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Enabling community health workers and their supervisors to implement appropriate solutions for their unique problem or situation, rather than making them wait for someone at a higher level to intervene, builds flexibility and agility into the supply chain.

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Innovative Solutions for Community Case Management Supply Chains

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Supply Chain Costing in Mozambique: Measuring Value through Impact and Expenditures

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Sophisticated Supply Chain Design: Practical Implications

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The USAID | DELIVER PROJECT Celebrates World Contraception Day

September 26 was World Contraception Day, and the USAID | DELIVER PROJECT had much to celebrate with significant progress being made toward contraceptive availability in many of the countries where we work. See the full article below.

2012 Global Health Supply Chain Summit

The 2012 Global Health Supply Chain Summit will take place on November 14-16, 2012, in Kigali, Rwanda. The event features two days of educational sessions on three key topics—understanding and managing risk in the supply chain, taking supply chain innovations to scale, and benchmarking supply chain performance. See the full article below.

Innovative Solutions for Community Case Management Supply Chains



A CHW in Rwanda is learning how to complete a bin card and other supply chain skills. Photo credit: JSI/SC4CCM

At the community level of any supply chain, the simplest innovation may offer the greatest opportunity to create lasting performance improvements. Undertaking incremental changes in processes by instilling elements of a quality improvement approach empowers health workers to identify and implement solutions for their specific and unique problems; these changes can also improve the way the supply chain responds to changes in the environment.

The Improving Supply Chains for Community Case Management of Pneumonia and Other Common Diseases of Childhood (SC4CCM) project seeks simple, affordable, and sustainable solutions to supply chain challenges faced by community health workers (CHWs). A common thread for SC4CCM in testing interventions at the community level in Malawi, Rwanda, and

Ethiopia has been to actively support staff that manage community supply chains to help them approach problem-solving in an organized and dynamic way. Approaches vary from country to country, but we are learning that the fundamental problem-solving skills—identifying the problem, trying different solutions, observing for improvements, and sharing the lesson learned—are critical to the process of finding appropriate, affordable, and potentially sustainable supply chain solutions for communities.

SC4CCM works in countries that have relatively new community case management programs. In 2010, baseline surveys in all three countries found opportunities for improving CHW supply management skills, as well as discovering the need to improve data visibility and transport solutions. The project considered several criteria when designing the intervention package for each country: the need for foundational supply chain skills, the variations in problems faced by CHWs, and most important, the relative isolation of CHWs; they are often located in remote communities and may not have regular visits from supervisors. Problem solving and elements of the quality improvement approach were, therefore, incorporated in the mix of interventions in all three countries.

Examples of Country Applications

Malawi—The Enhanced Management intervention established District Product Availability Teams (DPATs), which comprise district and health center resupply staff and CHWs. DPATs meet periodically to review community supply chain data, which is available from cStock (a short message service [SMS-] and web-based reporting system) for performance monitoring and quality improvement. When the DPAT members meet, they look at the data and are coached to use it to monitor their performance, identify problem areas, and find and document solutions. One exemplary health center set out to improve reporting rates as part of their DPAT goal. Their solution was to send stock-on-hand reports together at the DPAT monthly meetings when CHWs convene at the health center; this enables the supervisor to do on-the-spot troubleshooting.

Ethiopia—Problem solving is a key component of the Ready Lesson intervention, which provides basic, but critical, supply chain skills to the CHWs and their health center supervisors through concise one hour lessons. This is followed by 30 minutes of problem solving to help the CHWs implement what they learned. Since this intervention was rolled out in May 2012, some important issues have been identified and addressed during problem-solving sessions. For example, some CHWs did not understand the importance of their role in implementing the Integrated Pharmaceutical Logistics System (IPLS), including completing the report and request form. The health center pharmacist clarified the importance of the IPLS and what the CHWs are expected to do. As a result, the CHWs have begun to submit their report and request forms more regularly. Another issue identified was poor storage conditions at a health post; this was affecting the quality of products. Through successful advocacy, the health post received the necessary repairs to ensure that products remained in good condition.

Rwanda—The Quality Collaborative (QC) methodology has been used for quality improvement in an increasing number of settings; SC4CCM is testing the applicability of using QC to improve supply chain processes at the community level in Rwanda. Health center staff meet monthly to set and review QC goals, problems, and solutions; and to learn from the experiences of others. Every quarter, to accelerate the QC learning process, central and district staff, as well as representatives from all the health centers, convene to share and implement lessons learned and successful practices. As an example, one team pointed to the lack of bin cards at health centers as a barrier to maintaining logistics records. During the quarterly QC discussions, the teams determined that bin cards were sent to district hospitals instead of to district stores, which prevented them from being included with the deliveries of new products to health center stores. At the meeting, central-level staff helped identify the simple solution of sending bin cards to the district stores instead; they will work to develop a way for health centers to requisition bin cards.

Enabling CHWs and their supervisors to implement appropriate solutions for their unique problem or situation, rather than making them wait for someone at a higher level to intervene, builds flexibility and agility into the supply chain. Problem solving requires staff to be empowered with the structure and tools to identify problems and the willingness of staff to try new approaches. Ethiopia is an example of a country where supply chain problems that face CHWs vary dramatically in different regions because of the differences in geography and terrain. In Rwanda, CHWs in eastern districts face different challenges than their colleagues in the north. This is why flexible solutions are a key element of the problem-solving approach; providing structure and tools ensures that a systematic, quality-based approach is used to determine the way forward. Sharing lessons is also an important part of the process; because, even if the same solution cannot be applied in all cases, hearing about success stories can empower other community actors to seek the solution that works best for them, in their community. In summary, facilitating a structured process for CHWs to identify and make incremental changes in the way they do their supply chain tasks can lead to ongoing improvements in the performance of these tasks; and it can contribute to strengthening the last mile of the supply chain.

SCACCM is a learning project, implemented by JSI Research & Training Institute, Inc., that focuses on finding affordable, simple, and sustainable supply chain solutions that address the unique challenges of CHWs. To improve the supply chain for children's medicines in communities, SCACCM tests innovative solutions in Malawi, Ethiopia, and Rwanda. Our goal is to demonstrate that product availability can be significantly improved at the lowest levels of the supply chain, thereby contributing to improved child health in communities. We share what we learn; and we advocate for uptake, scale up, and continued action in countries and throughout the region.

Supply Chain Costing in Mozambique: Measuring Value through Impact and Expenditures

Although positive health outcomes depend on essential medicines, and the cost of medicines is usually known; the cost of ensuring that the medicines arrive at the health facility is often overlooked or unknown. Having details about the operating costs and the cost drivers of the supply chain enables supply chain managers, development partners, and other stakeholders to make sound decisions about improving the supply chain design, implementation, and performance. This article focuses on a supply chain costing exercise done by VillageReach in Mozambique and it explains how supply chain costing can affect change.



VillageReach staff member Gabriel Eduardo distributes HIV tests to a health worker. Photo credit: VillageReach

Background and Rationale for Costing

In March 2002, VillageReach partnered with the Mozambique Ministry of Health (MISAU); and a local nongovernmental organization (NGO), the Foundation for Community Development, to implement a five-year pilot project in Cabo Delgado province in northern Mozambique. The goal of the pilot was to strengthen the quality of health services by improving immunization services and the vaccine supply, as well as community and health worker support.

The project replaced an ad hoc, collection-based supply chain—where frontline health workers collected vaccines and related supplies from their district office—with a dedicated logistics system (DLS). The DLS employs a small number of specialized workers who visit the health centers every month. They use a vendor managed inventory approach to deliver vaccines and supplies, and use a management information system to collect data; they also repair equipment and offer supportive supervision.

After these interventions, an impact evaluation showed a 27 percent increase in the DPT-hepatitis B3 vaccine coverage rate and a decrease in the percentage of health centers reporting a stockout—from 80 percent to 1 percent. Despite these impressive results, questions remained about the cost required to sustain the achievements. The question of cost prompted VillageReach to conduct a provincial-level costing study that compared the costs of the vaccine supply chain in Cabo Delgado province—where the pilot project operated—with the costs in Niassa province, which was still using the health ministry's traditional vaccine logistics system.

Costing Approach

Designing the methodology and the costing model proved challenging because of the haphazard vaccine supply chain in Niassa province; which included a wide variety of activities, participants, frequency of pickup and delivery, and costs. Because of this, researchers decided to take a micro-costing approach, gathering costs for each activity and step of each segment in the supply chain, and then calculating the portion attributable to the vaccine program. The study used surveys to collect distribution, transport, and cold chain costs at the provincial and district level, and at the service delivery point. In Niassa, VillageReach collected a random sample of data at 10 health centers in eight districts; in Cabo Delgado, records of actual costs were available and were used for the study.

The study found that, although the absolute cost to operate a vaccine supply chain for one year was higher in Cabo Delgado province, compared to the traditional system in Niassa; the new system was more cost effective and efficient.



VillageReach field officer Alfredo Durão checks the quality of a vaccine in a health center. Photo credit: VillageReach

Total cost. The total cost to operate the vaccine supply chain for one year was U.S.\$38,855 greater in Cabo Delgado than in Niassa. Of the total supply chain costs, both provinces invested the largest percentage of resources in vaccines and supplies: 61 percent of the costs in Cabo Delgado and 46 percent in Niassa. Niassa spent a larger percentage on personnel (28 percent) and cold chain (12 percent) costs compared to Cabo Delgado (12 percent and 9 percent, respectively). Conversely, Cabo Delgado spent a larger percentage on transport (18 percent), compared to Niassa (14 percent).

In Niassa, transport was less expensive, but personnel and cold chain maintenance were more expensive. Both provinces

invested the largest percentage of resources in vaccines and syringes: 61 percent of the costs in Cabo Delgado and 46 percent in Niassa. The higher percentage in Cabo Delgado indicates relative efficiency because the cost of distribution is less than the cost of vaccines and syringes; whereas, Niassa spent more on distribution than they spent on vaccines and syringes.

Cost effectiveness. Researchers defined cost effectiveness as the increase in health outcome (measured by childhood vaccination), relative to the expenditure. The cost per child receiving a DPT-hepatitis B3 vaccine was \$1.04 higher in Niassa than in Cabo Delgado—a 17 percent difference.

Cost efficiency. Cost efficiency was defined as the effort (measured by doses delivered) relative to the expenditure. In Niassa province, the cost per dose delivered was \$0.32, or 21 percent more than in Cabo Delgado.

VillageReach and the stakeholders were most surprised to discover the large percentage of funds being spent for personnel. It was a significant finding that, while perceived to be relatively expensive, transport systems can be less expensive than paying per diems within an ad-hoc transportation system. Also, the breakdown of costs was interesting, as was learning that, in Niassa province, the cost of the vaccines did not cost more than the cost to distribute those vaccines. That fact highlighted the inefficiency of the traditional system.

Table 1 summarizes the two provinces' basic vaccine-related characteristics and supply chain costs by highlighting three comparisons: absolute cost, relative cost effectiveness, and relative cost efficiency..

Table 1. Allocation of Costs for One Year in Niassa and Cabo Delgado Provinces

Characteristic/Comparison	Niassa (traditional supply chain system)	Cabo Delgado (dedicated supply chain system)	Increase/Decrease in Niassa Compared with Cabo Delgado
Absolute Costs			
Population	1,178,117	1,632,809	-454,692
Total vaccine logistics costs for one year:	\$266,563.04	\$305,418.80	-\$38,855.76
Distribution	\$142,757.04 (54%)	\$117,802.30 (39%)	\$24,954.74 (15%)
<i>Transport</i>	\$35,968.39 (14%)	\$ 55,234.48 (18%)	-\$19,266.09 (-4%)
<i>Personnel</i>	\$75,482.23 (28%)	\$ 35,376.00 (12%)	+\$40,106.23 (16%)
<i>Cold chain</i>	\$31,306.42 (12%)	\$27,191.82 (9%)	+\$4,114.60 (3%)
Vaccines and supplies	\$123,806.00 (46%)	\$187,616.51 (61%)	-\$63,810.51 (15%)
Relative Cost Effectiveness			
DPT3 2008 coverage rate for children age 24–35 months	70%	95.4%	-25.4%
Total cost per child receiving DPT-hepatitis B3 in one year	\$6.07	\$5.03	\$1.04
Relative Cost Efficiency			
Number of vaccine doses delivered in one year	498,624	889,152	-390,528
Total cost per dose of vaccine delivered	\$1.50	\$1.18	\$0.32

Use of Results

Partners used the results to advocate for broader implementation of the dedicated logistics system. VillageReach disseminated the costing results widely to the Ministry of Health in Mozambique and its partners, including NGOs and bilateral and multilateral donors. Presentations were repeated at various levels within the ministry; building on the previous 15 months of advocacy, which used the impact study results.

After receiving the costing information, the Minister of Health authorized each of Mozambique's provinces to explore implementing the dedicated logistics system. This was a clear sign that the costing results were a major factor in the decision. It was also a major milestone because the supply chain redesign in the DLS included logistics task shifting from the districts to the provinces, which was often perceived as contradicting the government-wide policy of decentralization. Today, four of Mozambique's 10 provinces are implementing the new system, which now extends to more than 445 health centers.

VillageReach improves access to health care for remote, underserved communities around the world by partnering with governments, businesses, nonprofits, and other organizations to improve the performance and reliability of health systems in the most inaccessible and isolated last mile communities. The organization focuses its activities on improving the following key areas: increase health worker productivity and capacity, improve the effectiveness and efficiency of health service delivery, extend the reach of health services, and increase trust in and use of health services. VillageReach is headquartered in Seattle, Washington; they have field offices in Mozambique and Malawi, and projects in several African countries.

All dollar amounts in this article are U.S. dollars.

Sophisticated Supply Chain Design: Practical Implications

In the most remote parts of Tanzania, good health is more important to a person's livelihood than anything else. When rural citizens go to a health facility, their only interest is whether treatment, and the required medicines and medical supplies, are available in sufficient quality and quantity—especially lifesaving products like antimalarials and antibiotics.

The Medical Stores Department (MSD), a leading health supply chain organization in Tanzania, has an extensive distribution network. Established by an act of parliament in 1993 as an autonomous organization under the Ministry of Health and Social Welfare; the MSD has the mandate to procure, store, and distribute medicines and medical supplies to public health facilities in Tanzania.

During the past five years, the MSD has been increasingly challenged with providing health products to primary health facilities; this challenge indicated the need for a review of its supply chain design. The challenges have been due, in part, to business expansion and unprecedented sales growth; as well as increases in operational costs, organizational rigidity, and multiple uncoordinated operational improvement studies. The government of Tanzania asked the MSD to shape its organization with the goals of providing value for money, while encouraging various development partners to make modest investments in the MSD's infrastructure.

Historically, the district medical officer (DMO) has been the link between the MSD and the health facilities. Medicines and medical supplies from the MSD were delivered first to the DMOs; the DMOs then arranged for transportation to the primary health facilities. This procedure delayed the distribution of medicines to the more than 5,000 primary facilities; it may have also resulted in pilferage of life-saving medical products. By June 2013, the number of primary facilities is expected to increase to 7,000.

Based on these challenges, it was imperative for the MSD to create a roadmap leading to satisfied customers, competent staff, real-time information technology systems, and cost-optimized and efficient operations, ultimately resulting in a competitive supply chain system.

In Tanzania, Coca-Cola products are distributed from the capital city, Dar es Salaam, and are available in the most remote areas of the country. Could lessons learned from such private-sector models be used to bring medicines for malaria, HIV/AIDS, and vaccinations through the last mile in Tanzania? How can the



A staff person at a clinic in Tanzania

distribution system be reorganized to ensure that medicines and medical supplies reach all primary health facilities?

To answer these questions, two private-sector solutions—[Supply Chain Modeling for Optimization \(2020\)](#) and the Coca-Cola model for last mile logistics—were used to model Tanzania’s future public health supply chain. The MSD intends to build upon best practices in supply chain management from the private sector and apply these practices in a public-sector undertaking.

Supply Chain Modeling for Optimization can be used to support optimization of supply chain network routes, assets, and warehouses; and reduce the costs for transportation, storage, and distribution. The Coca-Cola model reviews the last mile logistics, including the distribution from zonal distribution points to the more than 5,000 health facilities throughout Tanzania.

The Coca-Cola model is more practical because it combines both the modality and cost-effective routing for the supplies. Applying the Coca-Cola model assumes that if Coca-Cola’s four major product lines can be distributed using this method, it is possible to do the same with 100 to 1,000 product lines. Table 1 summarizes the past, present, and future outlook for the MSD supply chain, based on the two models being implemented.

Table 1: Past, Present, and Future Outlook for the MSD Supply Chain

Past	Present and Future
MSD supplies reach the customer through centralized distribution centers (DMOs)	All supplies reach customers directly through primary health facilities
Quantification based on historical data from facility orders	National quantification determines national requirements
Multiple entities (DMOs and MSD) are accountable for the supply chain	MSD is fully accountable for the entire supply chain
MSD uses its own trucks for distribution from headquarters to primary health facilities; uses the private sector, as needed	Private sector (third party logistics providers), using direct delivery through the Coca-Cola model, is fully integrated into the distribution; including last mile logistics from zonal stores to primary health facilities
Late delivery of medicines and medical supplies	On-time delivery of medicine and medical supplies
Customer complaints	Customer satisfaction
Root integration and maximization	Root optimization
Multiple solutions for supply chain problems	Uses models with lessons learned from private-sector supply chains

The realization of the new supply chain model will depend on how the MSD drives the change agenda throughout its operational areas, including massive public awareness and collaboration from stakeholders, such as the DMOs. Some resistance is expected; therefore, it is important that a risk management strategy be designed in the context of the supply chain model. The risk identification, assessment, and mitigation draws from each of the future modeling outputs.

Pharmaceutical distribution requires a complex supply chain; it is imperative to use tested models and to measure results during a pilot test before implementing solutions. Modeling supply chain solutions with

computer applications can help establish an intelligent, informed, and integrated supply chain solution for sustainable development. However, modeling a supply chain and analyzing the results requires a concerted commitment from many stakeholders; because data collection, options for solutions, analysis, and review of outcomes all take time.

The MSD in Tanzania has started to optimize its supply chain by using modeling, with continued support from development partners that have invested modestly in infrastructure facilities, intellectual capacity, and global partnership: the U.S. Agency for International Development; the Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria; the Coca-Cola Company; and the Bill & Melinda Gates Foundation. All players understand that our goal is to ensure that a customer at the final distribution point has access to reliable medical products when they need them. The focus of development partners has, therefore, not been on short-term rewards, but on the long-term impact for the entire health sector.

The author, Sako Mayrick Mwakalobo, is a senior manager with the MSD in Tanzania. He manages strategic planning, risk management, pricing, and project management portfolios in the MSD's supply chain. He is also one of the pioneers of a direct delivery project to primary health facilities, which defines a costing model for internally driven processes and private-sector engagement. He has a pivotal role in supporting the implementation of the Coca-Cola model for last mile logistics and supply chain talent management initiatives. Mwakalobo is a certified public accountant; he has a master of business administration (MBA) and a bachelor of laws (LLB).

The USAID | DELIVER PROJECT Celebrates World Contraception Day



Pills being packed in boxes at the Social Marketing Company in Bangladesh.

September 26 was World Contraception Day, and the USAID | DELIVER PROJECT had much to celebrate with significant progress being made toward contraceptive availability in many of the countries where we work. In just one year, the number of contraceptives shipped to underserved countries by the USAID | DELIVER PROJECT helped contribute to an estimated 9.7 million unintended pregnancies potentially averted—meaning fewer pregnancy-related and infant deaths.

In developing countries, more than 200 million women and girls want to avoid or delay pregnancy but are not using effective methods of contraception. Making quality family planning methods available to all who want them is critical

to keeping families, women, and children healthy, educated, and out of poverty; however, this is only possible if effective supply chains are in place.

To help underscore the importance of strengthening public health supply chains, the USAID | DELIVER PROJECT shared stories and photos from its work on its website and via social media outlets, including Facebook, Twitter, GooglePlus, and Tumbler.

[World Contraception Day: Why Supply Chains Matter](#)

[Photo blog: The Last Mile](#)

Visit us on [Facebook](#), [Twitter](#), and [GooglePlus](#).

2012 Global Health Supply Chain Summit

The 2012 Global Health Supply Chain (GHSC) Summit will take place on November 14-16, 2012, in Kigali, Rwanda. The event features two days of educational sessions on three key topics—understanding and managing risk in the supply chain, taking supply chain innovations to scale, and benchmarking supply chain performance.

Speakers come from a wide variety of public health supply chain partners, including ministries of health, donor and implementing organizations, the private sector, associations, and academic institutions. In addition to plenaries and breakout sessions, the program features posters, and a World Café for dynamic exchange of ideas.

The third day will be dedicated to “open space technology” and discrete meetings, including educational content and networking for members of the International Association for Public Health Logisticians (IAPHL). This is the first time the summit is held in Africa, and IAPHL will be taking part as a sponsor and organizer.

IAPHL has raised funds to support 18 of its members in developing countries to attend the Summit. From over a hundred qualified applicants, winners were chosen from Liberia, Ghana, Nigeria, Ethiopia, Malawi, Kenya, Uganda, Zambia, Zimbabwe, India, Papua New Guinea, and Nepal.

We thank our sponsorship organizations that have contributed over \$170,000 to allow the Summit to be provided at no cost to participants:

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For information about the event, please visit the Summit website at http://www.ghsc-2012.com/ghsc_2012/homepart.php.

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