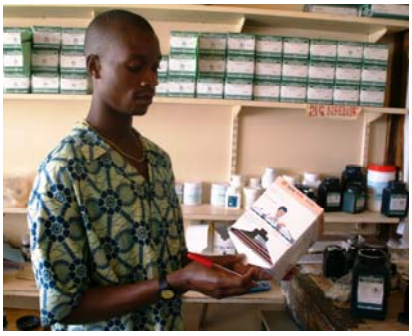
USAID | DELIVER PROJECT

FROM THE AMERICAN PEOPLE

Logistics Brief

Improving Access to Malaria Medicines in Zambia



USAID | DELIVER PROJECT 2009

A healthcare worker manages artemisinin-based combination therapies at a clinic in Zambia.

The Essential Medicines Public Pilot has resulted in significantly increased product availability, contributing toward a reduction in malaria morbidity and mortality.

OCTOBER 2011

This publication was produced for review by the U.S. Agency for International Development. It was prepared by the USAID | DELIVER PROJECT, Task Order 3.

U.S. Agency for International Development
www.usaid.gov

Malaria control remains a priority for the Ministry of Health (MOH) in Zambia. A significant bottleneck in the delivery of health services is the availability of essential drugs, including malaria medicines. To remedy this, in April 2009, the MOH implemented the Essential Medicines Public Pilot program. After the pilot, access to malaria medicines at the health-facility level improved significantly.

Background

Malaria is endemic throughout Zambia; it is the leading cause of morbidity and mortality. The disease accounts for 45 percent of all outpatient attendance and an estimated 50,000 deaths per year. Up to 20 percent of maternal mortality and 40 percent of infant mortality are attributed to malaria. A successful malaria program must have constant availability of malaria medicines.

A baseline survey for the pilot program, conducted at the end of 2008, reported high stockout rates at the health-facility level for a range of essential medicines. For artemether-lumefantrine (AL)—one of the most effective treatments for malaria—the stockout rate was around 40 percent for all four presentations. The stockouts resulted from, among other things, the lack of a formal system to determine order quantities. Consumption data were not used to calculate the quantities of medicines needed; rather, the quantities were based on a national allocation system, where quantities of health center kits were *pushed* from the central level.[1]

Another major cause of the stockouts has been weak distribution from the district level to the health facilities. District health offices are responsible for distribution from the district stores to the 1,800 health facilities. Distribution is challenging—health facilities are geographically spread out and the roads to reach the health facilities often require specialized off-road vehicles.

[1] In a push or allocation system, the person who fulfills the order determines the quantity to be issued.

USAID
PRESIDENT'S MALARIA INITIATIVE
CDC

Additional challenges include limited access to transport, lack of dedicated logistics staff members at the district level, and weak communication throughout the supply chain.

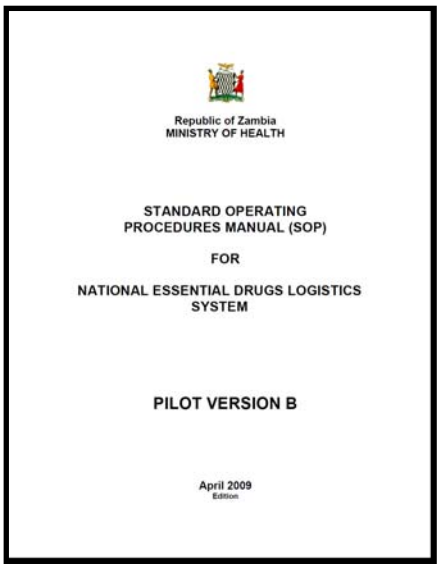
Design and Implementation Process

Recognizing the challenges of having malaria medicines available and their importance to achieving public health goals, the MOH implemented the Essential Drugs Public Pilot program. Before the design and implementation, they conducted an extensive baseline survey. The survey included all health centers in the targeted 24 districts, which were randomly selected out of the 72 in-country districts. From 50 peri-urban and rural districts, 16 were selected to implement one of two supply chain models. The MOH selected an additional eight districts with similar characteristics to act as controls; they included these districts in the evaluation but did not give them any pilot intervention.

USAID | DELIVER PROJECT 2009

A nurse conducts a physical inventory of ACTs and other medicines.

The MOH gained support from all relevant stakeholders, including (a) the MOH; (b) Medical Stores Limited (MSL), the parastatal agency responsible for primary distribution of medicines and medical supplies from Lusaka to the district stores, and approximately 48 hospitals; (c) John Snow, Inc., (JSI) and the USAID | DELIVER PROJECT; (d) USAID/President's Malaria Initiative (PMI); and (e) the World Bank. Because they did not hold a formal system design workshop, a smaller working group designed two models for the pilot. The pilot, significant in scale, covered almost 25 percent of the districts.



Standard operating procedures manual developed for the pilot in Zambia

Standard operating procedure (SOP) manuals were developed for both models, included instructions on how to use the system and described the roles and responsibilities of all participants in the system.

To implement the two different models of the pilot, all staff members with logistics responsibilities needed to be trained in using the system. A curriculum was developed based on the SOP manuals for this purpose. It developed staff members' capacity to use the SOPs for logistics tasks, such as handling logistics management information system (LMIS) records and reports and using an inventory control system.

Included in the training were 619 participants; most were service delivery point staff members. To train this large number of staff, the MOH organized a training-of-trainers (TOT) workshop; master trainers were taught how to use the curriculum for each model of the pilot. After the TOT, over the next five months, the master trainers facilitated sessions for staff members throughout the country.

Models

The MOH developed two models that focus on improving logistics capacity at the district level and reducing the number of stockholding points. Under the previous system, demand and supply were disconnected, resulting in limited product availability and frequent stockouts of essential medicines, including antimalarials. To improve customer service, links must be developed between the various stakeholders in the supply chain—from donors, to program managers, to service delivery point staff members—levels, and functions. The pilot models show what is needed to establish seamless (integrated) supply chains, which are characterized by clarity of roles and responsibilities, agility, streamlined processes, visibility of information, trust and collaboration, and alignment of objectives.

Both models assume that all products will be in full supply—that a sufficient quantity of malaria medicines will be available, whenever and wherever they are needed. Both models introduced the position of commodity planner (CP) at the district level and also at the district, if they did not have a pharmacist-in-charge. The role of the CP differed in each model.

Model A: In this model, stock is still held at the district level, as it is with the current system. The CP or district pharmacist-in-charge coordinates orders from the health facilities, thereby ensuring that each health facility sends requisitions to the district store, every month. The district level picks and packs the stock for each facility. In addition, the CP or district pharmacist-in-charge (a) places orders with MSL for the stock needed at the district and (b) manages stock at the district.

Model B: This model at the district level no longer holds stock. Instead, the district store acts as a *cross-docking facility*— MSL sends shipments that are pre-packed for individual health facilities. The district does not do secondary picking and packing, and orders are sent directly from facilities to MSL. This cross-docking concept is the same model successfully used for three years by the Antiretroviral (ARV) Medicines Logistics System. The newly placed CP or existing pharmacist-in-charge ensures the smooth flow of order information from the health facilities to MSL.

Results

To measure the effectiveness of the pilot, the program included a rigorous impact evaluation. One year after the baseline survey, which was at the end of the pilot, data were collected about inventory and stockout rates for 15 tracer drugs. The MOH conducted qualitative interviews with the CPs.

- **Noticeably improved access to essential drugs, especially in Model B districts**. In both districts, stockout rates decreased, especially in districts where they implemented Model B. In Model A districts, the stockout rates for adult artemisinin-based combination therapy (ACT)—a recommended treatment for malaria—medicines was reduced from 43 to 22 percent; for pediatric ACTs, stockouts were reduced from 34 to 30 percent. In Model B districts, the stockout rate for adult ACTs was reduced from 48 to 6 percent; pediatric ACTs was reduced from 43 to 12 percent. Figures 1 and 2 show the results for Model A and Model B, respectively.

Figure 1. Baseline and Endline Stockout Rates in Model A

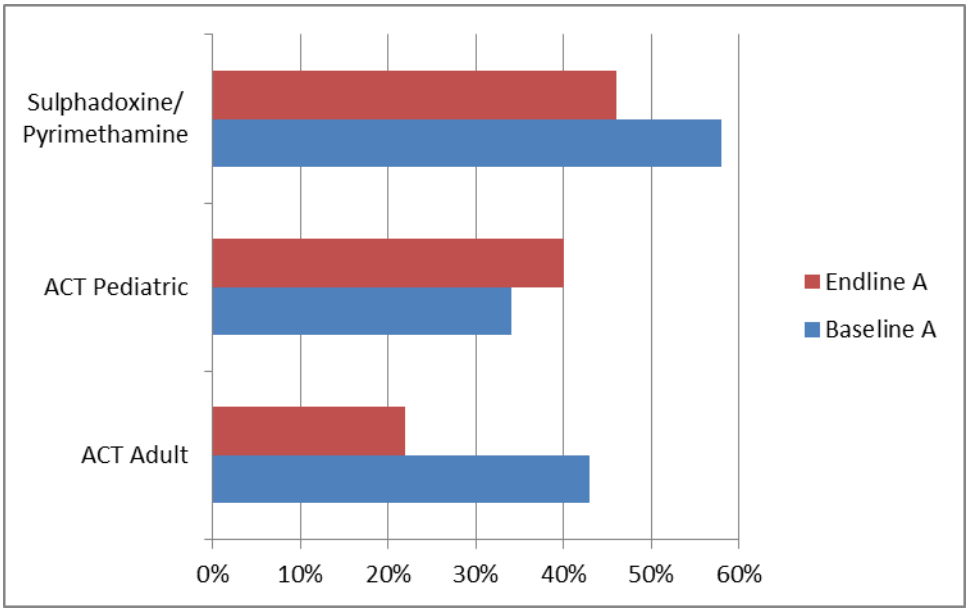
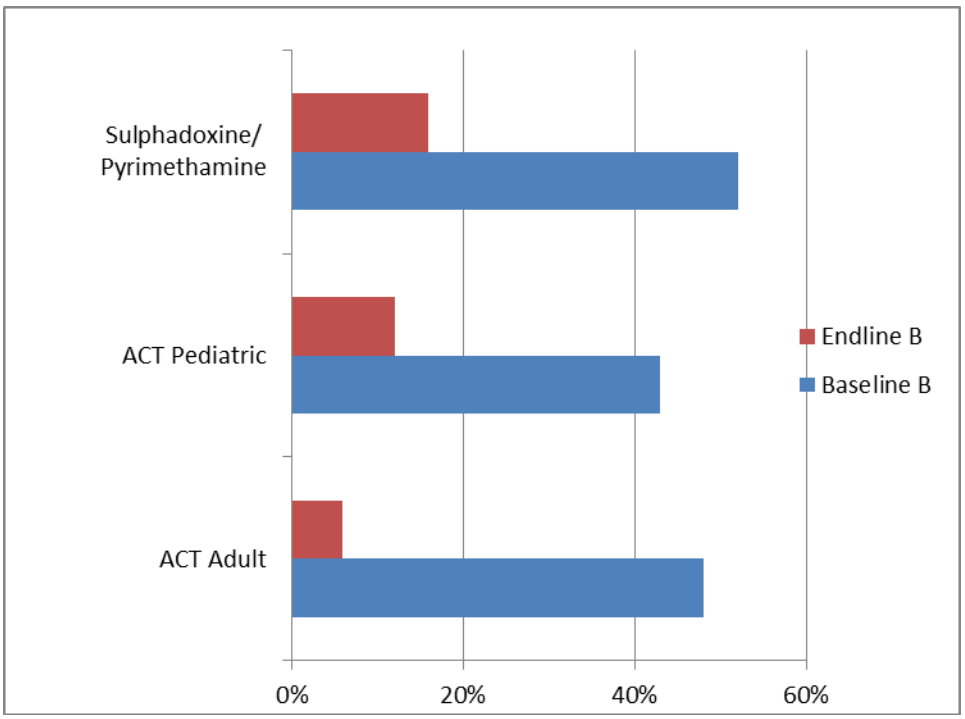


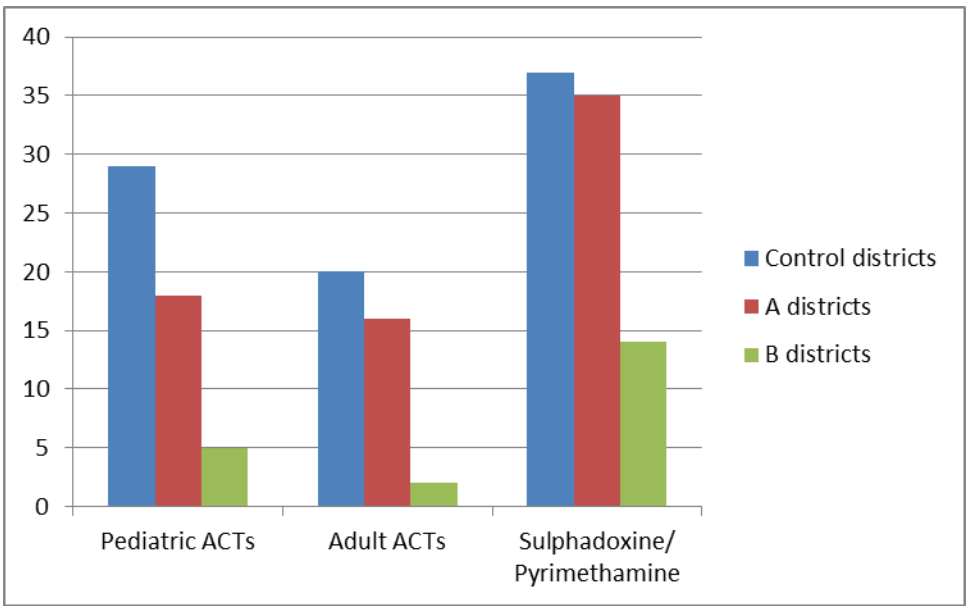
Figure 2. Baseline and Endline Stockout Rates in Model B



- **Reduced the average number of days stocked out in Model B districts.** In addition to reduced stockout rates, the number of days of out of stock was reduced for the fourth quarter of 2009. For pediatric ACTs in comparison districts (where no changes were made in the supply chain), the drugs were stocked out an average of 29 days, of a maximum 92 days; whereas, that number was reduced to 18

days in Model A districts and five days in Model B districts. Figure 3 shows the number of days of stockouts in quarter 4 of 2009.

Figure 3. Number of Days Stocked Out in Fourth Quarter 2009



- **Storage conditions improved**. Good storage practice—following first-to-expire, first-out procedures and separating unusable products— improved after the training; this was observed in both Model A and Model B districts.
- **Reporting rates improved**. Reporting rates significantly increased in both the A and the B districts. This increase was due, in part, to supervision by the district pharmacist-in-charge and CPs, both responsible for the smooth flow of logistics data reporting. For Model A districts, the reporting rate increased from 79 to 97 percent. For Model B districts, the reporting rate increased from 72 to 95 percent.
- **With the significant improvements in product availability under Model B, malaria-related morbidity and mortality should decrease if Model B is scaled up nationwide.** Decreasing the number and duration of stockouts means that more malaria patients can obtain life-saving medicines when they need them. Under Model B, ACTs should be available 99 percent of the time; whereas, stockouts will be substantially higher in Model A. Therefore, health gains should be significant. The World Bank developed a model to estimate the impact of reduced stockout rates on mortality and morbidity. Their model estimates significant reductions in mortality and morbidity and in number of deaths averted. For more information on this model and the estimated impact, see *Zambia Study Shows Stronger Supply Chains for Key Drugs Can Reduce Child Mortality* (World Bank 2010).

A woman receives ACTs in Zambia.

- **If Model B is scaled up nationwide, the aggregate household income loss averted is estimated at more than $1.6 million a year.** Households suffer significant economic loss for every malaria episode—significant work time is lost, per episode, for a sick adult and for an adult caring for a sick child. Considering

potential income lost (calculating, on the basis of estimated wages, the value of lost workdays resulting from a malaria episode) a national scale-up of Model B is expected to save an average of U.S. $1,629,312 (World Bank 2010).

Challenges

Despite the marked increases in product availability and reporting rates, persistent challenges remained.

- **Transportation from the district facility–level to the health facility–level.** CPs and district pharmacists-in-charge had to rely on vehicles from the district health office and rely on fuel to deliver the drugs to health facilities. According to interviewees, they had to *compete* with other programs and priorities for transportation resources.
- **Storage space.** Dedicated storage space at both the district- and health-facility levels remains a challenge. A number of CPs stressed that the storage facilities at all the district stores and health facilities should be surveyed before scaling up the program.
- **Communication.** Most health facilities have very limited mobile phone access; they rely on two-way radio. This limitation made it difficult for the CPs or district pharmacist-in-charge to regularly communicate with the health facilities, and provide supervision from a distance.

Conclusion: Moving Toward an Integrated Supply Chain

The Essential Medicines Public Pilot program, especially Model B, shows efforts to move toward an integrated supply chain. Table 1 displays the key features and its applicability in Zambia.

Table 1. Integrated Supply Change Features and Applicability

Component	Description	Demonstrated by the Pilot (Model B)
Clarity of roles and responsibilities	Establishing and publicizing roles, responsibilities, and processes (reporting or resupply procedures) up and down the supply chain can help expedite communication and can improve accountability, which should mean improved customer service.	As part of the pilot, standard operating procedures (SOPs) were developed, including descriptions of roles and responsibilities for all relevant staff (including the commodity planners [CP] and district pharmacist-in-charge). The SOPs were disseminated as part of the training; they provide references to help staff members complete their duties in a timely, effective way.
Agility	To respond to fluctuations in supply and demand, or to a changing policy environment, a supply chain must be agile and complete its functions with speed and flexibility. The faster the products, information, and decisions move through a supply chain, the faster it can respond to customer needs.	The pilot has a monthly reporting and resupply cycle. The frequency of information provided enables managers to quickly respond to supply imbalances. This quick response is shown by the decline in the duration of stockouts.
Streamlined processes	Bureaucratic hurdles, actions, or processes that do not add value to the supply chain impede the flow of information and commodities. Streamlining the number of levels in a system can shorten the pipeline to the end user. The fewer the *touches* in the resupply process, the closer the connection between supplier and user.	Model B, where the districts act as *cross-docking facilities*, removes one level from the supply chain and requires fewer *touches* (i.e., the CP or district pharmacist-in-charge does not need to organize the orders for the entire district).
Visibility of information	In an integrated supply chain, data are visible up and down the chain—from end to end. Different	In Zambia, logistics data is visible down to the facility level, where facility-level consumption and

Component	Description	Demonstrated by the Pilot (Model B)
	actors at different levels should be able to see where products are as well as the demand for those products. . In this way, the virtual gap between supply and demand is reduced, and transparency of data and information improves.	stock-on-hand data are available to stakeholders in the supply chain. High reporting rates have contributed to this visibility of information. Data from the logistics system are shared among stakeholders and are used to make decisions.
Trust and collaboration	Trust and collaboration are essential between the actors and levels, both within institutions and among organizations that comprise the end-to-end supply chain. Nurturing a collaborative environment can help break down existing functional and organizational barriers to improve supply chain performance.	The Ministry of Health led the pilot, and they were supported by various partners: the World Bank (through Crown Agents/Medical Stores Limited [MSL] and JSI Logistics Services) and the USAID/President's Malaria Initiative (through the USAID | DELIVER PROJECT, managed by John Snow, Inc.). Trust was established between the levels of the supply chain—from MSL to the district to the facility.
Alignment of objectives	Aligning vision, goals, and objectives across organizations (partners, clients, stakeholders) and levels helps ensure consistency in direction within the chain. Stakeholders must recognize that a problem exists, and then determine its root cause, before introducing, aligning, or redesigning objectives.	Before the design and implementation of the pilot, a situational survey and analysis were completed to ensure that all key stakeholders could discuss the problems of product availability; they all agreed on the design and implementation of the pilot. At the beginning of the pilot, they did an extensive baseline assessment, and shared the results with a larger stakeholder audience.

References

World Bank. 2010. *Zambia Study Shows Stronger Supply Chains for Key Drugs Can Reduce Child Mortality*. Washington, DC: World Bank.

Zambia Ministry of Health Logistics Pilot Program Steering Committee. 2011. *Essential Medicines Logistics Pilot Program: Steering Committee Evaluation Report*. Lusaka, Zambia: Zambia Ministry of Health.

The USAID | DELIVER PROJECT, Task Order 3, is funded by USAID, implemented by John Snow, Inc., and supports USAID's implementation of malaria prevention and treatment programs by procuring, managing, and delivering high-quality, safe, and effective malaria commodities; providing on-the-ground logistics capacity, technical assistance, and pharmaceutical management expertise; and offering technical leadership to strengthen the global supply, demand, and financing of malaria commodities.

The authors' views expressed in this publication do not necessarily reflect the views of the U.S. Agency for International Development or the United States Government.

USAID | DELIVER PROJECT

John Snow, Inc.

1616 Fort Myer Drive, 11th Floor

Arlington, VA 22209 USA

Phone: 703-528-7474

Fax: 703-528-7480

Email: askdeliver@jsi.com

Internet: deliver.jsi.com