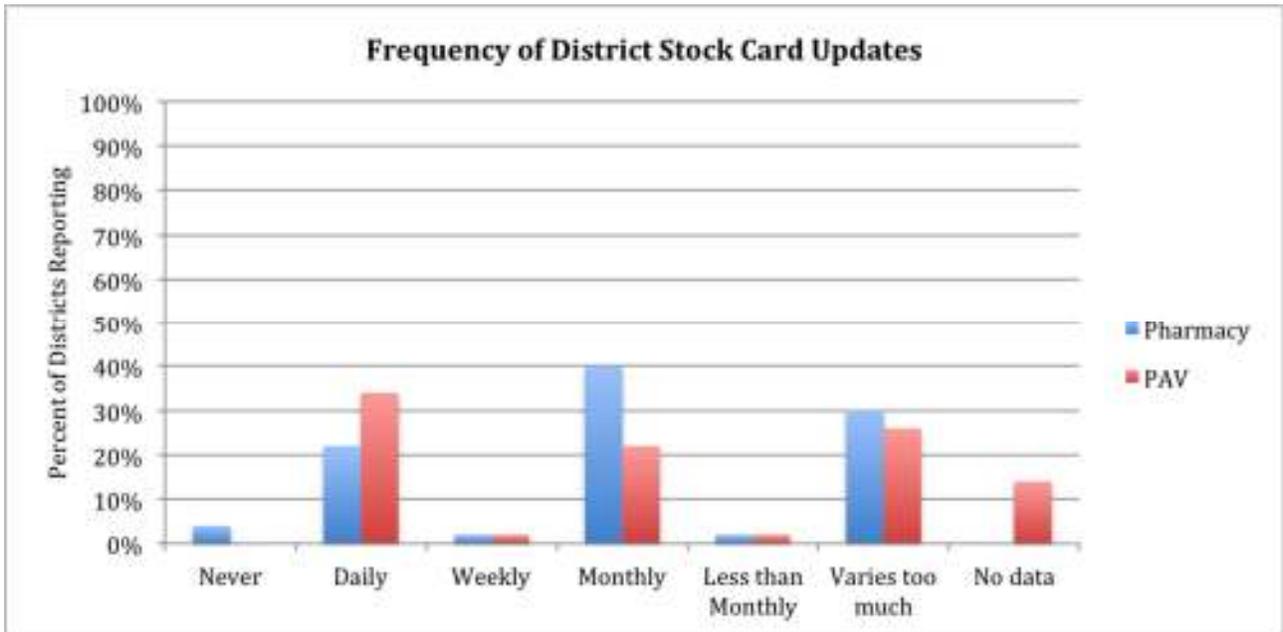
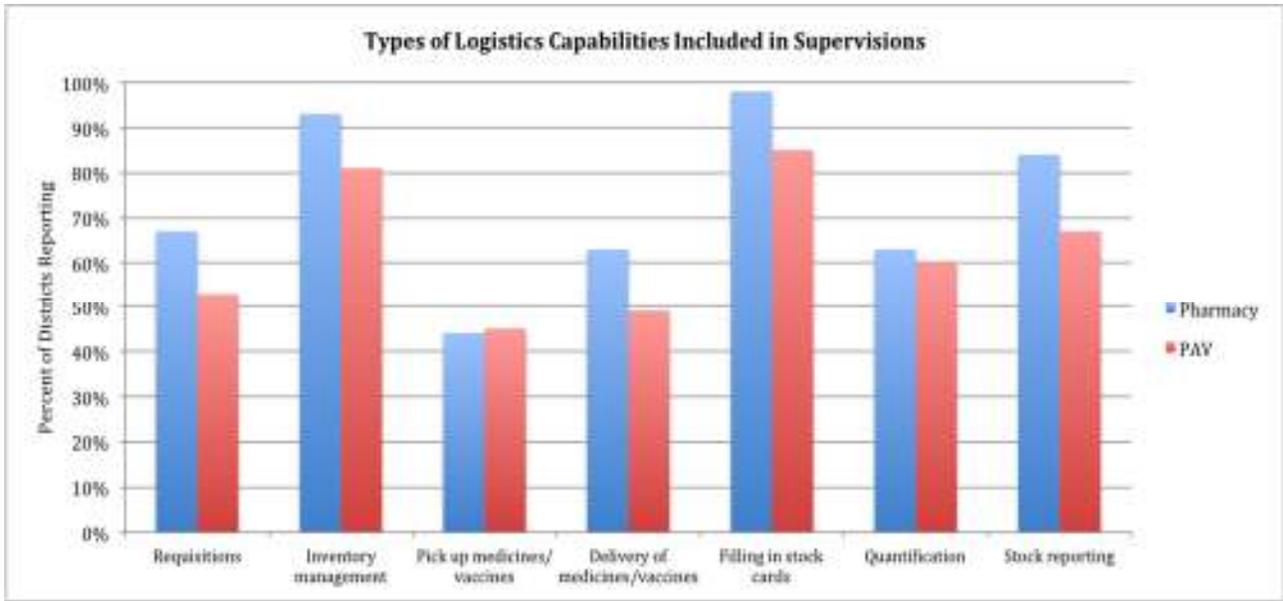
Appendix E: Various Positions Held by District Staff Performing Logistics

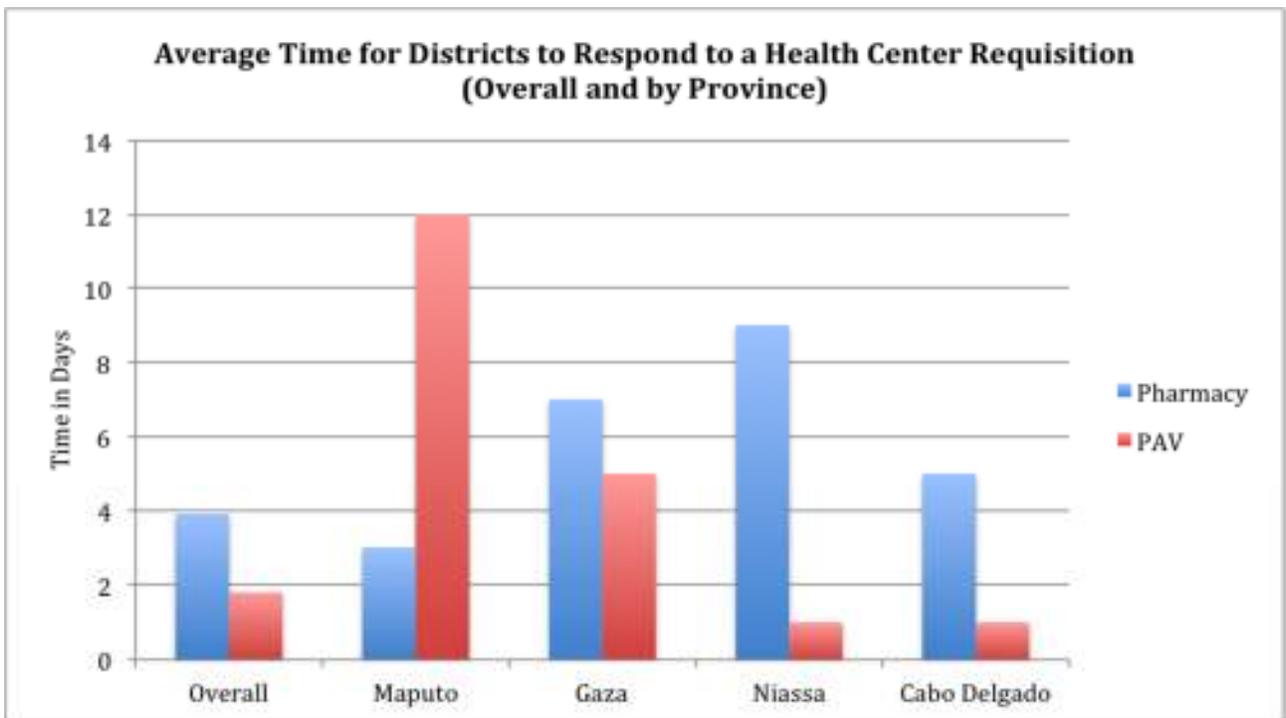
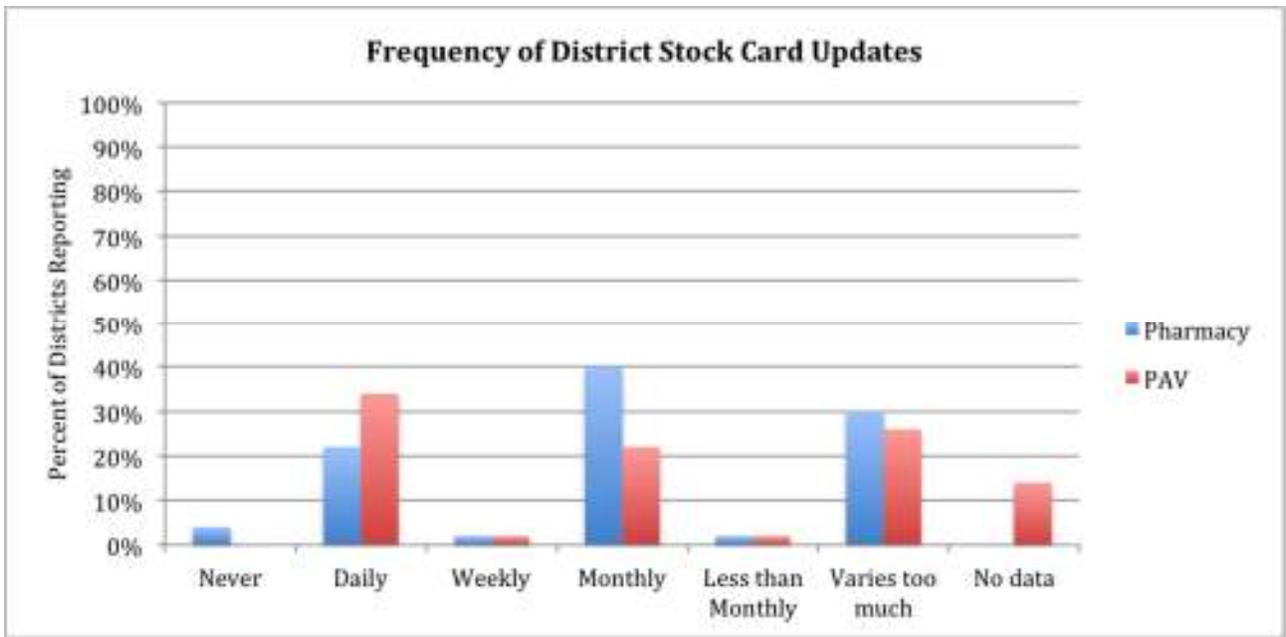
These positions are ranked in order of frequency.

Pharmacy	PAV
1. District Pharmacy Manager	1. District PAV Manager
2. Pharmacy Technician	2. Preventative Medicine Agent
3. District Health Facility Manager	3. District Health Facility Manager
4. Public Servant/Facility Cleaning Staff	4. Community Health Manager
5. Pharmacy Agent	5. Logistics Manager
6. Driver	6. Preventative Medicine Technician
7. Anti-Retroviral Treatment Program Manager	7. NED Manager
8. Nurse Manager	8. Medicine Provider
9. Malaria Program Manager	9. Epidemiological Vigilance Manager
	10. District Deposit Manager
	11. Environmental Health Manager
	12. Facilities/cleaning staff
	13. Health Education Manager
	14. Malaria Program and Health Education Manager
	15. Malaria Program Manager
	16. Maternal and Child Health Manager
	17. RSE Manager

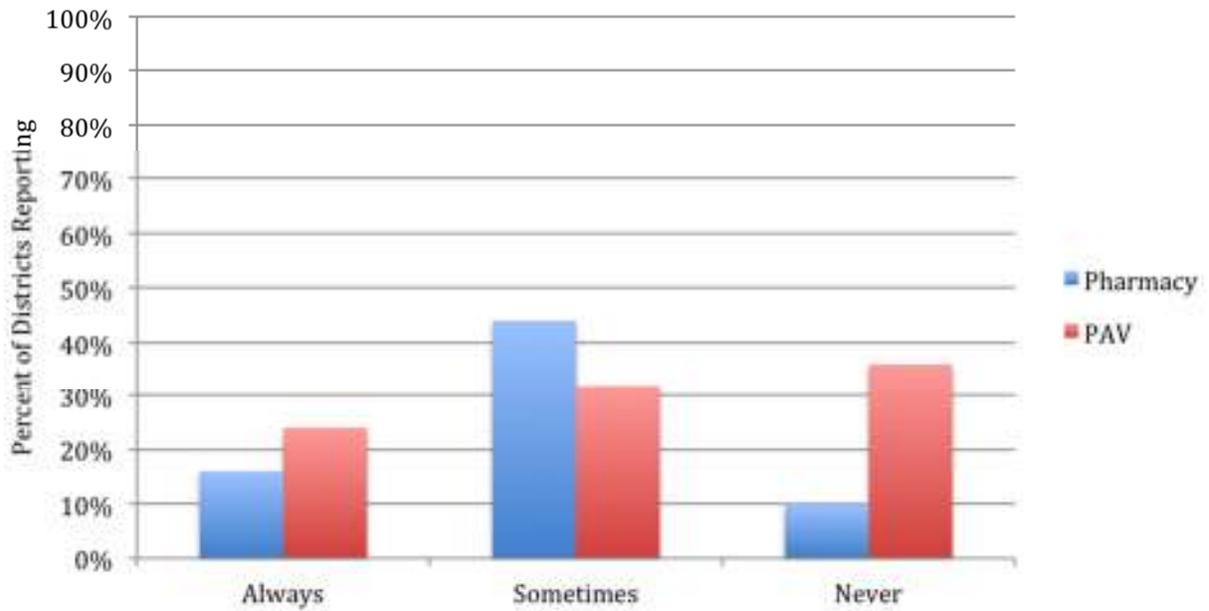
Appendix F: Pharmacy and PAV Survey Findings Comparison Graphs



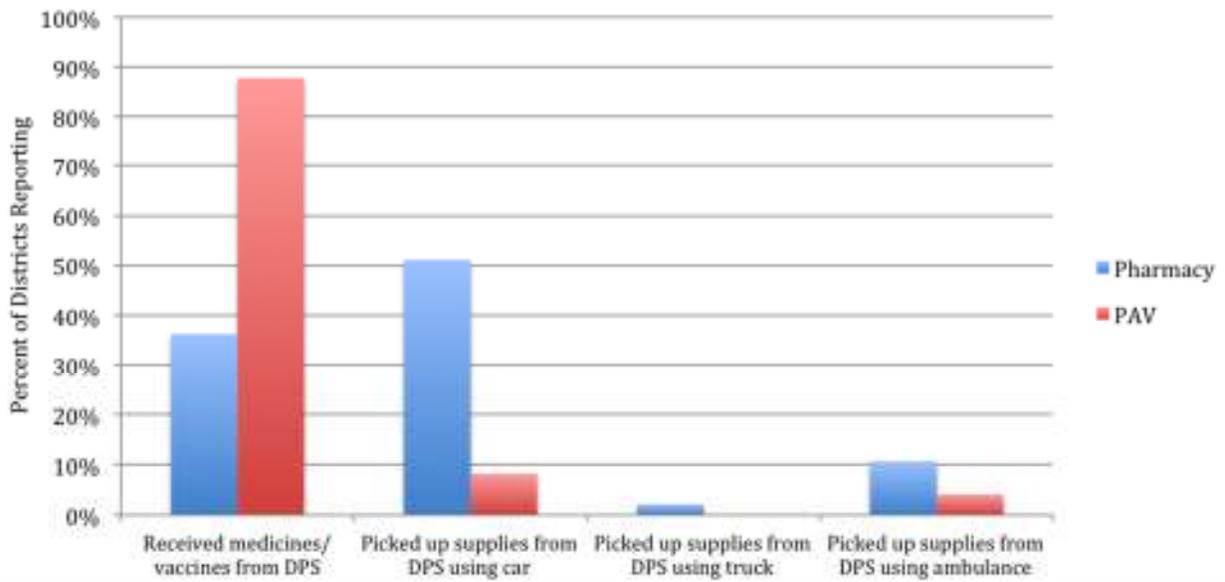


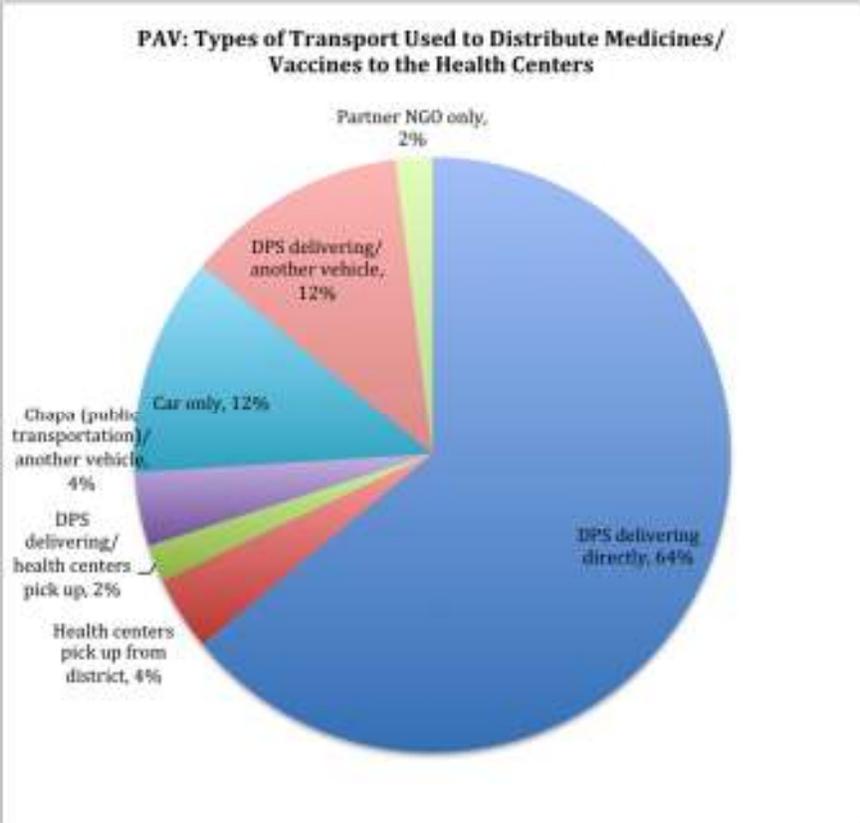
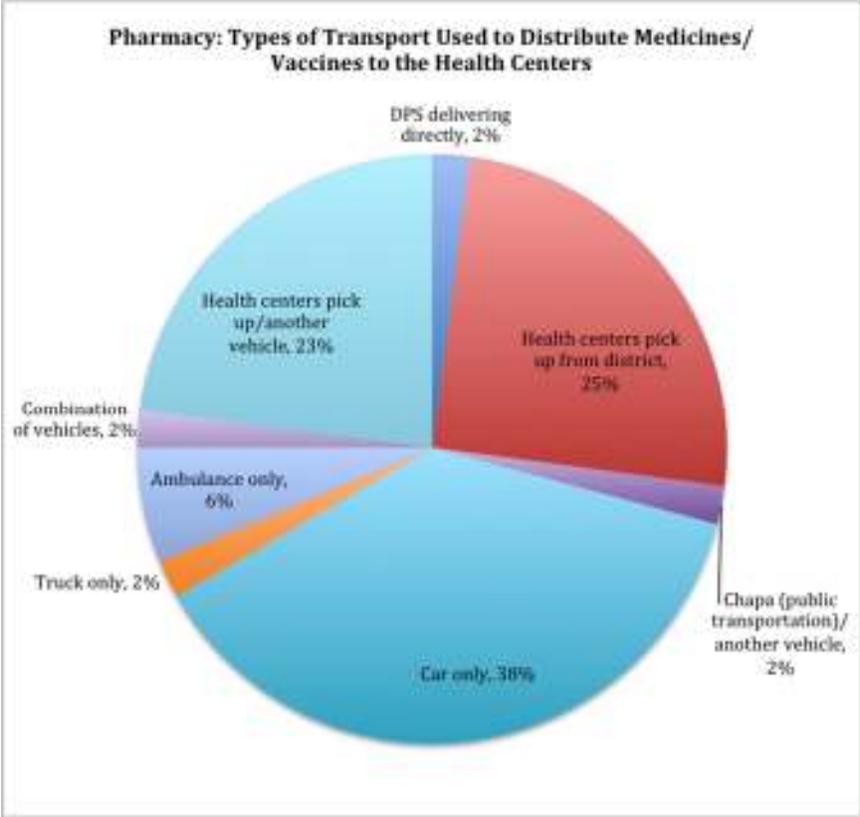


District Fuel Availability



Types of Transport Used to Collect/Receive Medicines/Vaccines from DPS





Appendix G: Complete Table of Management Survey Findings

Survey Indicator	Percent of Districts Reporting (n=14)
Sufficient infrastructure for medicine and medical commodity logistics	0%
Insufficient transport	79%
Insufficient fuel	93%
Insufficient per diems for distribution teams	100%
Insufficient human resources in general	64%
Insufficient logistics supervisions for staff	50%
Insufficient storage for medicines and vaccines	86%
Staff understands logistics processes well	57%
Staff understand logistics concepts well	57%
Staff know how to meet the needs of the supply chain	57%
Staff know how to problem solve in the supply chain	71%
Need additional training in supply chain and logistics	86%
Human resource quantity challenges in their supply chains	50%
Human resource quality weaknesses in their supply chains	36%
Dealing with upstream supply chain challenges	43%
Not enough medicines are sent to their districts	14%
Poor planning challenges affecting their supply chains	29%
Poor management challenges affecting their supply chains	57%
Specific medicines with supply chain problems in their district <ul style="list-style-type: none"> • BCG (most commonly cited) • VAS • Pentavalent • Yellow fever • DPT • Hib 	
Specific medicines with supply chain problems in their district Top cited medicines or related medical commodities of 24 total reported: <ul style="list-style-type: none"> • Amoxicillin • Penicillin • Malaria rapid diagnostic tests • Syphilis rapid diagnostic tests • Anti-malarial medication • Paracetamol • Metronidazole • Clotrimazole • Injectable antibiotics 	