



# USAID | DELIVER PROJECT

## Mozambique: Strengthening the Community Health Worker Supply Chain

### Final Report



**MAY 2014**

This publication was produced for review by the U.S. Agency for International Development. It was prepared by the USAID | DELIVER PROJECT, Task Orders 4 and 7.



PRESIDENT'S MALARIA INITIATIVE





# **Mozambique: Strengthening the Community Health Worker Supply Chain**

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#### **USAID | DELIVER PROJECT, Task Order 4**

The USAID | DELIVER PROJECT, Task Order 4, is funded by the U.S. Agency for International Development (USAID) under contract number GPO-I-00-06-00007-00, order number AID-OAA-TO-10-00064, beginning September 30, 2010. Task Order 4 is implemented by John Snow, Inc., in collaboration with Asociación Benéfica PRISMA; Cargo Management Logistics; Crown Agents USA, Inc.; Eastern and Southern African Management Institute; FHI 360; Futures Institute for Development, LLC; LLamasoft, Inc; The Manoff Group, Inc.; OPS MEND, LLC; PATH; PHD International (a division of the RTT Group); and VillageReach. The project improves essential health commodity supply chains by strengthening logistics management information systems, streamlining distribution systems, identifying financial resources for procurement and supply chain operation, and enhancing forecasting and procurement planning. The project encourages policymakers and donors to support logistics as a critical factor in the overall success of their healthcare mandates.

#### **USAID | DELIVER PROJECT, Task Order 7**

This document was prepared by staff of the USAID | DELIVER PROJECT, Task Order 7, which is funded by the U.S. Agency for International Development (USAID) under contract number GPO-I-00-06-00007-00, order number AID-OAA-TO-11-00012, beginning on March 28, 2011. Task Order 7 is implemented by John Snow, Inc., in collaboration with 3i Infotech, Inc.; Crown Agents USA, Inc.; FHI 360; Foundation for Innovative New Diagnostics; Logenix International, LLC; The Manoff Group, Inc.; MEBS Global Reach, LC; PATH; PHD International (a division of the RTT Group); Population Services International; Social Sectors Development Strategies, Inc.; UPS Supply Chain Solutions, Inc.; and VillageReach. Task Order 7 supports USAID's goal of reducing the malaria burden in sub-Saharan Africa by procuring and delivering safe, effective, and high-quality malaria commodities; by providing technical assistance and on-the-ground logistics expertise to strengthen in-country supply systems and build capacity for managing commodities; and by improving the global supply and long-term availability of malaria commodities.

#### **Recommended Citation**

USAID | DELIVER PROJECT, Task Orders 4 and 7. 2014. *Mozambique: Strengthening the Community Health Worker Supply Chain: Final Report*. Arlington, Va.: USAID | DELIVER PROJECT, Task Orders 4 and 7.

#### **Abstract**

In 2012, the USAID | DELIVER PROJECT designed and began testing a series of interventions aimed at improving logistics operations and supply chain performance at the last mile of Mozambique's healthcare system. This report documents the evaluation results and presents the relevant conclusions and recommendations for adaptation of this activity, within and outside the Mozambique community health worker context.

Cover photo: A district supervisor uses a mobile application to scan, process, and upload community health worker logistics data to a web database. Credit: VillageReach 2012

#### **USAID | DELIVER PROJECT**

John Snow, Inc.  
1616 Fort Myer Drive, 16th Floor  
Arlington, VA 22209 USA  
Phone: 703-528-7474  
Fax: 703-528-7480  
Email: [askdeliver@jsi.com](mailto:askdeliver@jsi.com)  
Internet: [deliver.jsi.com](http://deliver.jsi.com)

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# Acronyms

AL	artemether/lumefantrine
AMC	average monthly consumption
APE	<i>Agente Polivalente Elementar</i>
CHW	community health worker
CMAM	<i>Centro de Medicamentos e Artigos Médicos</i> (Central Medical Store)
DPS	<i>Departamento Provincial de Saúde</i> (Provincial Health Department)
LMIS	logistics management information system
MISAU	<i>Ministério da Saúde</i> (Ministry of Health)
ODK	OpenDataKit
RDT	rapid diagnostic test
SDMAS	<i>Serviços Distritais da Mulher e da Acção Social</i> (District Services of Women, Social Affairs and Health)
USAID	U.S. Agency for International Development
WHO	World Health Organization



# Acknowledgments

The authors wish to express their appreciation to the Ministry of Health in Mozambique, including the Community Health Program, in particular; and the program's partners. The authors also wish to thank the community health workers, health center staff, district supervisors; district pharmacy staffs of Manhiça, Marracuene, and Moamba districts; and Moamba province *Agentes Polivalentes Elementares* (APE in English) coordinators for their participation and contribution to this activity. Numerous staff contributed to the various data collection and analysis efforts, including Aida Coelho, Timóteo Chaluco, Jessica Crawford, Leah Hasselback, and Erin Larsen-Cooper—all of VillageReach. Funding for select elements of this activity came from a Gates Grand Challenges grant.



# Executive Summary

Mozambique, a developing country with a 2013 population of approximately 24 million, has a high burden of infectious disease. Malaria is transmitted year-round in much of the country; 100 percent of the population is considered at risk. In 2008, malaria annually killed an estimated 171 people per 100,000 of Mozambique's population (PMI 2013).

To provide health education, as well as treatment for common diseases at the community level, Mozambique's Ministry of Health (MISAU in Portuguese) has operated a community healthcare program since 1978. In 2010, MISAU and its partners began to revitalize the program. As it currently operates, select districts have 25 community health workers—known as *Agentes Polivalentes Elementares* (APEs in English)—multiuse, elementary agents who provide health education, disease prevention, and disease treatment to estimated catchment areas of 500 to 2,000 Mozambicans in rural areas (WHO 2010).

In 2012, for six months, the USAID | DELIVER PROJECT (the project), Task Orders 4 and 7, conducted a small-scale test with 44 APEs, across two districts in Maputo province, using innovative interventions to strengthen the supply chain for commodities that the APEs use in their disease prevention and treatment services. APEs should receive two nationally standardized kits once a month, which include various essential medicines, male condoms, rapid diagnostic tests (RDTs) for malaria, and four presentations of artemether/lumefantrine (AL) treatments. Drawing on interactions with stakeholders and an initial survey, the implemented interventions included the following:

- Training APEs to use their resupply process.
- Training APEs to use basic storage best practices and giving select APEs a durable plastic storage box.
- Training APEs to use a newly designed logistics record and report form that captures opening stock, amount received, amount dispensed, and ending balance; it also reports on whether or not the APE had a stockout for 21 commodities or treatment regimens.
- Training district APE supervisors and giving them mobile hardware that enables rapid electronic data capture of the APE logistics reports through an OpenDataKit (ODK) application. They used an Android smartphone to take a picture of the completed form, transcribe text and numeric data into the software, validate software interpretation of bubble fields, and submit the data to an online database.
- Providing job aids, conducting follow-up trainings, and conducting routine monitoring and supervision to support the other elements of the activity.

The project's subcontractor, VillageReach, conducted the field implementation for these activities; including the MISAU staff and partners at the national-, provincial-, and district-levels. It was supported by a Gates Grand Challenges grant.

An evaluation of these activities drew from the data reported and processed through the ODK application, the results from monthly monitoring surveys, qualitative interviews with district staff, and an endline survey that included site visits and focus groups.

## Results

During the six months of this activity, the APEs and their supervisors achieved an average on-time, complete reporting rate of 68 percent—ranging from 39 percent at the beginning of the activity to a high of 87 percent, which surpassed basic thresholds for use in logistics planning. This reporting rate probably benefited from a follow-up training on the form and supervision that targeted non-reporting APEs.

Data quality, as measured by the internal consistency of the stock status calculation on the forms, varied by product. For most of the commodities listed on the form (17 out of 21), internal consistency was above 80 percent, which is considered successful, considering the limited educational levels of the APEs and the short duration of the activity. Data quality would probably improve if changes were made to the form design before this activity is repeated.

The district supervisors, who used the ODK software to process these forms, successfully maintained the hardware and software—except for phone battery problems during one month, in one district—and they processed all the completed forms they received. On average, it took 10 to 13 minutes to process each form, spread over one to two work days per month.

District APE supervisors and district pharmacists responded that the data collected and reported through this system is valuable; they think it is a relatively accurate perspective of APE stock status and consumption patterns. Although one supervisor reported using the data to justify redistribution of overstocked commodities, the data was used very little during this activity.

As identified in the endline surveys, the training sessions on the APE resupply process and basic storage practices did not show any real differences between the test and control districts. Temperature readings inside the storage boxes given to the APEs showed a possible lower temperature compared to room temperature; but, if the activity is expanded, this should be tested further.

## Implications for Mozambique and Beyond

**Community health workers in Maputo province in Mozambique can record and report logistics data within a short implementation period.** The on-time reporting rates in this activity were achieved without extra incentives; also, they occurred at a time when APEs were not receiving the expected monetary stipends and commodities. Assuming similar educational levels of APEs and programmatic challenges in other districts across Mozambique, this logistics record and report could probably be repeated.

**Further expansion within Mozambique should include more support for data use at the district level, more guidance for APEs facing stockouts, and additional testing of durable boxes for commodities.** This activity collected specific recommendations for any potential expansion of this activity into other provinces, including the need for adaptations to the APE logistics report and the need for including supportive supervision for both APEs and district supervisors.

**APEs in Maputo province accessed and dispensed commodities despite numerous supply and programmatic challenges.** The consumption data captured in this activity show that APEs in the test districts were able to access and dispense commodities, such as AL, even when AL kits for APEs were not packed because of national supply shortages; and the promised monthly stipends were late. Although several APEs left the program during this time, this documented activity shows the resilience of the APEs and the confidence the health center and district pharmacy staff placed in them. Unfortunately, a high frequency of stockouts for APE commodities—on average, APEs stocked out of 58 percent of their products, once a month—and because of the limited scale of this activity, they were unable to collect data for redesigning current kits. However, the data provide a quantitative snapshot of the consumption patterns of APEs in Maputo province (see table 1). While APEs in the control district also accessed AL during this activity, as shown during endline site visits, the consumption data from the test districts shows a quantitative perspective of the amounts administered to patients.

**Table 1. Average Monthly Consumption by Commodity for APE Reports without Stockouts, November 2012–May 2013**

Commodity	Range	Median
Oral rehydration sachets	0–24	3
Mebendazole (tabs)	1–80	15
Male condoms (pieces)	25–171	74
RDT (tests)	0–85	23
AL 6x1 (treatments)	0–24	3
AL 6x2 (treatments)	0–5	2
AL 6x3 (treatments)	0–26	3
AL 6x4 (treatments)	0–23	4

**The ODK application offers a demonstrated medium for rapidly achieving near real-time visibility into APE consumption and stock status.** After two training sessions and monthly follow-up support, the district supervisors in this activity could scan recently completed forms and submit the data to an online database within several work days. While a permanent national database, or link to the existing MISAU system, was not developed during this activity, this mechanism could support routine data collection and submission from any district headquarters in Mozambique using mobile data service or an Internet connection. For each district, this would require initial trainings; printing of paper forms; a camera-enabled smartphone; technical support for several months; and charge cards to support mobile data submission—including 10 to 13 minutes, per form, per month, of the district supervisor’s time. Discussions for scale up within Mozambique are ongoing.

For any developing country community health worker program, this activity shows the basic viability of a logistics management information system (LMIS) that uses paper at the service delivery–level and mobile data transfer at the supervisor level. It can also be a potential option for comparing to other basic last mile routine data collection approaches, such as short message service (SMS) or full paper-based systems.

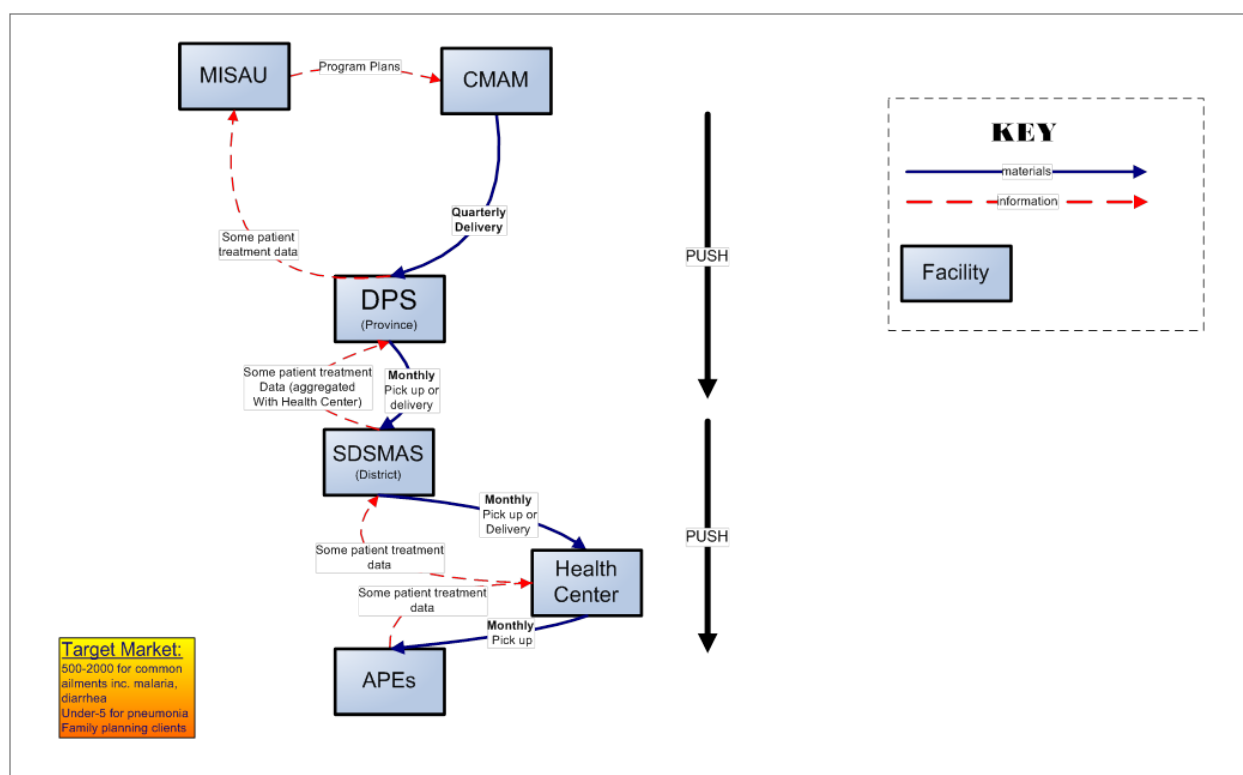


# Background and Introduction

In 2011, the USAID | DELIVER PROJECT, Task Orders 4 and 7, began an activity to design, implement, and test innovative supply chain strengthening approaches at the community health-level in Mozambique (see figure 1), drawing from prior experiences within and beyond the project. Based on a formal survey, the activity identified key supply chain challenges that community health workers (known in Mozambique as APEs) had under the revitalized national program. Based on these challenges, the USAID | DELIVER PROJECT (the project), with support from a Gates Grand Challenges grant, designed materials to support the training and operation of a series of interventions. Following trainings in November and December 2012, the project conducted targeted monitoring and supervision until May 2013, at which point the project conducted an endline survey to evaluate the logistics outcomes of the interventions.

This report summarizes the activity's background and initial research, but it primarily focuses on the results of the evaluation and the implications for future community health worker supply chain strengthening. For more details on Mozambique's APE program and the results of a formal survey of its supply chain, please see the preliminary report for this activity: *Mozambique: Strengthening the Community Health Worker Supply Chain*.

**Figure 1. Mozambique APE Supply Chain—Specific to Maputo Province as of May 2012**



## Identified Supply Chain Challenges

To summarize the results of the initial survey, program partners and APEs noted several key challenges to the APE program's logistics system:

*No standardized system for reporting logistics data.* While a consumption tick sheet is inserted into all APE artemether/lumefantrine (AL) kits, APEs did not receive training on how to use this form, there was no process for collating and using this data at higher levels of the system, and there was no system for collecting logistics data related to the essential medicines kits.

- APEs had limited ability to track data and store commodities properly at their homes. APEs did not have tools to monitor stock on hand or consumption patterns; their homes were considered potentially inadequate for drug storage.
- *General concerns about transport for commodity collection and supervision.* District staff believed that funding for ongoing operations, such as field supervision of APEs, would not be available.

## Implemented Interventions

Based on these and other specific challenges identified by Mozambique's APE program, as well as best practices, the existing frameworks for strengthening the community health worker (CHW) supply chain, and available resources for this pilot, innovative interventions were identified to strengthen the logistics aspects of the program:

- Designed and trained APEs on an adapted logistics record and report form, including consumption data and basic storage practices.
  - This new monthly form included opening balance, amount received, number of treatments dispensed, and closing balance; it also included whether or not the APE had a stockout during the month for 21 commodity treatment regimens (see appendix B for a copy of the form). Treatments dispensed were captured as bubbles that the APE filled out, effectively making the form a tick sheet consumption record, which became a report at the end of the reporting period.
- Provided training and hardware to district supervisors for electronic data capture.
  - District APE supervisors in the two test districts were given camera-enabled, Android phones (HTC Nexus One phones) loaded with freely available OpenDataKit (ODK) applications—ODK Scan, ODK Collect, and ODK Aggregate—and they were trained how to use them. Using a user-interface program, combined with basic software programming knowledge (Dell 2013), VillageReach customized these applications to support data collection through the APE logistics form. Each reporting period, the APE supervisors took a picture of each submitted form, entered data from the form into the application, and then submitted the electronic copy of the data through a mobile data connection to an online database. The applications automatically counted bubble fields and translated them into numbers; however, other fields required manual entry or selection by the user.

- Designed logistics process job aids and provided basic logistics trainings.
  - During the logistics form training session, APEs also received trainings and reinforcing job aids that detailed their monthly resupply process and proper commodity storage practices that were relevant for the community health workers.
- Provided select APEs with sturdy, secure boxes for commodity storage.
  - Several APEs also received plastic storage boxes for storing their commodities securely.
- Conducted follow-up trainings and routine monitoring and supervision for the interventions.
  - To reinforce the training on how to complete the logistics form, APEs received a follow-up training; then, once a month, project staff visited several APEs in one of the two districts—alternating from one month to another—to provide additional monitoring and supervision support. Non-reporting APEs were specifically targeted for these visits.

## Implementation and Evaluation Methodology

Ultimately, this activity was intended to improve logistics performance outcomes, including data availability, product availability, and product quality. However, due to the ongoing revitalization process of the APE program, a baseline for product availability and storage practices could not be determined prior to this activity. Additionally, performance, in terms of commodity availability, cannot be entirely attributed to the service delivery point. Instead, the overall evaluation focused on the data availability achieved and the completion of processes that could support future product availability improvements (see table 2).

The interventions took place in two test districts within Maputo province: Manhiça and Marracuene. A third district, Moamba, as a control district, participated in the initial survey and end evaluation, but they did not receive the interventions.

**Table 2. Evaluation Framework**

<b>Input (Design, Planning)</b>	<b>Process (Implementation)</b>	<b>Output (Interventions Running)</b>	<b>Outcome (Improved Logistics Performance)</b>
Human and financial resources to design interventions, conduct training	Distribute materials	Forms completed	Greater visibility into APE activities for all partners (central and district/province)
Printing of materials, and hardware and software development	Conduct training	Forms captured on mobile device	Fewer damaged, expired products
	Conduct periodic monitoring	Products stored properly in sealed boxes	Fewer/smaller stockouts
		If possible, adequate supplementary stock provided to APEs	

Design and planning of the interventions took place from May–November 2012, in both Mozambique and the United States. This process included drafting and reviewing the consumption

record/report, programming the template for ODKscan, adapting storage and logistics training materials for CHWs, and designing forms for monitoring and supervision.

In November, the training and implementation process included a one-day training session for the APEs on logistics and storage processes and the consumption form, which were held in each of the two test districts; this was followed by a half-day refresher training on the form in December.

Also, in December, the project trained the two respective APE district supervisors to use the ODK toolset to process submitted consumption forms on Android-based camera phones, provided by a Gates Grand Challenges grant. The phone was provided contingent on signing an agreement that showed the hardware was for APE management use at the district headquarters.

To ensure that APEs were correctly completing and submitting the consumption record, and to make sure that their district supervisors were successfully processing the submitted forms through ODK, the project conducted a supervision and monitoring visit once a month, alternating between the Manhiça and Marracuene districts. Project staff visited the APE district supervisor; and completed a routine supervision survey that captured their opinions and experiences related to using the ODK technology and the data it produced (see appendix D). With the district supervisor, project staff then visited several APEs at their homes to complete a site visit survey that included their experiences with the consumption form, current resupply practices, rational use of commodities, storage practices, and current physical inventory (see appendix D).

## Endline Evaluation

The results described in this report draw from the data reported through the tested system, the bimonthly supervision surveys conducted in each test district, and the endline evaluation surveys (see table 3).

**Table 3. Data Sources for Evaluation of the Activity**

Data Source	Format	Time Period Reflected	Respondents	Selection Criteria
Monthly APE monitoring and supervision visits	Site visit surveys (see appendix C)	December 2012–May 2013	APEs in two test districts	Approximately 4 APEs each month out of 44 total, alternating between districts, selected for non-submission of logistics reports or non-involvement in program
Monthly district monitoring and supervision visits	Surveys	January–May 2013	District supervisors and pharmacists in two test districts	Both districts each month
Qualitative interviews with APE coordinators and district pharmacists	Interviews	November 2012–April 2013 (time of the interview)	APE coordinators and district pharmacists in both test districts	N/A

Data Source	Format	Time Period Reflected	Respondents	Selection Criteria
Endline surveys	Site visit and focus group surveys	May–June 2013	APEs (through site visits and focus groups), health centers, district supervisors and pharmacists in two test and one control district	APE site visits representing average geographies and distances from the district capital; health centers chosen for supervision of selected APEs
Analysis of logistics data reported through ODK	Quantitative analysis	November 2012–May 2013	Data submitted by APEs and processed by district supervisors in two test districts	N/A

## Implementation Challenges and Results Limitations

Implementation of these interventions faced a number of challenges that affected the supply chain for APE commodities, or otherwise limited the ability to draw certain conclusions from the results:

- During the main implementation period (November 2012–June 2013), several upstream supply chain challenges resulted in shortages of commodities available for APEs at their resupply point. The intervention materials, namely the consumption tick sheet, were designed assuming that APEs would receive a *new* essential medicines kit, including several products and specific formulations not available in the *old* essential medicines kit (see appendix A for the commodities in the new kit). However, the new kit was not issued to APEs until April 2013, which meant that, for most of the activity period, APEs only received the old kit. The differences in available products somewhat confused the APEs as to how to treat patients, and how to complete the consumption record. Specifically, this issue affected paracetamol, amoxicillin, zinc, and benzene hexachlorate.
- During this activity, APEs did not fully adhere to standard treatment guidelines, resulting in drug distribution patterns that cannot necessarily be interpreted as successful disease treatment. Non-adherence may have occurred because not all commodities handled by the APEs had specific guidance, and not enough copies of the guidelines were available for the APEs.
- The APEs in the test districts had limited education or the ability to speak Portuguese. Some APEs did not complete the consumption record because they did not understand the terms *opening stock*, *total used*, and *ending stock*. These forms were not scanned and processed through the ODK software, and this limited the on-time reporting rate.
- During this activity, the older essential medicines kits, as well as the ACT kits, were in short supply at the district pharmacy-level; this led to stockouts of commodities for many APEs.
- Health centers did not have guidance on how to issue ACTs and rapid diagnostic tests (RDTs) to APEs, meaning that any product quantities APEs received outside the standardized kits were not determined using known inventory control rules.

- During the activity, APEs in the two test districts did not receive the expected stipend amounts on time, potentially lowering morale and adherence to protocols. One APE in Marracuene district left the program during this time.
- In May 2013, there was a nationwide public health worker strike, delaying the completion of the endline survey; however, it probably did not affect the results of this activity, because the collected data represents activities completed before the strike.
- In total, the results represent data collected over six months of APE operations in two of 129 districts in Mozambique—although not all the districts are implementing the APE program—which is a relatively small sample size and a short period of time for strengthening CHW operations.

# Results

## Logistics and Resupply Process Strengthening

To support the APE program by standardizing the resupply process for their commodities, the APEs received a job aid and training about when and where to collect commodities. Throughout the monitoring period, and during the endline, all APEs in the test districts who had been a part of the trainings still had copies of the job aid. While the APEs in Moamba—the control district—claimed that they had the resupply process training at the endline, they did not have copies of the resupply process job aid.

Despite the training and the job aid, the APEs reported having some flexibility in their process for obtaining commodities. During monthly monitoring and supervision in the test districts, 29 out of 40 APEs reported collecting commodities once a month or every month, while the other 11 reported collecting commodities whenever they needed them—this was, potentially, on *continuous review*, but it was probably when they had stocked out of all medicines and had an opportunity to visit their resupply point. This ratio did not appear to change during the intervention period. Similarly, at the endline, six of the nine APEs visited as part of the site visits in the test districts claimed to have a monthly order and resupply cycle; while the other three claimed to obtain commodities whenever they needed them. All four of the APEs in the control district reported obtaining their commodities, as needed. The difference between the test districts and the control district could indicate some level of standardization because of the job aid and training, although other explanations are possible because of the small sample sizes.

Reported locations of resupply also varied. As reported during the monthly monitoring and supervision period, 14 of the APEs—out of a total of 40 surveyed in more than six months—reported receiving their commodities from the district pharmacy, 25 from their reference health center, and one reported getting their commodities from another APE. During the endline, only one APE reported obtaining commodities from the district pharmacy, while the other 12—from both the test and control districts—listed the health center as their resupply point.

The variance reported during site visits contrasts somewhat with the resupply process, as described by the APEs in the APE focus groups. In the focus groups, all three district groups described a monthly process of collection from the health center, which aligns with the intended policy. The discrepancy between policy and practice could stem from the supply problems faced by the program during the intervention period. During this time, kits were not distributed through the in-country supply chain in quantities high enough to support the intended monthly distribution cycle, which encouraged APEs to find other ways to obtain products. While it is preferable to have a reliable source of commodities for the APEs, it is encouraging to note that they have multiple options available if the planned source is insufficient. During the endline site visits, seven of the 13 APEs, across all three districts, reported that they obtained some commodities from outside the kit system; for example, paracetamol or antimalarials through the via Classica system at the health center.

While the resupply training and job aid were not intended to direct APE behavior toward a particular location for resupply, it also did not provide any information on the possibility of obtaining *extra* stock. Any future iteration of these interventions should list the options available to APEs for avoiding

stockouts, although this must be negotiated with the program stakeholders in areas where the training materials could be seen as encouraging behavior that differs from program policy.

Also, the training materials did not include guidance on the return or redistribution of overstocked commodities. However, nine of the 13 APEs surveyed across the three districts in the endline site visits reported that they had to return excess commodities to their health center or, in one case, the district pharmacy. Products mentioned as being returned include iron sulphate tablets, cotton balls, gloves, ORS, and benzene. Future interventions focusing on the resupply process could also provide guidance to APEs or their supervisors on how to identify and manage excess stock properly. These results show that the current—both old and new—essential medicines kits do result in overstocks of some commodities for some APEs, at least as can best be estimated by the APEs without specific guidance in this area.

## Storage Practice Strengthening

During the formal survey at the start of the activity, district pharmacists noted their concern at the potential quality of storage conditions in the community, particularly without community health posts for the APEs to use for service provision and commodity storage.

Following the training sessions, monthly supervision of the APEs noted almost consistent adherence to recommended practices throughout the intervention: 39 out of the 40 APEs kept their commodities in a dry area out of direct sunlight; and they properly separated damaged and expired products, while all 40 kept their commodities away from insecticides, kept condoms away from fluorescent lights and motors, and followed packaging directions for commodities that required upright storage. The nine APEs included in the endline from the two test districts also showed consistent adherence to these principles, and they acknowledged that they had received training in this area. This consistency in practices shows that APEs are fundamentally capable of following these storage concepts.

However, the four APEs surveyed during the endline in Moamba, the control district, also acknowledged that they received training and they demonstrated adherence to the same storage guidelines, suggesting that the limited coverage of medicine storage during the initial APE training may have been sufficient to address these particular practices.

The endline survey also included a small analysis of a few plastic storage boxes provided to three APEs as part of the intervention. All three APEs said that the box improved their storage conditions and they only used the box for commodity storage. None of the APEs used the box for transporting commodities. Thermometers were also provided to these APEs during the focus group sessions of the endline survey; during the site visits, the temperature was taken inside the box and inside the room where the box was kept.

These three observations produced the following temperature comparisons:

**Table 4. Observed Temperature Comparison between Storage Boxes and Storage Rooms for APEs**

Observation	Temperature Inside Storage Box (C)	Temperature in Drug Storage Room (C)
1	21	25
2	25	26
3	25	28

While this data provides a limited perspective based on a single district, it does indicate that the plastic storage boxes potentially provide some insulation against excessive heat in this setting—for reference, it is recommended that AL be stored at or below 25° C.

## Improvement of Logistics Visibility

For the logistics reporting system to function properly, APEs must first have and understand the form used to record and report consumption. During the monthly supervision visits, and at the endline, all APEs visited in the test districts had a copy of the form, and they reported using it to control health products. APEs in the control district did not possess or have access to this form. Also, all nine of the test district APEs visited during the endline identified the form as one of their regular reporting requirements.

In terms of self-reported understanding of the form, nine of the 40 APEs (23 percent) included in monthly supervision reported having problems with the form. Five of these nine responded that the form was complicated, or that they didn't understand how to complete it. In the endline, three of the nine APEs surveyed in the test districts reported having challenges in completing the form, with two of these APEs citing their main challenge as being required to complete the form after not using it for a long period. These data indicate that, in general, the APEs claim that they can complete the form, but they do have some challenges in understanding or using the form as a tick sheet throughout the reporting cycle. This might indicate that the form should be simplified for improved initial trainings and for continued supervision or retraining during future implementations.

## On-Time Reporting Using the Consumption Record and Report Form

An analysis of the data submitted through ODK can provide a valid perspective of the effective reporting rate. Table 5 shows calculated on-time reporting rates that account for the non-reporting of APEs who left the program in April and May—leaving a total of 44 APEs in the two districts for those months.

**Table 5. On-Time Reporting for APEs in Test Districts during the Testing Period—Number and Percentage**

Month	Manhiça		Marracuene		Total	
December	13	59%	9	39%	22	49%
January	12	55%	18	78%	30	67%
February	16	73%	18	78%	34	76%
March	15	68%	20	87%	35	78%
April	12	55%	18	82%	28	64%
May	13	59%	19	86%	32	73%
<b>Total</b>	<b>81</b>	<b>61%</b>	<b>81</b>	<b>75%</b>	<b>183</b>	<b>68%</b>

During the intervention period, the total average reporting rate of 68 percent achieves a basic threshold for potential use in logistics planning, and represents a fairly successful implementation. This reporting rate also occurred during a period in the program when products and stipends were limited; some APEs reported challenges in understanding the form (see above). Incomplete

submitted forms were not scanned and are not included in these reporting rate figures. In total, 184 forms were submitted and scanned during this activity.

The routine monitoring and supervision during this period—that specifically targeted non-reporting APEs—is probably a supporting factor in this reporting rate. Also, because no currently implemented logistics reporting system is in place for the APE program, there is no control or baseline reporting rate with which to compare this activity.

## Completeness and Accuracy of Forms

The overall value of the consumption form, as implemented, is also affected by the quality of the submitted reports. The monthly monitoring visits noted that the APEs who were using the form at the time of the visit had problems using it, although these visits specifically targeted non-reporting APEs or APEs who were otherwise having challenges with the logistics reporting system. Problems with the form that we noted during these visits include non-completion of various sections of the form; particularly the beginning balance, amount received, and ending balance.

The internal consistency of forms submitted to the ODK database represents one method of measuring data accuracy. Given the design of the form (see appendix B), APEs had to enter beginning balance, amount received, amount dispensed, and ending balance for 21 products; they represented 84 data points where either the APE or the supervisor processing the forms could make a quantitative error. Two approaches to calculating data quality through internal consistency include an analysis of the submitted forms to identify the percentage of products for which—

- beginning stock + stock received – stock dispensed = ending stock
- beginning stock + stock received  $\geq$  stock dispensed.

Table 6 presents the results of this analysis.

**Table 6. Internal Consistency Calculations of APE Consumption Reports Submitted through ODK**

Commodity	Forms Where Beginning Stock + Stock Received Minus Stock Used = Ending Stock	Forms Where Beginning Stock Plus Received $\geq$ Stock Used
ORS	151 (82%)	182 (99%)
Zinc	169 (92%)	183 (99%)
Amox	166 (90%)	183 (99%)
Amox2	163 (89%)	183 (99%)
AS	178 (97%)	184 (100%)
AS2	174 (95%)	181 (98%)
Paracetamol1	6 (3%)	182 (99%)
Paracetamol2	27 (15%)	156 (85%)
Iron Sulfate	33 (18%)	182 (99%)
Tetra	151 (82%)	180 (98%)
Mebendazol	147 (80%)	177 (96%)
Hexaclor1	167 (91%)	183 (99%)

Commodity	Forms Where Beginning Stock + Stock Received Minus Stock Used = Ending Stock	Forms Where Beginning Stock Plus Received $\geq$ Stock Used
Hexaclor2	179 (97%)	182 (99%)
Fenox1	179 (97%)	182 (99%)
Fenox2	184 (100%)	184 (100%)
Male Condoms	144 (78%)	176 (96%)
RDTs	161 (88%)	180 (98%)
AL 6x1	169 (92%)	176 (96%)
AL 6x2	175 (95%)	181 (98%)
AL 6x3	165 (90%)	181 (98%)
AL 6x4	175 (95%)	180 (98%)

For 17 of the 21 commodity formulations, the ending stock matched the internal calculation on at least 80 percent of the forms. For three of the products—the two forms of paracetamol and iron sulfate—according to this measurement, internal consistency was extremely low, which may have been caused by problems other than APE entry and district supervisor processing. Paracetamol was included in two dosages on the form (250 mg and 500 mg), based on the plan for what APEs were supposed to receive in the new essential medicines kit; but, ultimately, only 500 mg was available. The tablets were cut in half for the smaller dosage, which confused the APEs about how to record stock quantities. Additionally, APEs held iron sulfate tablets in very high quantities—intended receipts were 500 tablets per month—probably discouraging the APEs from actually counting the quantities on hand. A similar problem of disinterest in counting stocks may have also applied for male condoms, which do not have a dispensing protocol.

For most products, the level of internal consistency again shows that most of the APEs can understand and successfully use the consumption form, at least with the levels of supervision included in this activity; although, there is room for improvement. Simplification of the form, more thorough training, and targeted supervision may help improve internal consistency. Implementing staff also said that the duration of the project was too short because the APEs were only becoming accustomed to using the form correctly toward the end of the project. Also, the form may require special adaptation for commodities that are held in large quantities, such as the iron sulfate; because, in these cases, the APEs are unlikely to count stock on hand.

The second measurement included in this table—whether submitted forms reported consumption that equaled or was less than the reported opening stock, plus the amount received—presents a more positive image of data accuracy because of the lower threshold of this measurement. The difference between these two measurements suggests that APEs occasionally applied estimates to figures reported, or made an error in calculation, but rarely to a degree that resulted in the reported figures being conceptually impossible—that is, they did not grossly overestimate consumption or underestimate stock on hand and amount received.

Internal consistency of the forms submitted by APEs can also be measured using the consistency between the reported stockouts and the beginning balance. Under this form, a beginning balance of *zero (0)* for a product should be accompanied by a *yes* under the column for *Stockouts Yes/No*. However, in some cases APEs did not record stockouts for specific products, but they had a beginning balance of 0 for the same product. Table 7 shows that the percentage discrepancy for all

the submitted forms ranged, by product, from 3 to 37 percent, with an average of 14 percent. The logistics training provided to the APEs, as part of this project, found that the concept of a stockout was particularly difficult for the APEs to understand; this analysis is consistent with that finding. This indicates some limitations when using the *Stockout Yes/No* column for analysis for some products; and some improvements can be made for the form or instruction for completing that column. Potentially, instead of asking APEs if they had *rupturas* (stockouts), the form could ask APEs if, at any point in the previous month, they had zero or no stock of a product; another colloquial conceptualization of a stockout could also be used.

**Table 7. Internal Consistency As Measured through Reporting of Stockouts**

Commodity	Reported Stockouts (n)	Unadjusted Stockout Rate (%)	Stockout/Beginning Stock Mismatch (n)	Percentage Misreported (%)
AL 6x1	113	61	26	17
AL 6x2	118	64	20	13
AL 6x3	97	53	24	16
AL 6x4	95	52	27	18
Amox	159	86	22	15
Amox2	155	84	24	16
AS	175	95	8	5
AS2	178	97	6	4
Fenox1	176	96	7	5
Fenox2	179	97	4	3
Hexaclor1	66	36	24	16
Hexaclor2	167	91	13	9
Mebendazol	70	38	47	31
Paracetamol1	37	20	46	31
Paracetamol2	123	67	56	37
Male Condoms	62	34	29	19
Iron Sulfate	27	15	33	22
ORS	19	10	31	21
RDTs	49	27	43	29
Tetra	37	20	41	27
Zinc	155	84	25	17
<b>Total</b>	<b>2,257</b>	<b>58</b>	<b>556</b>	<b>14</b>

## Perspective of District Supervisors

Successful reporting of APE logistics data through ODK also requires effort by the district supervisors as the users of the ODK application. In the endline, both test district supervisors reported that the routine receipt of logistics data was through the monthly consumption report, which the health center collected and submitted to the districts. Throughout the monthly

monitoring and supervision visits, the ODK software was installed and functioning. The hardware—the Android-based phone with a camera—was also working during this period, except the last month in one of the districts, which was caused by battery problems. The two district users also consistently reported being satisfied with the system, citing the ease of electronic form processing and sending.

In terms of processing time using the ODK applications, the two users reported needing 10 to 13 minutes, per form, during each month of the activity; potentially requiring a total of 6.5 hours of dedicated effort per month if there were 25 reports per month. At the same time, the users reported needing one to two work days per period to process the submitted forms, indicating that they interspersed other job duties when they were processing the logistics forms. Together, these data indicate basic feasibility of the application in this context, although the amount of time spent processing the forms potentially represents 4 percent of a 160-hour work-month for the district supervisor.

## **Use of Collected and Processed Data**

Logistics data only provide value after they are used for planning and operations decisionmaking. Unfortunately, under this evaluation design, no direct evidence shows that the application of the collected APE logistics data was used for this purpose. Both district supervisors reported that they think the information is real and valuable because of the visibility they have into APE consumption patterns and stock status. One supervisor indicated that they use the logistics data for supervisions, because it can help them when recommending redistribution of overstocked commodities.

Another primary potential user of the data could be the district pharmacists. At the beginning of the activity, the district supervisors in the test districts were not sharing the APE consumption reports with their respective pharmacists; but, by April, both pharmacists started reporting receipt of the reports during the monthly monitoring and supervision visits. At this point, both pharmacists reported that they saw the data as real—because it was based on the quantities issued to, and consumed by, APEs—and valuable—because it presents insight into the quantities of drugs dispensed by APEs. The receipt of this data by the district pharmacists in the test districts was also reported during the endline.

While it is an important step that local decisionmakers are confident in the reported data, the actual application of this data requires both an understanding of proper data manipulation methods—to account for the reporting rate and quality issues—and Excel-based analysis, because the reports currently are only accessible through ODK as unformatted spreadsheets. Future expansion of the ODK toolset includes plans for analytics applications; their use for logistics data management may benefit from an intervention focused on data processing and use.

## **Improvement of Environment for Commodity Availability**

Availability of commodities at the service delivery point depends on proper completion of logistics tasks throughout the supply chain. As this activity focused solely on process strengthening at the community- and district-levels, it did not influence commodity availability at the provincial- and national-stores in the short term. During the implementation period of this activity—November 2012 through May 2013—Mozambique suffered national shortages of AL and they resorted to temporarily limiting the packing and distribution of AL kits for APEs. As mentioned above, the essential medicine kits were also in short supply at the district level during this activity, resulting in significant stockouts of numerous products at the APE level. For the 21 commodities listed on each

of the 184 logistics reports submitted by APEs and scanned by district supervisors during this activity, the stockouts box was checked for 58 percent; this means that, on average, for the APEs who submitted complete reports, they had at least one day of stockout, with an average of 58 percent of their products monthly. Adjusting this figure to include forms with an opening balance of zero was reported, although the stockouts box was not checked, this rate increases to 73 percent.

However, the outcomes of this activity have the potential to improve stock situations in the long term. Accounting for reporting rates and inferred data quality, the data reported by APEs and processed by district supervisors through ODK, is near real-time visibility into the stock status of APEs for the first time in Mozambique. In the longer term, this type of data can inform central-level decisions about kit design by documenting relative consumption patterns between products at the APE level. Using calculations of average monthly consumption (AMC), by product, partners can calculate the percentage of APEs with normal stock levels at given points in time—see table 8—which can provide a general sense of the performance of the current kit design in the longer term and, also, indicate the need for redistribution of overstocked commodities in the shorter term.

Table 8 shows the estimated AMC for certain commodities, based on the submitted consumption reports. Some commodities were not included in this calculation because of data quality problems—Sal Ferroso and the two forms of paracetamol—or high stockout rates. AMC was then calculated for each APE based on consumption in months with no stockouts. In some cases, AMC was calculated using only one month of data for a specific APE and commodity.

**Table 8. Average Monthly Consumption by Commodity in APE Months with No Stockouts, November–May**

Commodity	Range	Mean	Median	Mode
ORS (sachets)	0–24	5	3	2
Tetra (tubes)	1–27	9	7	6
Mebendazol (tabs)	1–80	22	15	15
Hexaclorl (bottles)	0–13	5	4	0
Male Condoms (units)	25–171	80	74	50
RDTs (tests)	0–85	26	23	20
AL 6x1 (treatments)	0–24	5	3	2
AL 6x2 (treatments)	0–5	2	2	0
AL 6x3 (treatments)	0–26	6	3	2
AL 6x4 (treatments)	0–23	5	4	0

Given relatively large variances in AMC for the commodities, the median may present a more representative figure than the mean. Without accounting for the limited nature of this data, table 8 illustrates the wide range in consumption patterns across APEs, which is difficult to accommodate in the long term with kits. With better overall stock levels across the system, these data could present an informative picture of relative consumption patterns across commodities and APEs, as well as pinpoint APEs understocks and overstocks in a particular district, at a given point in time.

Individual APE reports also have the potential to inform resupply of commodities through the via Classica pull system. With sustained supervision and better training to improve data quality, health

centers can use reported APE consumption to justify providing extra commodities. Although the current policy instructs APEs to only receive commodities through their kits, the levels of consumption of AL during this study, and the APE responses to monitoring and endline survey questions, indicate that APEs, in practice, do use via Classica to access commodities.



# Conclusions

This activity has shown that it is possible to collect logistics data related to APE activities in Maputo province and to make that data available on an online database, within several days of their submission to district supervisors. APEs and their supervisors had enough capacity and motivation to record, submit, review, and scan data using a paper record/report combined with ODK applications to achieve an average on-time, complete reporting rate of 68 percent for both test districts during the six months of this activity. Although this reporting rate reflects the benefits of targeted supervision, it was not influenced by incentives or performance-based benefits for APEs or their supervisors.

The data collected and processed through this activity have provided visibility into the current level of stockouts that certain APEs had at the service delivery level, showing the stock impact of program and supply chain challenges, even in a theoretically (for the essential medicines) full supply system. Unfortunately, the frequency of stockouts limits the ability to calculate AMC for these APEs. The stockouts, with the limited duration and geographic scope of this activity, also prevent the drawing of conclusions about the need to redesign the essential medicines or AL kits. However, the small amounts of AL documented as dispensed by APEs also sheds light on the ability of some APEs to access supplies outside their kits at the health center-level. In the longer term, across a wider sample of APEs, and with higher basic stock levels in the system, consumption data has the potential to—

- inform quantitative adjustments for AL and essential medicines kits
- inform collection and transfer of overstocked commodities between APEs
- support resupply for APEs through via Classica
- ultimately support improvement of stock levels for APEs and, subsequently, improve health service provision at the community level.

This activity also applied interventions that focused on resupply process strengthening and storage practices. For these interventions, delays in the start of APE service provision affected the evaluation's ability to compare endline results to a baseline; but, the endline and monitoring visits did offer some insight into changes in outcomes. Flexibility in the actual practice of commodity resupply by APEs shows that the training and job aid may have had limited results, but that APEs could potentially benefit from information and guidance on the options available to them. The training and job aid for storage processes may also have had limited effect, given the similarity in performance between test and control districts, but the temperature differential observed in the few provided storage boxes indicates that this may benefit future efforts to improve APE storage approaches in this way.

## Implications for Mozambique and Beyond

Community health workers in Maputo province in Mozambique can record and report logistics data during a short implementation period. The on-time reporting rates in this activity were made without

extra incentives and they occurred when APEs were not receiving the expected monetary stipends and commodities. Assuming similar educational levels of APEs and programmatic challenges in other districts across Mozambique, this logistics record and report could probably be replicated.

Based on the experiences of implementing staff and the feedback collected through endline documentation, the specific recommendations for any further expansion of this activity within Mozambique are as follows:

- Provide more support for using logistics data at the district level, including creating and training on Excel templates and associated operating procedures for basic analysis and use of data and, potentially, the administration of routine management meetings. This would help build the capacity of Mozambique's Ministry of Health (MISAU in Portuguese) staff to use logistics data for operational decisionmaking.
- Provide more guidance for APEs facing stockouts and overstocks; for example, job aids that list available options for obtaining emergency stock and tools. This would encourage health center staff to provide rational amounts of commodities, which would, potentially, reduce the frequency and duration of stockouts.
- Conduct additional testing for durable boxes used for commodities at the APE level; disseminate them to more APEs. Possibly compare the impact of box material—metal or plastic—on commodity temperature.
- Adapt the APE logistics record and report form; for example, simplifying the language and terminology, particularly the column for *rupturas*, which would be clearer if it used more vernacular terminology.
  - Remove the requirement to count the exact number of units on hand for commodities that include iron sulfate or male condoms, which APEs hold in relatively high quantities.
  - Add tick sheet bubbles for high-turnover commodities—namely male condoms.
- Improve training for APEs on conceptually challenging terminology, such as stockouts, which was a noted challenge during and after APE training.
- Continue including supportive supervision for both APEs and district supervisors for a limited time, after training.
- Remove the storage practice training and job aid unless further assessments indicate that these areas are a challenge; potentially, replace them with guidance and training on waste management.
- As much as possible, strengthen the time-series component of the evaluation to improve the interpretation of results related to commodity availability.
- Coordinate APE and district-level interventions with broader supply chain strengthening efforts.

APEs in Maputo province accessed and dispensed commodities despite numerous supply and programmatic challenges. The consumption data captured in this activity show that APEs in the test districts managed to access and dispense commodities, such as AL, even during a time when AL kits for APEs were not packed because of the national supply shortages and the promised monthly stipends were late. Although several APEs left the program during this time, this activity shows the

resilience of the APEs and the confidence placed in them by the health center and district pharmacy staff.

The ODK application has a demonstrated medium for rapidly achieving near real-time visibility into APE consumption and stock status. After project staff developed a data collection template, held two training sessions on ODK and monthly follow-up support, the district supervisors in this activity could scan recently completed forms; within several work days, by phone, they submitted the data to an online database. While they did not develop a permanent national database or link to existing MISAU information system during this activity, this mechanism could feasibly support routine data collection and submission from any district headquarters in Mozambique with mobile data service or an Internet connection. Each district would require initial trainings, a camera-enabled smartphone, technical support for several months, charge cards to support mobile data submission, as well as 10 to 13 minutes per form, per month, of the district supervisor's time.

Estimated required monetary costs for this particular implementation to replicate within Mozambique would include the camera-enabled Android smartphones (\$320 each); data airtime for wireless form submission (approximately \$0.05 per APE form); printing paper forms (less than \$25 per month); storing reported data in a cloud database (\$8.50 per month); implementing partner staff labor and other expenses to support training sessions (two day-long APE sessions and one supervisor training per district); staff labor and expenses to support bimonthly monitoring visits); as well as any staff labor required to customize the ODK data capture template (Dell 2013).

For any developing country community health worker program, this activity demonstrates the basic viability of an LMIS that uses paper consumption tick-sheet record and that report at the service - delivery level and mobile data transfer at the supervisor level; it is a potential option for comparison to other basic last mile routine data collection approaches. See the project's *Using Last Mile Distribution to Increase Access to Health Commodities* or Hasselberg's *Supply Chain Models and Considerations for Community-Based Distribution Programs: A Program Manager's Guide*.

Several important aspects of this approach could affect replicability in other contexts. Table 9 summarizes these factors and notes their status in this activity.

**Table 9. Factors That Might Affect Replicability of a Paper to ODK Electronic Entry LMIS at the Last Mile**

Important Factors	Status in This Activity	Effect on Replicability
Education and motivation of the service delivery providers	Largely primary-level education with basic literacy and arithmetic skills; motivation not measured	Staff with lower capacity or motivation may not be able to complete reports with the same consistency and quality
Number of commodities and data points to be handled by the paper and ODK entry	21 commodity formulations with four quantitative data points and one yes/no question each	A higher number of commodities would likely extend the current form to more than two pages, and might inhibit form completion
Average quantity of commodity dispensed per period	No conclusive measure in this activity, but captured data in table 8 suggests the range and median of AMC for test district APEs	Higher dispensed quantities (for example at a typical health center) would make the tick sheet element of the form difficult to manage

<b>Important Factors</b>	<b>Status in This Activity</b>	<b>Effect on Replicability</b>
Number of monthly reports to be processed by ODK users	A maximum of 25 APEs per district supervisor	A higher number of reports to process per period would increase the data entry time required of the ODK supervisors (roughly 6 hours per month in this activity)

In summary, this type of last mile data collection approach offers an alternative for comparison to other known methods, setting-by-setting.

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## Appendix A

# Commodities Included in APE Kits

Commodities provided to APEs in the revitalized program (NB: APEs in Manhica and Marracuene districts only began receiving the new version of the essential medicines kit in May 2013, and for some periods of this activity did not have access to AL kits).

Contents of New APE Kits (Essential Medicines)			
	Product	Form	Quantity
1	Iron sulfate 90 mg + folic acid 1 mg	Tablet	1×500
2	Paracetamol 500 mg	Tablet	1×1000
3	Paracetamol 250 mg	Dispersible tablet	1×500
4	Mebendazole 500 mg tablet	Tablet	1×100
5	Oral Rehydration Salts (ORS)	Dispersible powder sachets	150
6	Benzene hexachloride 600 mg/60 ml	Lotion	1×10
7	Tetracycline 1 percent tube 5 g	Ophthalmic ointment	1×25
8	Cetrimide 15 percent / Chlorhexidine gluconate 1.5 percent, 500 ml	Solution concentrate	1×1
9	Adhesive bandage (2.5cm × 5m)	Roll	3×1
10	hydrophilic cotton 500 g	Roll	2×1
11	Sterile compression (10 cm × 10 m)	Compression	1×3
12	Gauze ligature (10 cm × 10 m)	ligature	1×12
13	Plastic dispensing envelop (60×80×0.025 mm)	Unit	2×250
14	Zinc 20 mg	Dispersible tablet	400
15	Amoxicillin 125 mg	Dispersible tablet	90
16	Amoxicillin 250 mg	Dispersible tablet	260
17	Male condoms	Condoms	144 (1 box)
18	Soap	Soap	3×1
19	Incinerator box		1
20	Disposable gloves		250 (pairs)

Contents of New APE Kits (Essential Medicines)			
	Product	Form	Quantity
New APE malaria kit contents			
1	Artemether + lumefantrine 20 mg/120 mg	Tablet	<input type="checkbox"/> 30×6
			<input type="checkbox"/> 30×6×2
			<input type="checkbox"/> 30×6×3
			<input type="checkbox"/> 30×6×4
4	Rapid test for malaria (with lancet and pipette)	Rapid tests	200

## **Appendix B**

# **Tested APE Consumption Form**

Folha de Consumo Mensal de Medicamentos do APE									
Provincia: .....						VISTO			
Distrito: .....									
Comunidade: .....									
Nome do APE: .....						Assinatura Responsável da U.S. de Referência do			
Mês: ..... Ano: .....									
<p>Ficha a ser preenchida pelo APE e entregue a Unidade Sanitária de referência até dia 21 de cada mês, durante o período de estudo. Por sua vez, a Unidade Sanitária de referência entrega ao SDSMAS coordenador dos APES.</p> <p><b>Instruções:</b> Para cada paciente tratado pinte, <u>diariamente</u>, uma bolinha na linha correspondente ao tratamento receitado. No início e no final de cada mês faça a contagem dos medicamentos que dispõe e usados, e preencha nos espaços em branco.</p>									
Medicamentos	Stock no Início do Mês	Total Recebido no Mês	Número de Tratamentos Usados			Total Tratamentos Usado	Stock no Fim do Mês	Ruptura de Stock <small>Durante o mês houve falta de algum medicamento (marcar com um x):</small>	
<b>SRO</b>  1 bolinha = 1 pacote			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000			Sim <input type="checkbox"/>	
			00000	00000	00000			Não <input type="checkbox"/>	
			00000	00000	00000				
	Pacotes	Pacotes	00000	00000	00000		Pacotes		
			00000	00000	00000				
<b>Zinco 20 mg</b>  <b>Crianças de 2 a 5 Meses</b> 1 bolinha = 1 criança  <b>Crianças de 6 Meses a 5 Anos</b> 1 bolinha = 1 criança			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000			Sim <input type="checkbox"/>	
			00000	00000	00000			Não <input type="checkbox"/>	
			00000	00000	00000				
	Comprimidos	Comprimidos	00000	00000	00000		Comprimidos		
			00000	00000	00000				
<b>Amoxicilina</b>  <b>Crianças de 2 à 11 meses 125 mg</b> 1 bolinha = 1 criança  <b>Crianças de 1 à 5 anos 250 mg</b> 1 bolinha = 1 criança			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000			Sim <input type="checkbox"/>	
			00000	00000	00000			Não <input type="checkbox"/>	
			00000	00000	00000				
	Comprimidos	Comprimidos	00000	00000	00000		Comprimidos		
			00000	00000	00000				
<b>Artesanato Supositorio</b>  <b>50 mg (2-12 meses) - 1 supositorio</b>  <b>50 mg (13-42 meses) - 2 supositorios</b>  <b>200 mg (43-59 meses) - 1 supositorio</b>			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000			Sim <input type="checkbox"/>	
			00000	00000	00000			Não <input type="checkbox"/>	
	Supositorios	Supositorios	00000	00000	00000		Supositorios	Sim <input type="checkbox"/>	
			00000	00000	00000			Não <input type="checkbox"/>	
<b>Paracetamol</b>  <b>Paracetamol 500 mg</b> 1 bolinha = 9 comprimidos  <b>Paracetamol 250 mg</b> 1 bolinha = 9 comprimidos			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000			Sim <input type="checkbox"/>	
			00000	00000	00000			Não <input type="checkbox"/>	
	Comprimidos	Comprimidos	00000	00000	00000		Comprimidos		
			00000	00000	00000				
<b>Sal Ferroso</b>  <b>Sal Ferroso 90 mg + Ácido Fólico 1 mg</b> 1 bolinha = 15 comprimidos			00000	00000	00000				
			00000	00000	00000				
			00000	00000	00000			Sim <input type="checkbox"/>	
			00000	00000	00000			Não <input type="checkbox"/>	
	Comprimidos	Comprimidos	00000	00000	00000		Comprimidos		
			00000	00000	00000				
<b>Tetraciclina Pomada</b> 1 bolinha = 1 Tubo				00000	00000	00000			Sim <input type="checkbox"/>
	Tubos	Tubos	00000	00000	00000		Tubos	Não <input type="checkbox"/>	

Folha de Consumo Mensal de Medicamentos do APE										
Medicamentos	Stock no Início do Mês	Total Recebido no Mês	Número de Tratamentos Usados			Total Tratamentos Usado	Stock no Fim do Mês	Ruptura de Stock <small>Durante o mês houve falta de algum medicamento (marcar com um x)</small>		
Mebendazol 500 mg Comprimidos  <i>1 bolinha = 1 Comprimido</i>			00000	00000	00000					
			00000	00000	00000					
			00000	00000	00000					
			00000	00000	00000			Sim <input type="checkbox"/>		
			00000	00000	00000			Não <input type="checkbox"/>		
			00000	00000	00000					
	Comprimidos	Comprimidos	00000	00000	00000		Comprimidos			
			00000	00000	00000					
			00000	00000	00000					
			00000	00000	00000					
Hexacloreto de Benzeno	Solução 25%  <i>1 bolinha = 1 Frasco</i>		00000	00000	00000			Sim <input type="checkbox"/>		
			00000	00000	00000			Não <input type="checkbox"/>		
			00000	00000	00000					
		Frascos	Frascos	00000	00000	00000		Frascos		
				00000	00000	00000				
	Pomada 600mg/60ml  <i>1 bolinha = 1 Tubo</i>		00000	00000	00000			Sim <input type="checkbox"/>		
			00000	00000	00000			Não <input type="checkbox"/>		
			00000	00000	00000					
		Tubos	Tubos	00000	00000	00000		Tubos		
				00000	00000	00000				
Fenoximetilpenicilina	250 mg mg Suspensão  <i>1 bolinha = 1 doente</i>		00000	00000	00000			Sim <input type="checkbox"/>		
			00000	00000	00000			Não <input type="checkbox"/>		
			00000	00000	00000					
		Frascos	Frascos	00000	00000	00000		Frascos		
				00000	00000	00000				
	500 mg Cápsulas  <i>1 bolinha = 1 cápsula</i>		00000	00000	00000			Sim <input type="checkbox"/>		
			00000	00000	00000			Não <input type="checkbox"/>		
			00000	00000	00000					
		Cápsulas	Cápsulas	00000	00000	00000		Cápsulas		
				00000	00000	00000				
Preservativos Masculinos	Preservativos Masculinos  <i>1 bolinha = 1 preservativo</i>		00000	00000	00000					
			00000	00000	00000					
			00000	00000	00000					
			00000	00000	00000			Sim <input type="checkbox"/>		
			00000	00000	00000			Não <input type="checkbox"/>		
			00000	00000	00000					
			00000	00000	00000					
		Preservativos	Preservativos	00000	00000	00000		Preservativos		
				00000	00000	00000				
				00000	00000	00000				
CONSUMO DE TESTES RÁPIDOS DE MÁLARIA		CONSUMO DE AL (Anti malária)								
No Livro de Registo do APE, conta o número de testes usados neste mês.		No Ficha de Consumo de AL, conta o número de AL usados neste mês.								
Stock no Início do Mês (incl. Kit) - Testes		Stock no Início do Mês (incl. Kit AL APE) - Cartelas	6x1	6x2	6x3	6x4	Data: / /			
No. de TDRs RECEBIDOS Neste Mês - Testes		No. de AL RECEBIDOS Neste Mês - Cartelas								
No. de TDRs USADOS Neste Mês - Testes		No. de AL USADOS Neste Mês - Tratamentos					Assinatura do APE			
No. de stock de TDRs no Fim do Mês - Testes		No. de stock de AL no Fim do Mês - Cartelas								
Ruptura de Stock	Sim <input type="checkbox"/> Não <input type="checkbox"/>	Ruptura de Stock	Sim <input type="checkbox"/> Não <input type="checkbox"/>	Sim <input type="checkbox"/> Não <input type="checkbox"/>	Sim <input type="checkbox"/> Não <input type="checkbox"/>	Sim <input type="checkbox"/> Não <input type="checkbox"/>				



## Appendix C

# Monitoring Forms (English)

### APE Site Visit Monitoring and Evaluation Form



Província: \_\_\_\_\_ Distrito: \_\_\_\_\_  
 Comunidade: \_\_\_\_\_ Nome do APE: \_\_\_\_\_  
 Dia: \_\_\_\_\_ Mês: \_\_\_\_\_ Ano: \_\_\_\_\_

Consumption Form			
1. Did you receive training in stock management for the products you manage?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2. Can I see the job aids that are specific to the management of health products?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
3. Do you use the consumption form to keep track of your health products?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4. Do you have any problems completing the consumption form?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5. If yes, what problems do you have? (write response):	<input type="checkbox"/> Form is too long <input type="checkbox"/> Form is complicated <input type="checkbox"/> Lack of stationary / supplies	<input type="checkbox"/> Don't know how <input type="checkbox"/> Other (Specify): _____	
<i>Reviewer: Ask the APE to show you a copy of the form and explain how to complete it. Then, take a photo of the form.</i>			
6. Does the APE have a copy of the consumption form for this month?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7. Is the APE filling in the form for this month?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8. Is the APE filling in the form correctly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9. If not, what are the problems the APE is having with the form? (write all):			
Product Supply			
10. How often do you receive a new supply of commodities?	<input type="checkbox"/> Less than once per month <input type="checkbox"/> Whenever I need more <input type="checkbox"/> Other _____	<input type="checkbox"/> Every month <input type="checkbox"/> Every week	
11. When was the last time you received commodities?	<input type="checkbox"/> Within past week <input type="checkbox"/> Within past month	<input type="checkbox"/> More than one month ago	
12. Where did you go the last time you received commodities?	<input type="checkbox"/> Health Center <input type="checkbox"/> District	<input type="checkbox"/> Other APE <input type="checkbox"/> Other _____	
13. What commodities were you resupplied with last time? (check all that apply)	<input type="checkbox"/> APE Kit <input type="checkbox"/> AL Kit	<input type="checkbox"/> RDTs <input type="checkbox"/> Other _____	
14. Did you receive extra stock of any of the following commodities? (check all that apply)	<input type="checkbox"/> AL <input type="checkbox"/> RDTs	<input type="checkbox"/> Amoxicillin <input type="checkbox"/> Condoms	<input type="checkbox"/> Paracetamol <input type="checkbox"/> ORS
15. If yes, did you receive the extra stock at the same time you received regular resupply?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
16. Did you submit your consumption form at the time of resupply?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17. Did you experience a stock out of any commodity in the previous calendar month?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
18. If yes, which of the listed commodities did you stock out of? (check all that apply)	<input type="checkbox"/> AL <input type="checkbox"/> RDTs	<input type="checkbox"/> Amoxicillin <input type="checkbox"/> Condoms	<input type="checkbox"/> Paracetamol <input type="checkbox"/> ORS

<b>Product Storage</b> <i>Reviewer: Ask to see where (s)he stores the products.</i>		
19. Does the APE have a storage box?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
20. Is the APE using appropriate storage?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
21. Are supplies stored in a dry area, out of direct sunlight?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
22. Are condoms and other latex products stored away from electric motors and fluorescent lights?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
23. Are medical supplies stored separately, away from insecticides and chemicals?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
24. Are cartons arranged so that any arrows point up?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
25. Are there any damaged or expired products in the storage box?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
26. Is the storage box locked when not in use?	<input type="checkbox"/> Yes	<input type="checkbox"/> No

<b>Prescription Patterns.</b> <i>Reviewer: Ask the APE to tell you what (s)he dispenses to the following patients. Be sure to include units.</i>		
27. Amoxicillin	Child 2–11 months:	Child 1–5 years:
28. Zinc	Child 2–5 months:	Child 6 months to 5 years:
29. Mebendazole	Child:	Adult:
30. Paracetamol	Child 2–5 months:	Child 6 months to 5 years:
<b>Physical Inventory</b> <i>Reviewer: Count the following products on hand</i>		
Commodities	Stock available?	Stock on hand
Rapid Diagnostic Test for Malaria (RDT)	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Paracetamol	<input type="checkbox"/> Yes <input type="checkbox"/> No	
ORS	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Male Condoms	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Amoxicillin	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Zinc	<input type="checkbox"/> Yes <input type="checkbox"/> No	

District Site Visit  
Monitoring and Evaluation Form



Província: \_\_\_\_\_ Distrito: \_\_\_\_\_

Dia: \_\_\_\_\_ Mês: \_\_\_\_\_ Ano: \_\_\_\_\_

Method of data capture (ODK Scan or Summary Form) ☐ Scan ☐ Form

Consumption form – Questions for District APE Coordinator		
1. Do you regularly receive consumption forms from the APEs?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
2. Do you believe that the information on the consumption form represents the actual usage of these products?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
3. Why or why not? (write response):		
4. In your opinion, do you believe the information on the form is useful to have?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
5. Why or why not? (write response):		
<i>Ask the Coordinator to show you copies of the forms they have received for the previous month</i>		
6. Have you completed the processing of forms this month using the ODK Scan?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
7. How much time did you spend processing the forms this month? (write response in minutes):	<div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div>	
8. Count the number of forms received during the previous month and enter total:	<div style="border: 1px solid black; width: 40px; height: 20px; margin: 0 auto;"></div>	
9. How many of the forms were unique reports (i.e., only one report from each APE)?		
<i>Review the forms for completeness, messiness, and accuracy</i>		
10. Are the forms generally complete?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
11. Are the forms generally legible?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
12. Are the forms generally accurate (i.e., circles for quantities used filled properly, totals added correctly, math for each column is correct, etc.)?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
13. Do you think APEs need additional training in completing the consumption form?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
ODK Scan- Questions for District APE Coordinator		
14. Do you have the device with ODK Scan installed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
15. If no, why not? (write response):		
16.		
17. If yes, can you show me the device?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
18. If no, why not? (write response):		
19. Is the device functioning currently? Turn on the device to see if it is functioning currently.	<input type="checkbox"/> Yes	<input type="checkbox"/> No
20. Are you using the device to scan APE consumption forms? Ask to see a copy of the most recently scanned copy of the form, and then mark “yes” or “no.”	<input type="checkbox"/> Yes	<input type="checkbox"/> No
21. How do you characterize your satisfaction with the device?	<input type="checkbox"/> Very satisfied <input type="checkbox"/> Satisfied	<input type="checkbox"/> Neutral <input type="checkbox"/> Not satisfied <input type="checkbox"/> Very unsatisfied
22. Please state your reasons for satisfaction or dissatisfaction:		
23. Have you had any problems using the device this month?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
24. If yes, please describe the problems you have had this month or are having.	<input type="checkbox"/> Device Errors <input type="checkbox"/>	<input type="checkbox"/> Battery problem <input type="checkbox"/>

<i>(write responses if different from selections, check all that apply)</i>	Error in ODK application <input type="checkbox"/> Can't remember how to use ODK applications <input type="checkbox"/> Incorrect data <input type="checkbox"/> Can't keep the device charged	Network problems <input type="checkbox"/> Not enough time to scan the forms <input type="checkbox"/> Other <i>please specify:</i>
<i>Ask the Coordinator to show you how to process a form using the device</i>		
25. How much time did it take the Coordinator to process the form (enter in minutes)?	<input type="text"/>	
26. Did the supervisor have problems with the application?	<input type="checkbox"/> Yes	<input type="checkbox"/> No
27. What problems did they have? Please describe.		
28. Observations:		

For more information, please visit [deliver.jsi.com](http://deliver.jsi.com).

**USAID | DELIVER PROJECT**

John Snow, Inc.

1616 Fort Myer Drive, 16th Floor

Arlington, VA 22209 USA

Phone: 703-528-7474

Fax: 703-528-7480

Email: [askdeliver@jsi.com](mailto:askdeliver@jsi.com)

Internet: [deliver.jsi.com](http://deliver.jsi.com)