Burundi National Supply Chain Assessment Results

Capability and Performance

August 2014

SCMS

Providing quality medicines for people living with and affected by HIV and AIDS

PEPFAR
Implementing Partner

Burundi National Supply Chain Assessment and Baseline

Capability and Performance

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About the Supply Chain Management System (SCMS)

SCMS was established to enable the unprecedented scale-up of HIV/AIDS prevention, care and treatment programs in the developing world. SCMS procures and distributes essential medicines and health supplies, works to strengthen existing supply chains in the field, and facilitates collaboration and the exchange of information among key donors and other service providers. SCMS is an international team of 13 organizations funded by the US President's Emergency Plan for AIDS Relief (PEPFAR). The project is managed by the US Agency for International Development.

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About the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program

The goal of SIAPS is to assure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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Acronyms

ARV	antiretroviral
ASAQ	Artesunate Amodiaquine fixed-dose combination
CAMEBU	Central d'achat de medicaments essentiels de dispotifs medicaux, de produits et materiels de laboratoire du Burundi
CDS	Centre de sante
DPML	Directorate of Pharmacies, Medicines and Laboratories
FEFO	first expired, first out
FOSA	Formation Sanitaire
GDP	good dispensing practice
HIV	human immunodeficiency virus
INSP	Institut National de Sante Publique
KPI	key performance indicator
LNME	Liste national de medicaments essentiel
LMIS	logistics management information system
MoH	Ministry of Health
MSH	Management Sciences for Health
NSCA	National Supply Chain Assessment
PD	Pharmacie de district
PEPFAR	US President's Emergency Plan for AIDS Relief
PNILP	Programme National Integre de Lutte Contre le Paludisme
PNLS	Programme National de Lutte Contre Sida
PNILT	Programme National Integre de Lutte Contre la Tuberculose
PNSR	Programme National de Sante de la Reproduction
SCMS	Supply Chain Management System
SEAM	Strategy for Enhancing Access to Medications
SIAPS	Systems for Improved Access to Pharmaceuticals
SOP	standard operating procedure
STG	standard treatment guideline

TB	tuberculosis
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

The Supply Chain Management System (SCMS) and Systems for Improved Access to Pharmaceuticals (SIAPS), in collaboration with the Ministry of Public Health and Fight Against AIDS conducted comprehensive assessment of Burundi's supply chain from March 10-28th, 2014.

The purpose was to establish a baseline of capability and performance and provide comprehensive analysis to key stakeholders, including the Ministry of Public Health and Fight Against AIDS, the United States Agency for International Development (USAID) (the President's Emergency Plan for AIDS Relief (PEPFAR) and President's Malaria Initiative (PMI)) and implementing partners. Results will inform key strategic decision-making processes for supply chain stakeholders, including the government and donors.

Thirty data collectors were dispatched to 132 sites in 14 districts across Burundi, including PEPFAR-supported and non-PEPFAR-supported sites (see Figure 1). Sites were visited at each level of the supply chain, including:

- Central d'achat de medicaments essentiels de dispotifs medicaux, de produits et materiels de laboratoire du Burundi (CAMEBU)
- 15 district pharmacies
- 10 district hospitals
- 107 health centers

Methods

The assessment was conducted using the National Supply Chain Assessment (NSCA) Tool, which is a qualitative and quantitative tool with two components to assess supply chain capability and performance:

- **Capability maturity model (CMM):** This tool is based on industry best practice to determine supply chain levels of maturity, using a scale of 1–5 with 5 being the most mature.[1] Each functional area of the Burundi supply chain was assessed at the national, district and facility levels by conducting interviews with key stakeholders. Inventory management procedures and infrastructure were also observed to validate information provided in interviews.
- **Key performance indicators (KPIs):** Data was collected at each facility for a set of indicators measuring performance of stock availability, product selection, quantification, procurement, and warehousing and inventory management. Data collection used a variety of sources detailed in Table 5.

[1] The CMM tool measures performance on scale of 1-5. Results are presented as percentages where 1=20%, 2=40%,3=60%, 4=80% and 5=100%.

Figure 1. Burundi supply chain assessment districts visited

Districts

- Gahombo
- Rumonge
- Nyanza Lac
- Ngozi
- Ryansoro
- Ruyigi
- Buye
- Mabayi
- Kiganda
- Nyabikere
- Kiremba
- Kibumbu

PD Seulement

- Kabezi
- Buja Nord

Results

Evaluation of Burundi's supply chain revealed several opportunities for improving both capability and performance. Overall results are highlighted in Table 1 below. Detailed results and recommendations for potential systems strengthening can be found in Section 3: Data Analysis and Results of this report.

Capability: Overall capability of the supply chain in Burundi is low, with 5 of 6 functional areas falling at or below 40 percent.

Performance: Performance varied by supply chain functional area with evident challenges such as 36 percent order fill rate between CAMEBU and district pharmacies to very good-illustrated by 99 percent supplier fill rate.

Table 1. Burundi supply chain assessment results

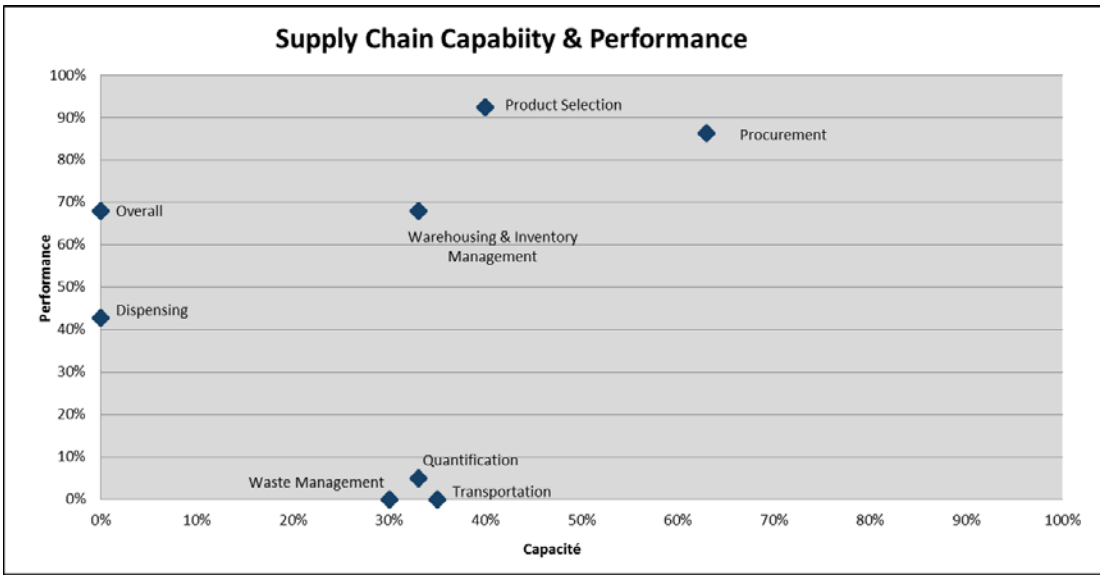
Results of National Supply Chain Assessment			
Functional Areas	**Capability**	**KPIs**	
Overall		Stock Out (6 month average)	15%
		Stock Out (day of visit)	11%
		Stock Accuracy (PD & FOSA level)	71%
		Stocked According to Plan	27%
Product Selection	40%	% products tested conforming to quality standards	98%
		% procurement compliant with LNME	87%
Quantification	33%	% of products with higher than 80% forecast accuracy	5%
Procurement	63%	Supplier On-time delivery	68%
		% product quantity ordered as emergency order	14%

		Order fill rate	99%
		% variance between prices paid and int'l reference price	8%
Warehousing & Inventory Management	33%	Expiry (CAMEBU)	$ 163,770
		Stock Accuracy (CAMEBU)	85%
		Stock Out Rate (CAMEBU)	9%
		Average % of unplanned orders placed by district pharmacies	60%
		Order fill rate (CAMEBU-district pharmacy)	36%
Transportation	35%		
Waste Management	30%		
Dispensing		% prescription compliance to STG	77%
		% patients with knowledge of medicines	51%
		% compliance with good dispensing practices	0%

Currently, supply chain stakeholders are motivated, already enhancing the supply chain, including improving the infrastructure at CAMEBU and rolling out a national paper-based logistics management information system (LMIS).

However, examining performance in each functional area against the assessed capability demonstrates that only in the area of procurement both performance capability were above 60 percent, highlighting potential areas to focus supply chain system improvements.

Figure 2. Capability and performance comparison[2]



[2] Some supply chain functional areas were not evaluated in both capability and performance. Overall and dispensing areas were measured for performance only and due to lack of systems for waste management and transport these functional areas were measured for capability only.

Key Results & Recommendations

Results of this assessment are intended to provide stakeholders with the necessary information to implement systems strengthening initiatives that strive to achieve a best practice, highly capable and well-performing supply chain. Key results and recommendations include:

Quantification

Results

Current forecasting for essential medicines is conducted on an annual basis using data on CAMEBU's sales to clients as a proxy for consumption data. Data quality for forecasting is low as even this data from CAMEBU only accounts for an estimated 36 percent of its client's needs as evidenced by the order fill rate between CAMEBU and district pharmacies. In addition, budget constraints limit the funding available to procure the quantities forecasted with reduction adjustments done to match available funds.

Recommendations

Results reveal challenges in both capability and performance. Due to the impact of this functional area on the overall availability of product throughout the supply chain, CAMEBU should prioritize systems strengthening improvements for quantification.

In the short term (2015 quantification process), CAMEBU should consider:

- Incorporate facility-level consumption data, which will be available from the new paper-based LMIS system, which will improve data quality being input in to the forecasting process.
- Forecasting processes typically involve use of two methodologies to better estimate needs. CAMEBU should also consider integrating a second method, such as the morbidity method, to improve forecast accuracy.

In the long term, supply chain stakeholders should consider:

- Moving toward integrated forecasting to maximize their ability to petition for adequate funding levels from the Ministry of Finance and donors, as well as achieve downstream improvements in product availability through improved supply planning and inventory management.

Warehousing and inventory management

Results

CAMEBU- With the opening of its new warehousing space and standard operating procedures (SOP), CAMEBU is on the right track to improving its infrastructure and overall capability. Despite new infrastructure, CAMEBU experiences inventory management issues with only 44 percent of tracer commodities between the established minimum and maximum stock levels of 3 and 18 months. With 55 percent of the tracer commodities below the three month minimum there is a high risk of potential stock out.

District Pharmacies- Due to low order fill rate by CAMEBU, district pharmacies place a significant number of orders with the private sector accounting for about 40 percent of the quantity ordered.

Likely because of this dual supplier system, stock levels are relatively sufficient at this level of the supply chain with 71 percent of tracer commodities with 2 or more months of stock on hand on average. Stock availability is further illustrated by 80 percent of district pharmacies with 67 percent (6 of 9) order fill rate to health facilities.[3]

Health Facilities- Basic inventory management infrastructure and processes are in place with 78 percent of facilities visited scoring above 40 percent capability.[4] Success at inventory management is illustrated in a stock accuracy of 71% for tracer commodities, with quantities on stock cards matching physical inventory. Despite these successes, stock levels at the health facility level remain low with 31 percent of tracer commodities with less than 1.5 months of stock on hand indicating risk of stock outs.

Recommendations

CAMEBU should consider:

- Ensuring staff are trained on new operational processes (including SOPs). This training should be provided in a formal training setting and re-enforced through on-the-job training over the longer term. Continued education on and support of these changes will be required to ensure that these new, best practice processes are institutionalized.

Supply chain stakeholders should consider implementing stock levels:

- Strong supply chains rely on access to key stock status data, which is transmitted through the LMIS system. This information is used to actively manage core supply chain functions that ensure product availability. Stakeholders should routinely analyze data to inform sufficient order quantities to better maintain adequate stock levels across all levels of the supply chain. These stock levels should be set by the Ministry of Public Health and Fight Against AIDS, establishing standard minimum and maximum months of stock on hand.

Transportation

Results

Currently transportation of products is arranged on an ad hoc basis, highlighting the lack of transportation capability. CAMEBU and district pharmacies do not have the required fleet infrastructure to meet the potential transportation needs of their clients, leading to receiving facilities to collect product from their supplying facility with available transportation ranging from bicycles to pick-up trucks.

Recommendations

In the long term, CAMEBU should consider

- Conducting a study to determine the feasibility and best option for implementing an active distribution system between CAMEBU and district pharmacies. Options could include establishment of a transportation system owned and managed by CAMEBU or contract management of an outsourced third party logistics provider (3PL).

[3] Sample for order fill rate between district pharmacies and health facilities was calculated on a limited sample of orders to ensure feasibility of data collection.
[4] Maximum score possible at the health facility level for capability is 60 percent.

Waste management

Results

With the exception of separation, accountability and destruction of products expired at CAMEBU, waste management infrastructure and processes are not in place across the health supply chain in Burundi. Although many facilities identify and separate unusable products (41 percent), the lack of reverse logistics system for transport of product to facilities with destruction capabilities potentially leads to high volumes of unusable products being stored at each level of the supply chain.

Recommendations

CAMEBU and other supply chain stakeholders should consider:

- Evaluating and design a waste management system for pharmaceutical and consumable waste. This should include identifying, managing, transporting, treating and disposing of this waste based on best-practice requirements

1.0 Background

1.1 Burundi health system

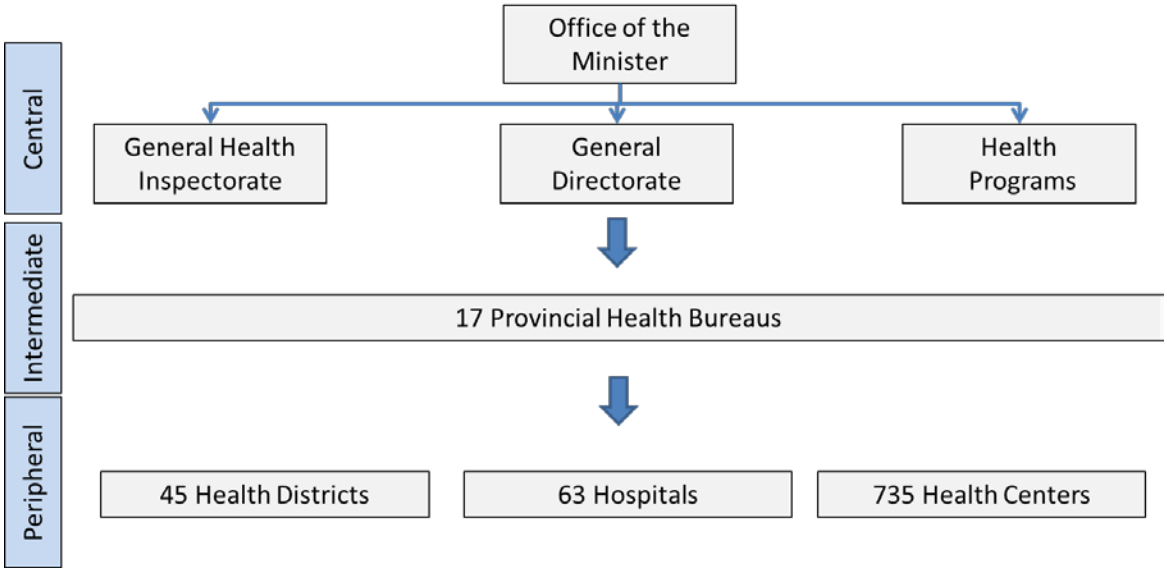
The Burundi health system aims to "contribute to improving the health condition of the population, not only because it is a human right, but also to allow the recovery of the economy and a decrease in poverty, maintaining human capital in good health."[5]

The Ministry of Public Health and Fight Against AIDS outlines three core objectives for the health sector in the National Health Development Plan II 2011–2015, including to contribute to reducing:

1. Morbidity-mortality related to communicable and non-communicable diseases through 2015
2. Maternal and neonatal mortality through 2015
3. Mortality of children less than five years of age through 2015[6]

Burundi's health system includes three levels: central, intermediate and peripheral, as shown in Figure 3.

Figure 3. Health sector map



Priority diseases in Burundi

HIV/AIDS

According to the United Nations Development Program's 2012 Millennium Development Goals Report, Burundi ranks among the countries most affected by HIV/AIDS in eastern and central Africa. Burundi faces a generalized HIV/AIDS epidemic that continues to be a priority public health threat. The 2010 demographic and health survey indicates that the rate of HIV prevalence in the population aged 15–49 is 1.4 percent.

[5] National Health Development Plan II 2011–2015, page 10.
[6] National Health Development Plan II 2011–2015, page 10.

Among women aged 15–49, the rate was estimated at 1.7 percent and is higher than that of men in the same age group (1.0 percent). This results in an infection ratio between women and men of 1.7. Moreover, the prevalence of HIV infection was 1.8 percent among men aged 50–59 years, giving a prevalence of 1.1 percent for men aged 15–59. Significant progress has been made in preventing and treating HIV/AIDS with positive effects in reducing seroprevalence and mortality.

Despite this progress, additional efforts are needed to deal with the potential increased prevalence of the disease in rural areas, where over 90 percent of the population live. These efforts are designed to increase the coverage of key interventions contained in the 2012–16 national strategic plan to combat HIV/AIDS.

Burundi's HIV/AIDS program is implemented under the leadership of the National Council against AIDS. The national response to AIDS started in 2002, guided by a strategic plan and five-year operational plans. Since 2002, Burundi has drafted three national HIV strategic plans (NSPs) with the objective of defining clear priorities to guide donor interventions. The most recent NSP 2012–16 sets objectives for prevention, treatment, care and support in light of the current financial environment. NSP implementation is supported by the active contribution of the Global Fund and PEPFAR, and to a lesser extent by international nongovernmental organizations (NGOs), United Nations and bilateral donor cooperation.

The PEPFAR program in Burundi aims to reduce new infections, disease impact, morbidity and mortality due to HIV through an efficient, coordinated response. The program applies the comprehensive approach model, which includes prevention services, prevention of mother-to-child transmission, health systems strengthening, orphans and vulnerable children and care and treatment of HIV/AIDS.

Malaria

Malaria accounts for 74.7 percent of all external consultations recorded in 2010 and 62.6 percent among children under five. Data available for the 2000–10 period shows fluctuating trends in the number of cases of malaria due to a combination of factors, such as improvements to the reporting system as well as an increase in health care service utilization after free health care was introduced for children under five (2006) and first-line antimalaria drugs for all patient categories.

Burundi's malaria control strategy has included malaria prevention by using insecticide-treated nets and indoor residual spraying; improvement in accessibility to effective antimalarial medicines; and early detection and control of epidemics. However, the country's pharmaceutical management system shows weaknesses, access to health services is poor, and accurate laboratory diagnostic capabilities are lacking. Thus, ensuring prompt, effective and safe rapid diagnostic tests and artemisinin-based combination therapy treatment to patients with diagnosed and confirmed malaria continues to be one of the greatest challenges for the national malaria control program, Programme National Integre de Lutte Contre le Paludisme (PNILP).

Tuberculosis

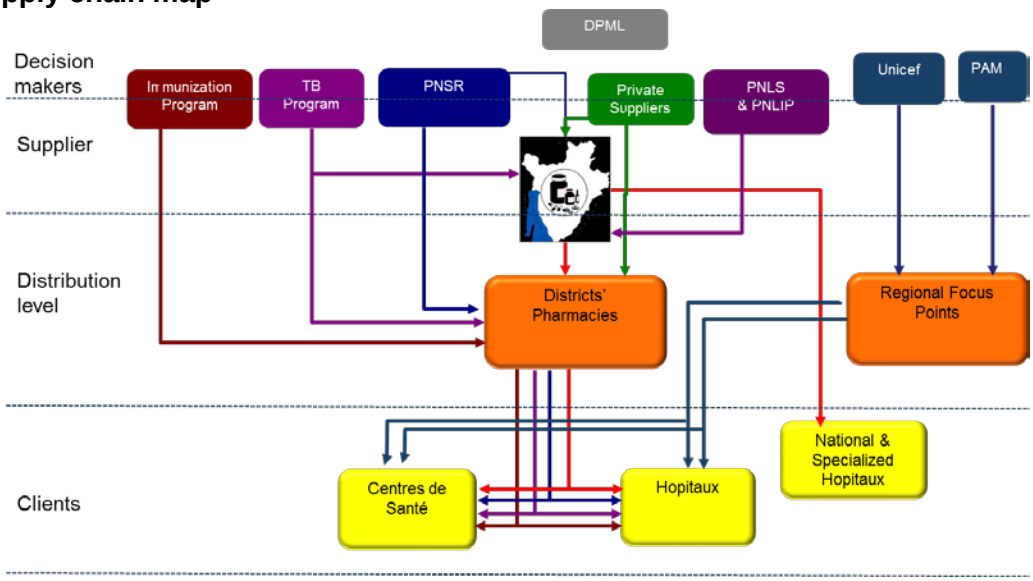
Tuberculosis (TB) is an endemic epidemic. Its prevalence in Burundi in 2010 was 162 cases per 100,000 inhabitants. These figures are below the actual figures because the detection rate for 2011 was 47 percent, far below the World Health Organization (WHO) target of 70 percent (Programme National Integre de Lutte Contre la Tuberculose (PNILT) report, 2011). Tuberculosis mainly affects the age bracket of the productive population aged 15–44, impeding the fight against poverty and development in general.

1.2 Burundi's health supply chain

Burundi's health supply chain is a complex series of supply chains to ensure availability of products for priority disease areas as well as essential medicines. The system has three tiers with a central level passing products through district pharmacies at the intermediate level, which is responsible for providing health products to patient-serving facilities (hospitals and health centers).

Burundi's supply chain is partially integrated. Some parallel vertical supply chains are in place for specific programs (see Figure 4).

Figure 4. Supply chain map



Policy and oversight

Overseeing the supply chain is Direction de la Pharmacie, du Médicament et des Laboratoires (DPML). This organization guides policy making for the supply chain, including standard treatment guidelines and the national essential medicines list.

Included in the decision-making processes are a series of key programs, also responsible for supplying priority disease products, including:

- Programme National Integre de Lutte Contre le Paludisme (PNILP)
- Programme National Integre de Lutte Contre la Tuberculose (PNILT)
- Programme National de Lutte Contre Sida (PNLS)
- Programme National de Sante de la Reproduction (PNSR)

Quantification and procurement

Quantification and procurement are managed by individual vertical programs (HIV, TB, Malaria) and Central

d'achat de medicaments essentiels de dispotifs medicaux, de produits et materiels de laboratoire du Burundi (CAMEBU) for essential medicines. Technical support is provided to some areas by donors such as the Supply Chain Management System (SCMS) and Systems for Improved Access to Pharmaceuticals (SIAPS).

Warehousing and inventory management

Storage is partially integrated. Most programs use CAMEBU as their primary storage site, including PEPFAR, PNILP, PNILT, PNLS, United Nations High Commissioner for Refugees and PNSR. The United Nations Children's Fund, PAM and some Population Services International programs are exceptions, managing their own warehouses and vertical supply chains. Products pass from CAMEBU through the 45 district pharmacies before being collected by patient treatment facilities (health centers and hospitals).

1.3 Supply chain assessment and baseline

Technical assistance to the national health supply chain in Burundi began in 2010 for SIAPS and 2012 for SCMS:

- SIAPS builds on the work carried out by its predecessor, Strengthening Pharmaceutical Systems (SPS) Program, to ensure that pharmaceutical-sector governance is strengthened, capacity for decision-making challenges in the pharmaceutical sector are addressed, and pharmaceutical services are improved to achieve desired health outcomes. SIAPS Burundi focuses on strengthening PNILP's organizational and management capacity to develop policies and strategies for malaria control and pharmaceutical management. The program also works to improve patient safety and rational use of malaria products.
- SCMS operations in Burundi started in 2012 with a clear mandate of providing supply chain services to programs supported by the President's Emergency Plan for AIDS Relief (PEPFAR). SCMS in Burundi manages procurement and provides system strengthening support services to eight provinces supported by PEPFAR and the national HIV/AIDS program. The scope of SCMS activities under the period review includes quantification and supply planning, procurement, warehousing of health products, infrastructural and technical support to the central medical warehouse (CAMEBU), logistics management information system (LMIS) system implementation, and national laboratory policy development and supply chain facilitation and development.

As these programs increase their support of the supply chain, the decision was made to conduct a baseline assessment of supply chain performance at all system levels. This assessment serves as a baseline for the HIV/AIDS and malaria programs supported by these projects. It also provides comprehensive results for the capability and performance of the entire supply chain, including all program products and essential medicines providing the required data for all stakeholders, including the government of Burundi.

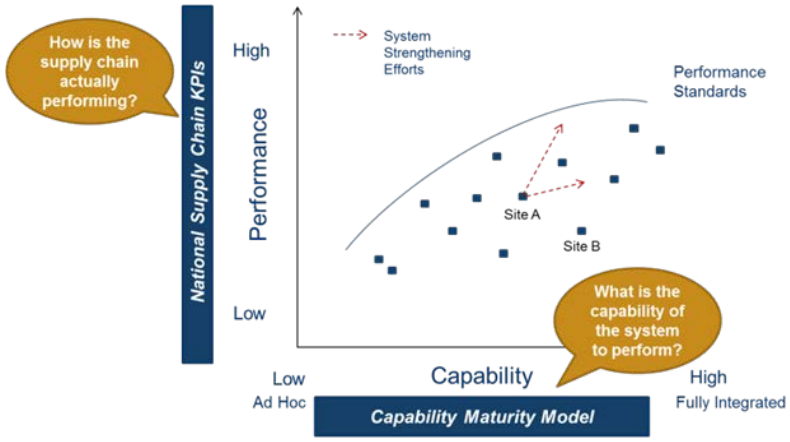
In the report that follows, baseline assessment results are outlined for the supply chain's key functional areas, from product selection to waste management. Recommendations for improvement are provided for consideration by Burundi's key stakeholders.

2.0 Methodology

2.1 The National Supply Chain Assessment toolkit

The National Supply Chain Assessment (NSCA) is a comprehensive toolkit developed collaboratively by SCMS, USAID|DELIVER and SIAPS. The kit provides tools for assessing the capability and performance of supply chain functions at all levels of a health supply chain. Assessment results help supply chain managers and implementing partners develop their strategic and operational plans and monitor whether activities are achieving their expected outcomes (see Figure 5).

Figure 5. Supply chain capability and performance assessment



The assessment includes two tools:

- **Capability maturity model (CMM) diagnostic tool:** a diagnostic tool that assesses the capability maturity of a supply chain
- **Supply chain key performance indicator (KPI) assessment:** a set of indicators that comprehensively measure performance of stock availability, product selection, quantification, procurement and warehousing and inventory management

2.2 Assessment methodology and scope

The assessment used a stratified, cluster sample[7] of 136 of 686 publicly supported facilities in Burundi (see Table 2). First, the cluster was chosen by randomly selecting 15 of the country's 45 districts. This methodology was chosen to ensure geographic feasibility of data collection by limiting the sample's geographic spread. Within this cluster, a stratified sample of 136 facilities was chosen randomly. The sample was stratified by supply chain level to ensure that the final sample was representative of facility volume at each specific level of the supply chain. Additional facilities were added to augment the sample, particularly at the intermediary level (district pharmay). These facilities were selected by taking the next facilities of their type on the randomized list used to select the sample.

Table 2. Sampling stratification

	Total no. of facilities	Percent of facilities	Random sample size	Additional facilities	Total sample size
CAMEBU	1	0%	0	1	1
Pharmacie de District	45	7%	9	6	15
L'hopital	38	5%	7	3	10
Centre de Sante	602	88%	110	0	110
Grand total	686		126	10	136

From the original sample, teams were unable to reach 3 of the 136 chosen sites due to road infrastructure challenges and missing personnel at facilities, leaving the final sample size at 133 sites.

The assessment was applied at each level of Burundi's supply chain, including CAMEBU, les pharmacie de district and Formation Sanitaire (FOSA) (centre de santé et l'hopital). Data collected varied at each supply chain level; details are provided in sections 2.4, CMM tool and 2.5, KPI tool.

2.3 Data collection

Data was collected by 30 data collectors at the 133 sites across all supply chain levels.

At each site the data collection team undertook three exercises:

- Interviewed relevant personnel using the CMM questionnaire(s). Interview results were verified by directly observing the relevant supply chain space, such as a storeroom or warehouse.

[7] A cluster sample indicates that a portion of the sample population, in these case districts, was randomly chosen to geographically limit the sample to ensure feasibility of data collection in the allotted time period with available resources. Within this cluster, the sample was stratified to represent the number of facilities by type across the supply chain as illustrated in *Table 2 Sample Stratification*

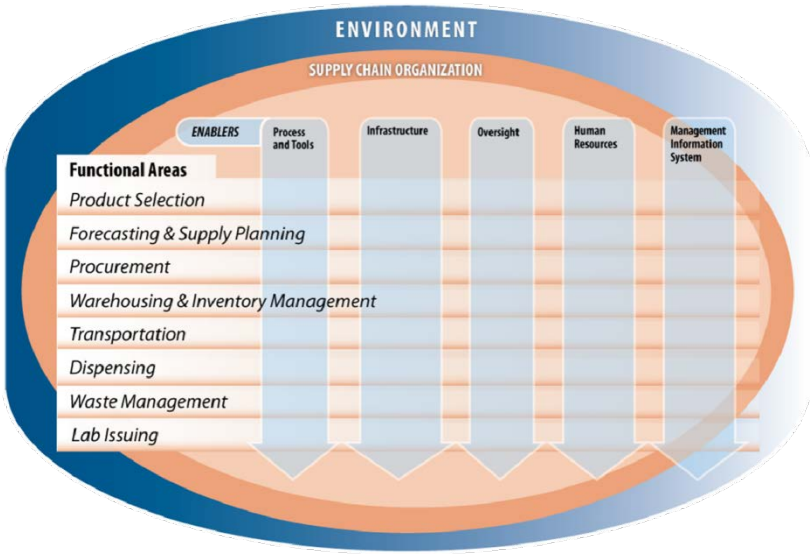
- Conducted interviews with patients and dispensary staff to collect data on dispensing case management indicators.
- Collected relevant KPI data from appropriate paper and electronic sources.

Details of specific sources used for each KPI can be found in Table 5.

2.4 CMM tool

The CMM tool covers the supply chain's key functional areas. It also measures key "enablers" (Figure 6) that impact all supply chain functions. For each functional area, scores are assigned for each capability. They are aggregated to understand the functional area as a whole as well as the enabling elements impacting the functional areas, which include processes and tools, infrastructure, oversight, human resources and management information system (MIS).

Figure 6. Functional areas and enablers covered by the CMM tool



An overall maturity scale guides the definitions within the CMM tool, broadly describing each capability level (1–5) (see Figure 7). For each specific capability, defined components at each level of the capability maturity scale represent these broadly defined levels. For example, minimal capability (1) for the warehouse process of checking is that *"orders are not checked to ensure correct items are picked"* and best-practice capability (5) is *"dispatch weighs product to validate weight of carton is in range of items confirmed as picked."*

These levels were adapted from private-sector best-practice capability maturity models used to assess commercial supply chains.

Figure 7. Maturity-level descriptions

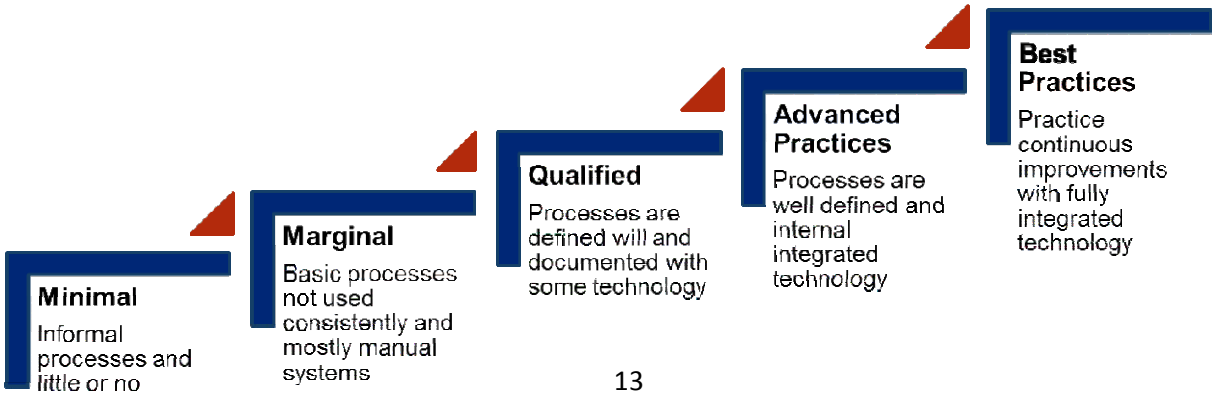


Figure 8 illustrates an example of a capability with a specific maturity scale where components of capability are defined at each level (1–5).

Figure 8. Specific capability from the CMM tool

Level: Central Warehouse
Functional Area: Warehouse and Inventory Management
Enabler: Infrastructure
Capability: Building and power

□ Warehouse has a roof and floor for storing product □ There is no power	□ Warehouse has a level floor with some semblance of storage and staging areas □ There is intermittent power	□ Warehouse has a separate receiving and dispatch area □ Regular power	□ Warehouse has designated operational areas □ There is a generator	□ The warehouse has a battery back-up for cross over time to the generator kicking in

In Burundi, the CMM tool was implemented at each supply chain level. Interviews were conducted for each supply chain function appropriate to that level. Table 3 highlights in green the functional areas implemented.

Table 3. CMM Implementation by level in Burundi

	CAMEBU	Pharmacie de District	Hopital	Centre de Sante
Product selection				
Forecasting and supply planning				
Procurement				
Warehousing and inventory management				
Transportation				
Waste management				

A CMM interview was conducted with relevant personnel at each facility. At the FOSA level (l'hopital et centre de santé), interviews were conducted with the health center manager and stock manager. At the central level, several key informant interviews were conducted with CAMEBU and DPML staff (see Table 4).

Table 4. Functional area implementation by level

Functional areas	Site
Product selection	DPML
Quantification	CAMEBU
Procurement	CAMEBU
Warehousing and inventory management	CAMEBU, Pharmacie de district (PD), Centre de sante (CDS)
Transportation	CAMEBU, PD
Waste management	CAMEBU, PD, CDS

2.5 KPI tool

At each site visit, data collection teams also collected data for several KPIs (see Table 5). Data sources were reviewed, and data was extracted and entered into an Excel spreadsheet.

Table 5. KPI list and data sources

No.	KPI	Data source(s)	Timeframe
1	Stock out rates (6 month average)- PD & FOSA level	Site visit	September 2013-February 2014
2	Stock out rates (day of visit)- PD & FOSA level	Site visit	Day of visit
3	Stock Accuracy PD & FOSA level	Site visit	Day of visit
4	Stocked according to plan (6 month average)- PD & FOSA level	Site visit	September 2013-February 2014
5	% of products passing quality testing	CAMEBU-Quality Unit	2013
6	% of procurement compliance with national essential medicines list	CAMEBU-SAGE SAARI/Archives Procurement records LNME	2013
7	% of products with 80% or better forecast accuracy	CAMEBU-Forecasts CAMEBU-SAGE SAARI data	2013
8	Supplier on-time delivery	CAMEBU-Procurement records	2013
9	% of product quantities procured under emergency orders	CAMEBU-Procurement records Approvisionnement	2013
10	Order fill rate	CAMEBU-Procurement records	2013
11	% Variance in international reference price	CAMEBU-Procurement records Management Sciences for Health (MSH) International Drug Price Indicator Guide	2013
12	Expiry (CAMEBU)	CAMEBU- Liste des medicaments perimes et abimes inventories et deturuits pour l'exercice 2013	2013
13	Stock Accuracy (CAMEBU)	CAMEBU-Stock cards	Day of visit
14	Stock out rate (CAMEBU)	CAMEBU-Stock cards CAMEBU-Physical inventory	September 2013-February 2014
15	Average percentage of orders placed as planned orders PD-CAMEBU	Delivery Notes Orders	September 2013-February 2014
16	Order fill rate (CAMEBU-PD)	Delivery Notes Orders	September 2013-February 2014

For several of the KPIs, a tracer product list was used to scope data collection (see Table 6).

Table 6. Tracer products

	Produits Traceur	
	Type de Produit	**Nom de Produit**
1.	ARV	Efavirenz-Lamivudine+Tenofovir Disoproxil Fumarate (600+300+300mg)
2.	ARV	Lamivudine+Zidovudine (150+300mg)
3.	ARV	Lopinavir-Ritonavir (200+50mg)
4.	ARV	Lamivudine+Zidovudine+Nevirapine (30+60+50mg)
5	ARV	Zidovudine (10mg/ml)
6	ARV	Nevirapine (10mg/ml)
7	HIV Rapid Test Kit	Determine HIV 1&2
8	HIV Rapid Test Kit	Statpak HIV 1&2
9	OI	Cotrimoxazole 960mg
10	OI	Cotrimoxaxole 240mg/5ml
11	Anti-Malarial	Artesunate+Amodiaquine 25/67.5mg
12	Anti-Malarial	Artesunate+Amodiaquine 50/135mg
13	Anti-Malarial	Artesunate+Amodiaquine 100/270mg/3 tabs
14	Anti-Malarial	Artesunate+Amodiaquine 100/270mg/6 tabs
15	Family Planning	Male Condoms
16	TB	Rifampicine 150mg
17	TB	Ethambutol 275mg
18	Maternal Child Health	Folic Acid 200mg
19	Essential Medicine	Amoxicilline 500 mg
20	Essential Medicine	Mebendazole 100mg
21	Essential Medicine	Paracetamol 500mg
22	Malaria Rapid Diagnostic Test	Paracheck

2.6 SIAPS data collection tool

Four facility-level SIAPS-specific indicators were included in this baseline survey. These indicators were selected based on the SIAPS Burundi mandate in-country. Indicator data was collected using three separate questionnaires.

SIAPS-specific indicators

1. *Percent of patients surveyed that know correct information about their medication*

The survey was designed to assess three aspects of a patient's knowledge of their medication, including name, frequency and dosage. Respondents were counted as having "knowledge" of their medication if they could answer all three questions below for each medication prescribed.

How **often** are you supposed to take this medication?
How **much** of this medication are you supposed to take each time you take it?
For **how long** are you supposed to take this medication?

These three markers for patient knowledge were chosen based on previous MSH research and studies conducted, including those done by the Strategy for Enhancing Access to Medicines (SEAM) Program.

Every third patient was randomly selected after consulting with the pharmacist at the facility. Each was read a standardized consent form, describing the purpose of the interview and ensuring the confidentiality of his/her statements. Patients were given the opportunity to ask questions and the option of abstaining from the survey without repercussion.

A total of 521 individuals were surveyed at 97 facilities. Interviews were not conducted at CAMEBU and the district pharmacies, because patients are not prescribed medication at these locations.

2. *Percent of health facilities implementing good dispensing standards for medicine dispensing*

For this baseline survey, facility dispensers were observed for compliance with good dispensing practices (GDP) in Burundi. Evaluated practices are shown in Table 7.

Table 7. Compliance with GDP

GDP in Burundi	
Action/item observed	**Dispensing process**
Labels on dispensed medication are clear and legible	Preparing label
Name of the medication is on the label	
Patient's name is on the medication label	
Instructions are included on the medication label	
Name and address of the health facility are on the medication label	
Date is on the medication label	
The dispenser identifies the patient at the time of dispensing	Issuing prescription to patient
The patient receives instructions on medication use	
Medication name is recorded during dispensing	Dispensing record-keeping
Date of dispensing is recorded during dispensing	
Dosage form and amount of the medication are recorded at time of dispensing	
Name and address of the patient are recorded at time of dispensing	
Name and address of the provider are recorded at time of dispensing	

These criteria were also chosen based on previous SEAM Program research. Using a random skip

pattern, every third patient, at each facility, data collectors observed a total of 802 dispensing interactions at 99 facilities. Dispensing practices were not observed at CAMEBU and the district pharmacies because dispensing to patients does not occur at these locations.

3. *Percent of facilities with available copy of current standard treatment guidelines (STGs) & Percent of prescriptions in compliance with STGs*

This survey specifically addressed adherence to treatment guidelines for malaria (SIAPS mandate). In total, 997 prescriptions were reviewed at 99 facilities. Data collectors used the information shown in Table 8 to evaluate randomly selected prescriptions.

Table 8. Malaria standard treatment guidelines for Burundi

	Name of medication	Dosage	Frequency	Duration of treatment
Simple malaria in adults	Artesunate+Amodiaquine 100/270mg	2 tablets	Once/day	3 days
Severe malaria in adults	Artesunate IV/IM	2.4 mg/kg	2 times on day 1; once a day until patient can take ASAQ	Undefined (the duration will depend on duration of IV treatment; but ASAQ will be taken for 3 days to complete the treatment)
	Quinine IV with IV fluid (glucose 5 or 10%)	Loading dose: 20mg/kg in IV slowly (4hrs), break of 4hrs Maintenance dose 10mg/kg	The loading dose is given once The maintenance dose 3 times a day (every 8 hours) until patient can take oral Quinine or ASAQ	Total of 7 days including IV treatment, oral Quinine is used as a complement If ASAQ is used, the duration will depend on duration of the IV treatment
Simple malaria in children (2-11 months)	Artesunate+Amodiaquine 25/67.5mg	1 tablet	Once/day	3 days
Simple malaria in children (1-5 years)	Artesunate+Amodiaquine 50/135mg	1 tablet	Once/day	3 days
Simple malaria in children (6-13 years)	Artesunate+Amodiaquine 100/270mg	1 tablet	Once/day	3 days
Severe malaria in children	Artesunate IV/IM	2.4 mg/kg	2 times on day 1; once a day until patient can take ASAQ	Undefined (the duration will depend on duration of IV treatment; but ASAQ will be taken for 3 days to complete the treatment)
	Quinine IV with IV fluid (glucose 5 or 10%)	Loading dose: 20mg/kg in IV slowly (4hrs), break of 4 h Maintenance dose 10mg/kg	The loading dose is given once The maintenance dose 3 times a day (every 8 hours) until patient can take oral Quinine or ASAQ	Total of 7 days including IV treatment if oral Quinine is used as a complement If ASAQ is used, the duration will depend on duration of the IV treatment
Malaria in pregnant women	Quinine 500mg	1 tablet Quinine	3 times/day	7 days

3.0 Data Analysis and Results

Analysis was completed in Microsoft Excel and Microsoft Access. For the purpose of presenting results, all CMM scores are converted to a 0–100 percent scale rather than a 1–5 scale.

1 = 20%

2 = 40%

3 = 60%

4 = 80%

5 = 100%

3.1 Product selection

Product selection includes two key supply chain elements: supply chain policies and product quality testing.

Product Selection Capability

Overall capacity for product selection in Burundi is low. As shown in Figure 9, oversight and processes and tools scored at a minimal level. Table 9 indicates specific challenges in product selection.

Figure 9. Product selection capability

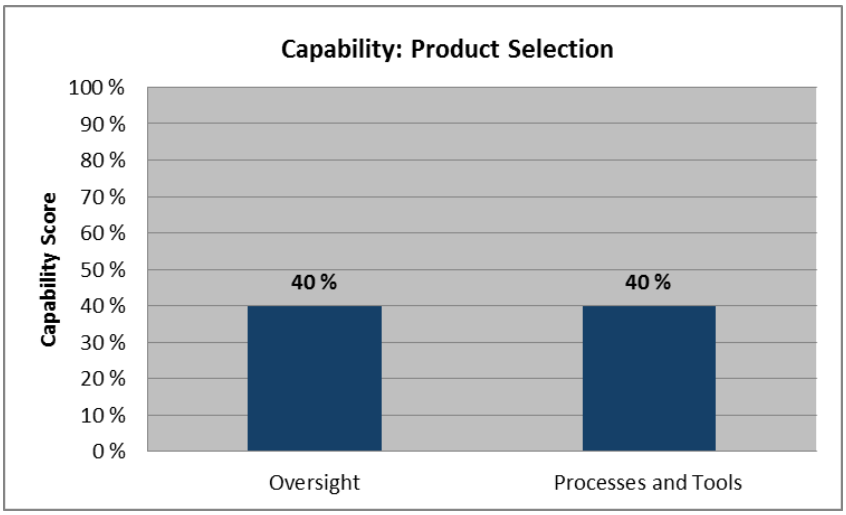


Table 9. Capability challenges, product selection

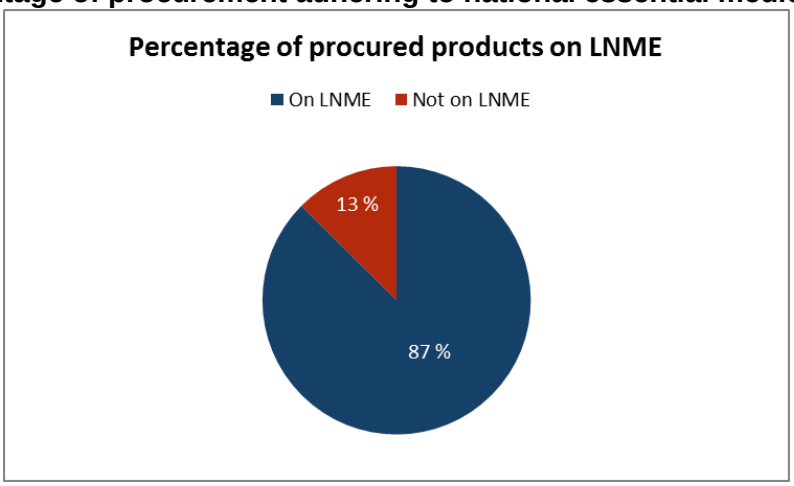
Capability	Key capabilities	Score
Standard treatment guidelines	Although some programs, such as malaria and HIV, have standard treatment guidelines, comprehensive STGs are not in place for all prevalent diseases in Burundi.	20%

National essential medicines list	The Liste National des Medicaments Essential (LMNE) is updated every two years. CAMEBU uses this document as the basis for its procurement decisions.	60%

Product Selection Performance

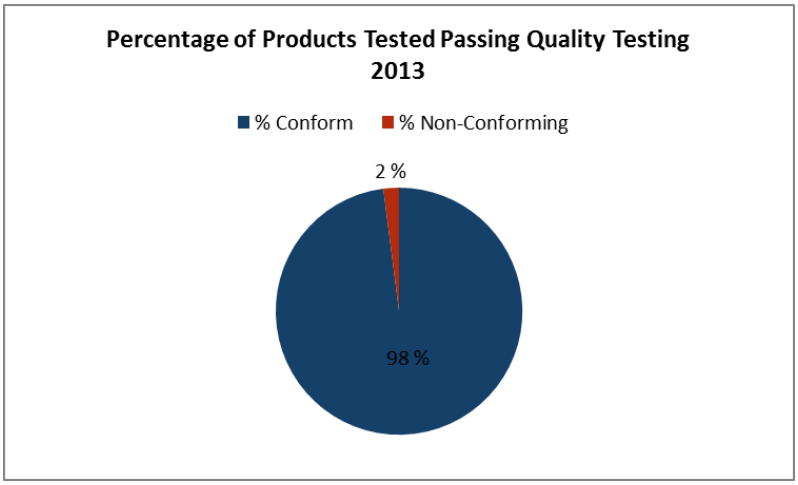
One strength of product selection in Burundi is the regular update and use of the LNME. Of the two major tenders placed in 2013, 87 percent of the products procured were on the LNME (see Figure 10). Of the 231 line items procured, only 29 could not be found on the LNME. Of these 29 line items, 82 percent were consumables. Overall, this illustrates that product selection for essential medicines procurement by CAMEBU largely complies with the essential medicines policy established by the DPML.

Figure 10. Percentage of procurement adhering to national essential medicines list



Another measure of product selection performance is the quality of products selected/procured. CAMEBU sends samples for testing at Institut National de Sante Publique (INSP) and international laboratories. In 2013, only one of the 49 samples tested failed to conform to quality standards (Erythromycine cé 250mg supplied by Anm life science of India) (see Figure 11). Of the 49 samples tested, 80 percent were conducted at the local laboratory, INSP.

Figure 11. Percentage of products tested that conform to quality standards



Recommendations

For DPML and relevant stakeholders:

- Develop comprehensive standard treatment guidelines for all primary medicine and priority diseases for Burundi. These guidelines will provide dispensing pharmacists and nurses at the hospitals and health facilities the information required to make sure patients are receiving the correct medicines.

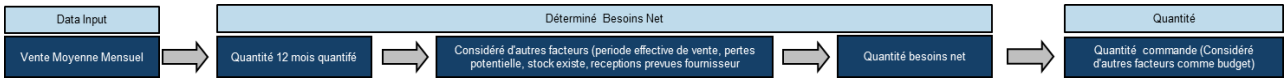
3.2 Quantification

Forecasting and supply planning are key elements of ensuring product availability within the supply chain. Forecasts are used to determine supply, informing procurement decisions and ultimately ensuring consistent product availability within a supply chain.

Within Burundi's supply chain, forecasting and supply planning are conducted by various stakeholders, depending on the product group.

The CAMEBU procurement division conducts essential medicine forecasts. Using sales data from the previous year, CAMEBU calculates average monthly sales of each essential medicine. After considering existing stocks and potential losses, the required quantity is determined taking into account the factors shown in Table 10.

Table 10. Essential medicines procurement processes



Statistiques Articles														12	mois à couvri	3	mois sécurité	
					12.00	nb mois statistiques vente (année 2012)								12	Délai liv.			
														10%	augm. Vente			
Code Article	Nom	Vente (12 mois)	Stock 31 dec 2012	PR unité	VMM	Période effective de vent	VMM corrigée	Pertes potentielles (pér à 6 mois)	Stock "utile" *(hors Rel. Fourn.)*	nb mois stock	alerte R/S (< 3 mois)	alerte surstock (> 18 mo	Besoin brut	Réceptions Fournisseurs prévues	Besoin net	Décision de commande	Montant commande
ORAAAS	Acide acétylsalicylique, 500mg, cès	2,000,000	2,355,000	5	166,666.67	12.0	166,666.67	1,724,000	631,000	3.8			4,700,000	2,912,000	1,157,000	1,000,000	5,000,000.00
ORAALB	Albendazole, sirop, 400mg/10ml, flacon	62,878	1,595	169	5,239.83	10.0	6,287.80		1,595	0.3	!! R/S		177,316	100,000	75,721	50,000	8,450,000.00
ORAAMI	Aminophylline, 100mg, cès	718,840	601,800	10	59,903.33	10.0	71,884.00		601,800	8.4			2,027,129	1,750,000	0	0	0.00
ORAAMO	Amoxycilline, 500 mg,gélule	12,887,790	11,540,960	54	1,073,982.50	10	1,288,779.00		11,540,960	9.0			36,343,568	8,500,000	16,302,608	16,500,000	891,000,000.00
ORAAMO	Amoxycilline, poudre pour suspension buvable, 250mg/5ml, flac	600,486	103,185	486	50,040.50	10.0	60,048.60		103,185	1.7	!! R/S		1,693,371	400,000	1,190,186	1,200,000	583,200,000.00

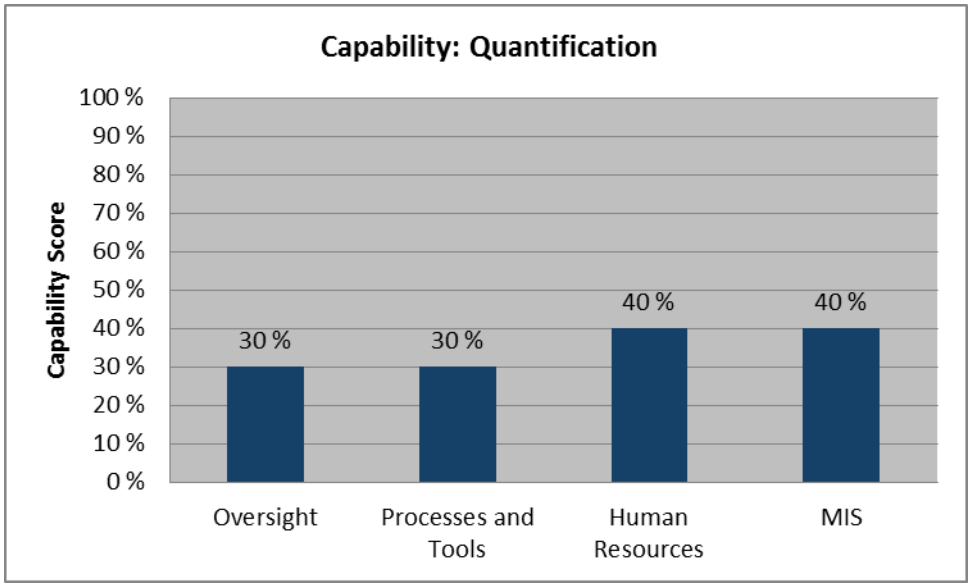
Needs are then costed and submitted for approval. The budget allotted to CAMEBU often informs the alterations made to the final decision of quantity to order. These final forecasted quantities are translated into procurement tenders.[8]

Quantification Capability

Overall, CAMEBU's quantification capability is limited, with an overall score of 33 percent. CAMEBU uses the limited resources available to forecast product demand, but limited budgets and the lack of available data lead to a reduced capability to undertake quantification and supply planning. Quantification capability by enabler is shown in Figure 12.

[8] Data collection and interviews were conducted only for the essential medicines quantification process at CAMEBU. All results that follow only reflect this capability or performance.

Figure 12. Quantification capability by enabler



Essential medicines forecasting and supply planning in Burundi face four major challenges, as described in Table 11.

Table 11. Challenges in quantification

Capability	Quantification challenges	Score
Methodologies and assumptions	The current forecasting methodology, while considering many important best-practice factors, has some challenges. In addition to quantifying for the 12-month period and three months of buffer stock, the forecast also accounts for a 12-month delivery delay and potential 10 percent augmentation of sales. This essentially is the equivalent of quantifying for 30 months in each annual forecasting process.	20%
Forecasting data quality	Accurate forecasting relies on accurate data. Currently, the only data available to CAMEBU to use in its consumption-based methodology is sales data from CAMEBU to the district level. This proxy data does not reflect the actual needs of the district pharmacies, which CAMEBU is currently filling at only 36 percent order fill rate.	20%
Financing	Budget constraints also impact the translation of the forecast into procurement orders. Although many critical elements are considered when determining the quantity required in this process, ultimately, the budget is fixed by stakeholders outside of CAMEBU. They adjust the quantity ordered according to these limitations.	20%

Supply planning	Although no official supply planning process is in place, orders for high- volume products are often spaced out across two to four orders and agreed upon with the vendor when orders are placed. Bulk product quantity is divided out over these orders to arrive every four months as specified by CAMEBU.	40%

Quantification Performance

The capacity challenges for forecasting and supply planning are also evident in the performance of the 2013 forecast. The quantity forecasted was compared with the quantity sold (SAGE SAARI report), revealing significant variance for many products. Only 5 percent of products had a forecast accuracy of higher than 80 percent. A look at the top 20 products (by sales quantity) finds that 20 percent of the products were under quantified. The remaining 16 products were over quantified, with a percentage error ranging from 100 percent to 1,240 percent (see Table 12).[9]

Table 12. Percentage difference between forecasted and purchased quantities of essential medicines

Product	Quantified Consumption	Actual CAMEBU Sales	Variance in Unit Quantity	Percentage Error	Forecast Accuracy
Paracétamol, 500mg, cès	71,208,807	24,413,000	46,795,807	192%	0%[10]
Amoxycilline, 500 mg,gélule	36,343,568	18,168,400	18,175,168	100%	0%
Metronidazole, 250mg, cès	41,533,216	16,719,000	24,814,216	148%	0%
Sulfaméthoxazole/Triméthoprime, 400/80mg, cès	35,372,200	13,984,650	21,387,550	153%	0%
Phenoxymethyl penicilline, 250mg, cès	17,864,700	11,834,000	6,030,700	51%	49%
Hydroxyde aluminium/trisilicate magnesium, 125+250mg, cès	12,552,173	6,189,600	6,362,573	103%	0%
Mebendazole, 100mg, cès	35,996,595	6,100,000	29,896,595	490%	0%
Ibuprofène, 400mg, cès	29,421,530	5,785,000	23,636,530	409%	0%
Ibuprofène, 200mg, cès	15,018,850	4,236,000	10,782,850	255%	0%
Quinine, 100mg, cès	11,895,700	4,005,000	7,890,700	197%	0%
Sulfaméthoxazole/Triméthoprime, 100/20mg, cès	29,414,950	3,993,900	25,421,050	636%	0%

[9] In Table 12, forecast accuracy is listed as 0% for all numbers below 0% or above 100%.
[10] NB All variances above 100% are translated to 0% forecast accuracy.

Paracétamol, 100mg, cès	50,062,050	3,735,000	46,327,050	1,240%	0%
Hyocine butylbromide, 10mg, cès	10,324,960	3,733,000	6,591,960	177%	0%
Ciprofloxacine, 250mg, cès	1,717,850	3,604,000	1,886,150	52%	48%
Indométacine, 25mg, cès	6,688,100	3,531,700	3,156,400	89%	11%
Fer/acide folique, 200mg/0.5mg, ces	-	3,270,000	3,270,000	100%	0%
Ciprofloxacine, 500mg, cès	7,343,045	2,571,000	4,772,045	186%	0%
Chloramphénicol, 250mg, gélule	9,595,050	2,519,000	7,076,050	281%	0%
Quinine, 500mg, cès	9,884,335	2,342,000	7,542,335	322%	0%
Gant d'examen non steriles, latex, moyen, pièce	9,319,748	2,323,100	6,996,648	301%	0%

Recommendations

Short-term

For CAMEBU:

- **Replace sales data with consumption data from the paper based LMIS in the 2015 forecasting process and beyond.**[11] Consumption data will more accurately represent the quantity of products being consumed at the health facility level. With more accurate data, CAMEBU can improve its order fill rate and remove some of the fail-safes currently included in the forecasting methodology, such as the 12-month delivery delay.
- **Introduce into the quantification process a second forecasting method, such as the morbidity method, in addition to improving current consumption-based methodology.** By using several methods, CAMEBU can see a variety of estimates and determine its order quantity using multiple data points, potentially improving forecast accuracy.
- **Conduct an ABC analysis of essential medicines stored and distributed at the central medical store.**[12] With this analysis, CAMEBU can focus on high-throughput

[11] Sales data is the quantity of products sold to CAMEBU's clients. Consumption data is the quantity of product distributed to patients (or issued to the dispensary). Consumption data is preferred in forecasting as this is the closest point to the patient and most accurate reflection of product usage/demand.

[12] ABC analysis analyzes products managed at a warehouse to place them in three categories based on consumption or value. 'A' products typically account for the highest percentage of sales (around 70-80%), 'B' products have less sales but still account for a significant percentage of sales (15-25%) and 'C' products are products that are rarely sold and account for a limited proportion of sales (5-10%).

products for procurement if it faces budget constraints, better ensuring availability of these high-use products for clients.

Long-term

For CAMEBU:

- **Consider introducing long-term forecasting, which can be used as a funding advocacy tool with the Ministry of Finance and other stakeholders.** Even with an improved methodology and data quality for forecasting, CAMEBU will likely experience budget shortfalls. By understanding long-term needs, CAMEBU can provide its funders with price estimates, potentially increasing its budget and meeting more of its client demands.

- **Integrate supply planning into quantification exercises and consider placing orders at multiple points in the year to facilitate easier inventory management, if flexibility in procurement processes is increased.** Currently, ad hoc planning of order volume is undertaken with some high-volume products, but the current tendering system for procurement does not allow for regular supply planning and agile procurement.

- **Along with stakeholders in other areas, consider integrating quantification processes, particularly coordinated supply plans.** In its current state, CAMEBU serves as the warehouse for all essential medicines and most program products, although it does not participate in the planning process for these products. Integrated planning would improve stakeholders' ability to advocate for funding, enhance product availability and allow for better inventory management at CAMEBU.

3.3 Procurement

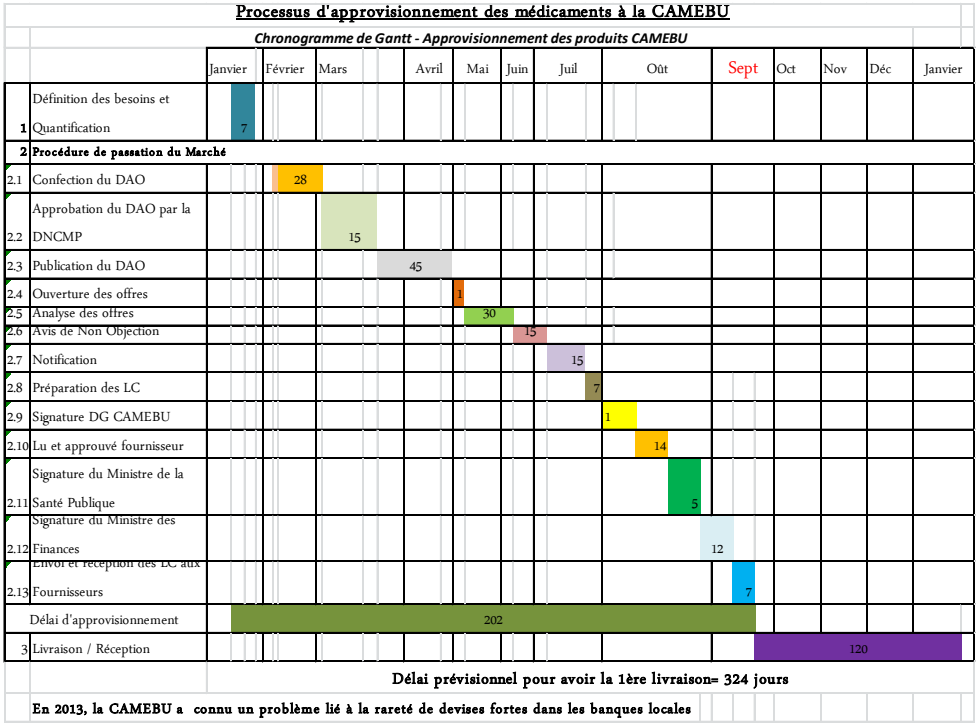
The procurement system in Burundi is not integrated. Programs and donors provide this service for many product categories such as HIV/AIDS, malaria and tuberculosis. The focus of this assessment was procurement conducted by CAMEBU, which includes all essential medicines and medical equipment and consumables.

Essential medicines procurement follows the regulations "Code des marchés publics du Burundi, LOI n° 1/01 du 4 Fevrier 2008," with all procurements placed under tenders. In 2013, CAMEBU performed two major tenders, including one planned tender and one unplanned tender to accommodate quick supply of product (within 15 days of order) for products that are stocked out or low in stock.

The procurement process immediately follows the quantification, with creating a tender document, and ends with placing orders with selected vendors.

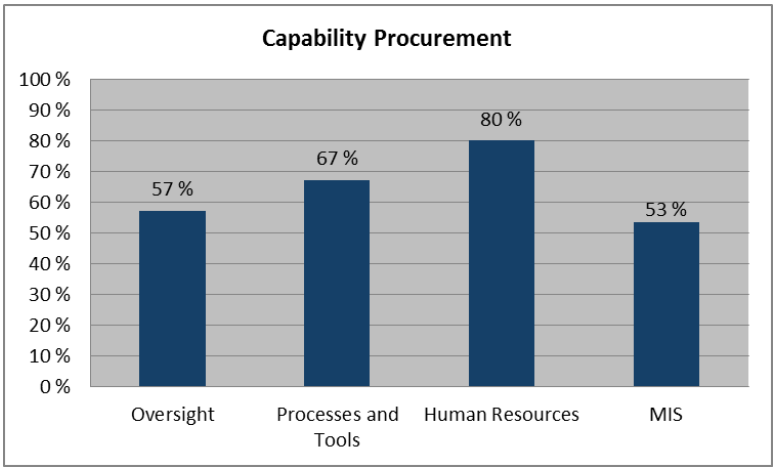
In 2013, this process took 202 days, highlighting the major challenge with procurement at CAMEBU. Key steps in the process are outlined in Table 13. After the 202-day procurement delay, there is an additional waiting period of 120 days before the first scheduled delivery.

Table 13. Schedule of procurement activities at CAMEBU for essential medicines



Although the process has some key delays and the potential for improving efficiencies is evident, procurement at CAMEBU scored well in capability and performance (see Figure 13).

Figure 13. Procurement capability by enabler



Tender evaluation

In 2013, 27 companies responded to the planned tender. Each underwent extensive evaluation of their responses in three key areas: administrative, technical and price.

1. **Administrative:** The administrative review evaluates whether the tender responses conform with criteria established in the tender, including packing of the tender and inclusion of the primary elements such as technical and financial dossiers. Table 14 provides a snapshot of administrative tender evaluation.

Table 14. Administrative tender evaluation snapshot

Présentation de l'offre Pièces du dossier	Offre n°1 : Fournisseur 1			Offre n°2 :Fournisseur 2		
	oui (C ou NC)	non	Rq	oui (C ou NC)	non	Rq
8 Enveloppe extérieure *(anonyme, scellée, avec mentions)*	**C**			**C**		
8Triple enveloppes intérieures *(Dossiers administratif & technique & financier)* *Chaque dossier comporte 1 original et 3 copies*	**C**			**C**		
8 Pièces Administratives *(1 original et 3 copies)*						
- Preuve de paiement du DAO	**C**			**C**		
- Garantie de soumission (Annexe 2)	**C**			**C**		
- Acte d'engagement (Annexe 4)	**C**			**C**		
- Copie d'Autorisation d'exercice	**C**			**C**		

2. **Technical:** The technical review evaluates dosage conformance, availability and quality of products (through sampling/testing records) and product manufacturer information. Table 15 offers a snapshot of technical tender evaluation.

Table 15. Technical tender evaluation snapshot

Produit	Cdte	Qtés Requises	Produit offert	Fiche Tech.		Conf Tech.	Echantillion			Fabricant	Lettre Agr Fab.	Pays d'origine	Conclusion
				Infos	Visa		Présent	Conf. Spécif. Tech.	Etiquette				
Spécifications Techniques	unités	unités	☺	O/N	O/N	C/NC	O/N	C/NC	C/NC	(nom)	O/N	(nom)	(A/R)
Poche à urine + valve de vidange+anti-retour 2l	100	24,000	☺	O	O	C	O	C	C	Fabricant A	O	CHINE	A
Bande platrée 15cmX3m	2	100,000	☺	O	O	C	O	C	C	Fabricant B	O	CHINE	A
Compresse de gaze stérile 10X10cm, 17 fils/cm² minimum	10	450,000	☺	O	O	C	O	C	C	Fabricant C	O	CHINE	A

3. **Price:** Price evaluation compares the unit prices each vendor provided, approved in the technical review to supply the product, including any potential fees, the final choice of vendor for the product and the amount in Burundian Francs (BIF) attributed for the product. Table 15 provides a snapshot of price tender evaluation.

Table 16. Price tender evaluation snapshot

Soumissionnaire	Items	Quantité	Prix U Réf.	Prix U CIP	Coeff	Prix U CIP	Choix	Montant
		AO	Dernier Prix achat Camebu (BIF)	Offert (BIF)	Redevance (0.5%)	Bonifié (BIF)	CA	Choix
Acide acétyl salicylique 500mg cp blister			5.00			prix		
Fournisseur 1		900,000		9.22	0.5%	9.17	X	8,297,100
Acide folique 5mg cp blister			3.00			prix		
Fournisseur 1		3,000,000		3.75	0.5%	3.73	X	11,250,300
Fournisseur 2		3,000,000		4.53		4.53		
Fournisseur 3		3,000,000		4.61		4.61		
Albendazole 400mgcp blister			74.00			prix		
Fournisseur 1		3,000,000		26.56		26.56	X	79,689,600
Fournisseur 2		3,000,000		30.31	0.5%	30.16		
Fournisseur 3		3,000,000		31.32		31.32		

Based on these evaluation components, awards are made to selected vendors, which include key terms of reference and anticipated delivery date(s).

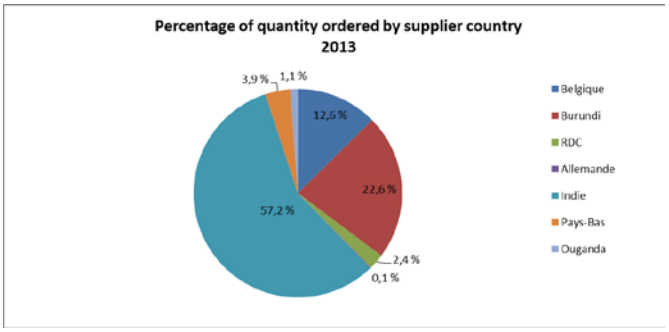
2013 Essential Medicines Procurement Performance

In 2013, vendor diversity was strong for CAMEBU's essential medicines orders, which used 16 vendors across seven countries (see Table 17) including local, regional and international companies. The highest quantity of products was ordered from vendors in India (57.2 percent) and Burundi (22.6 percent) (see Figure 14).

Table 17. Quantity procure by vendor country

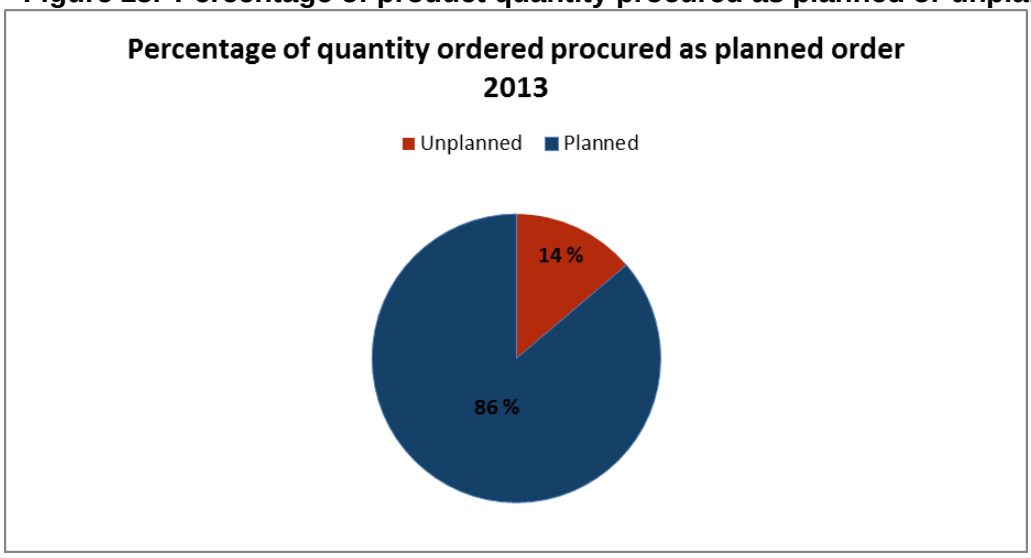
Supplier Country	Quantity Ordered
Belgium	47,241,900
Burundi	84,801,727
DRC	9,000,000
Germany	473,000
India	214,287,800
Netherlands	14,649,248
Uganda	4,300,000
Grand total	374,753,675

Figure 14. Quantity procured by vendor country, percentage



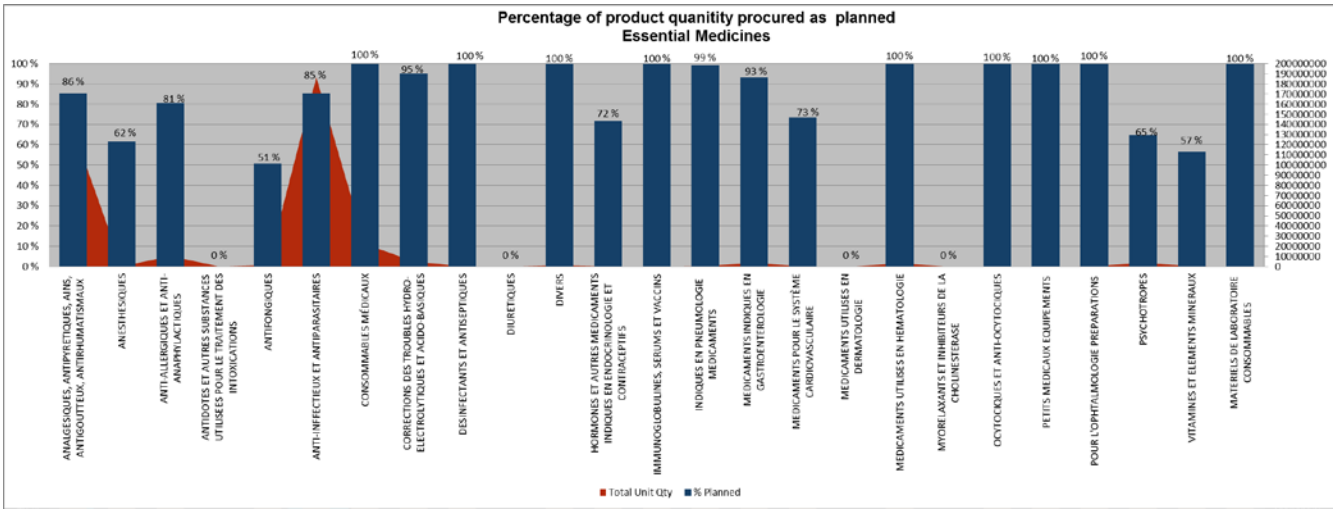
Two major tenders were placed for these quantities, one planned (DNCMP/231/F/2013) and the other unplanned (DNCMP/522/F/2013). Of the total unit quantity procured in 2013, 86 percent of these products were procured as a planned order, while the additional 14 percent were procured under the unplanned tender to accommodate for stockouts and stock shortages (see Figure 15).

Figure 15. Percentage of product quantity procured as planned or unplanned orders



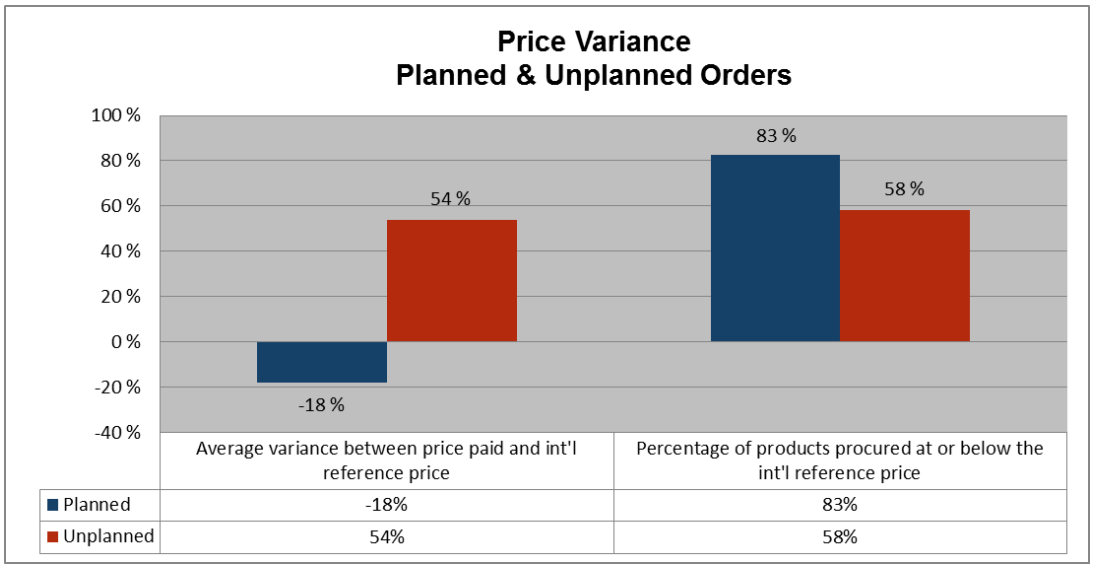
While most product types had relatively high volumes procured through the planned tender, several product types faced challenges in this area, including antidotes et autre substances utilisees pour la traitment des intoxications, Diuretiques, Medicaments utilizes en dermatologie, myorelaxants and inhibiteurs de la cholinesterase (see Figure 16). Although all of these areas place 0 percent of their orders as planned, they account for only 0.003 percent of the total quantity ordered for the year.

Figure 16. Percentage of product type procured as planned orders



Prices paid for product varied overall by only 8 percent above the international reference prices, indicating that CAMEBU obtains competitive pricing from its vendors. Although the overall prices secured by CAMEBU are competitive, when looking at the orders based on planned and unplanned procurements, price variances are distinctly higher for unplanned orders (see Figure 17). Unplanned orders were 54 percent above the reference price on average, while planned orders were 18 percent below the reference price on average (see Table 18). The number of product line items at or below reference prices also drops from 83 percent to 58 percent (see Figure 17).[13]

Figure 17. Variance between prices paid and international reference price for planned and unplanned orders



[13] Reference prices were from the MSH International Drug Price Indicator Guide, 2012 edition.

Table 18. Variance between prices paid and international reference price for planned and unplanned orders

	Total quantity	Average variance from Int'l reference price	Percent of line items at or below reference price
Planifee	**279,299,799**	**-18%**	**83%**
Non-Planifee	**24,917,598**	**54%**	**58%**
Overall	**304,217,397**	**8%**	**74%**

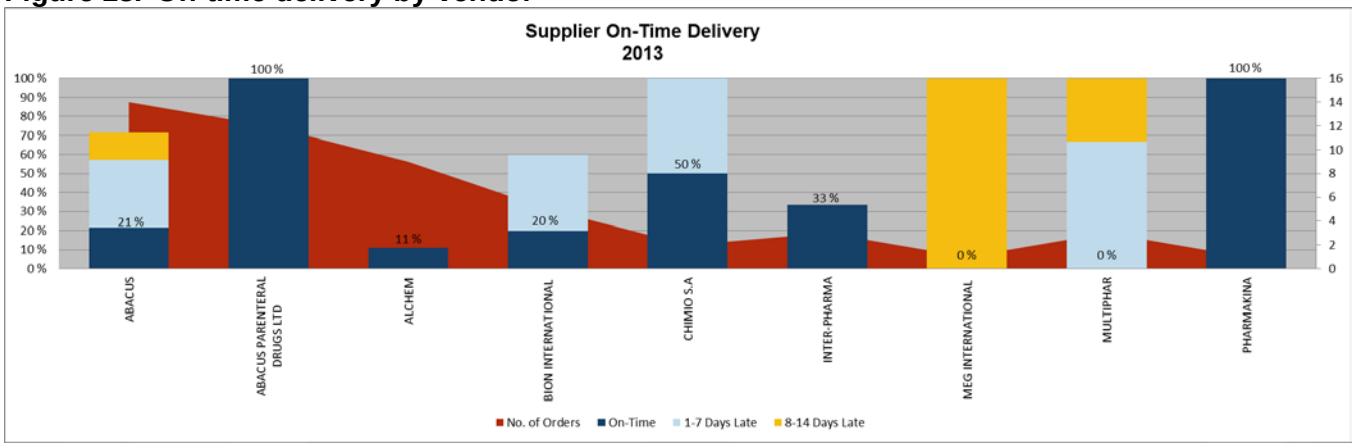
Vendor performance

In addition to assessing the performance of CAMEBU's procurement processes, two key metrics were analyzed for vendors: vendor on-time delivery and vendor fill rate.

Vendor on-time delivery

Vendor on-time delivery varied depending on the vendor, with the overall average at 68 percent in the year-to-date deliveries received by CAMEBU.[14] This performance provides a 14-day grace period from the intended delivery date. Figure 18 indicates the percentage of shipments arriving on time, within 1–7 days after the anticipated delivery date and within 8–14 days after the anticipated delivery date. Of the four vendors with performance below 80 percent, two are local wholesalers based in Burundi: Alchem and Inter-Pharma.

Figure 18. On-time delivery by vendor[15]



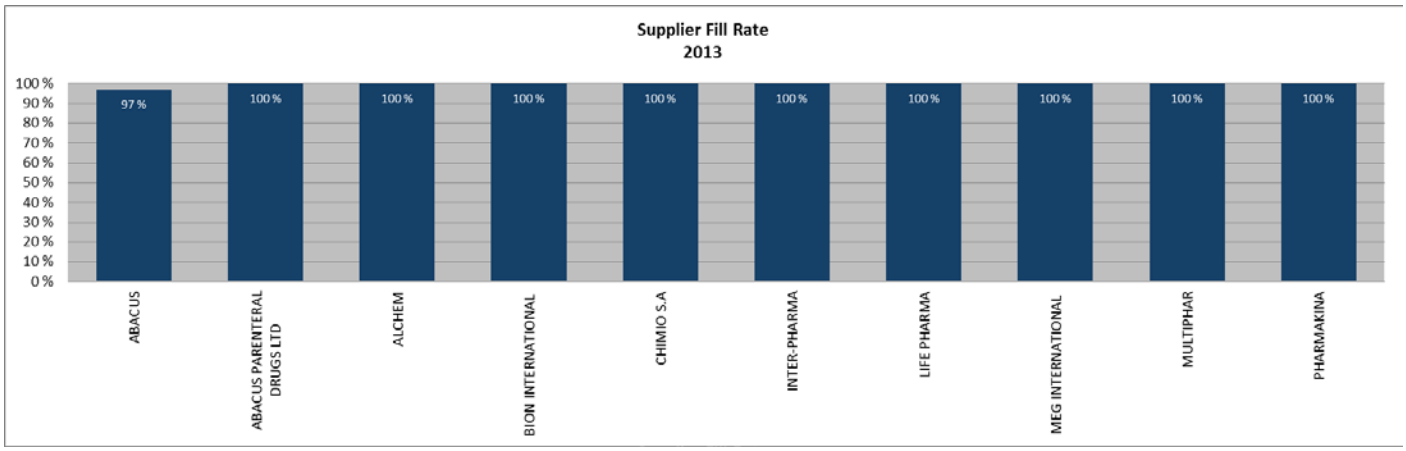
[14] Not all 2014 procurements have been received. Vendor performance analysis is based only on those shipments that arrived before March 31, 2014.

[15] At the time of the assessment, not all 2013 procurements were delivered. This indicator and vendor fill rate consider only those orders that are fully delivered as of March 2014.

Supplier fill rate

Suppliers had high fill rates (see Figure 19), fulfilling the order quantity exactly as requested over 97 percent of the time for each vendor. This fill rate indicates high performance in this important component of vendor relations.

Figure 19. Supplier fill rate, 2013



Recommendations

Overall, capability and performance for essential medicines in Burundi are strong. Recommendations for improving the process include the following.

For CAMEBU:

- **Identify potential efficiency improvements in the current procurement process to reduce the 202-day delay between tender creation and order placement.** The current process is well documented, illustrating several parts of the process that take 20 or more days. Conduct a detailed review of the procurement process to determine areas that can be shortened.
- **Consider implementing a vendor management program, routinely monitoring performance and communicating successes and challenges with vendors.** Although vendor fill rate is high, vendor on-time delivery remains a challenge, particularly for some local vendors. Introduce routine monitoring to provide incentives for improving vendor performance, ensuring that vendors provide accurate lead times and encouraging them to deliver on time. Incorporate past performance into the tender evaluation process, where poor or high performance levels are also contributing to future procurement decisions. Some key measurements to potentially include are:
    - Vendor on-time delivery
    - Vendor fill rate
    - Variance in forecasted lead time and actual lead time
- **Consider exploring the option of vendor prequalification with relevant in-country stakeholders, including the public market.** Currently, procurement regulations lack the flexibility for agile responses to fluctuating stock levels at CAMEBU. By prequalifying some

key local and regional vendors, CAMEBU could quickly alleviate stock shortage situations with prenegotiated prices. This program could reduce the time it takes to fulfill urgent supply needs and ensure good prices are attained for unplanned orders.

3.4 Warehousing and inventory management

CAMEBU

Capability at CAMEBU

Assessment of warehousing and inventory management capability at CAMEBU revealed an overall score of 42 percent, highlighting several challenges.

At the time of assessment, CAMEBU is in the process of overhauling its infrastructure and processes. Table 19 provides results and analysis of CAMEBU's current state, followed by an overview of the planned future state for warehousing and inventory management.

Table 19. Results and analysis of CAMEBU's current state

Capability	CAMEBU challenges	Score
Put Away	Products are arranged in specified depots based on product type and funder. Each depot was arranged using different methods. A few depots were arranged ad hoc, with products placed where space is available upon their receipt. Many products lacked adequate shelving.	20%
Expiration Management	Annual management of expired and unusable products is a well-documented process at CAMEBU. A commission oversees the count and valuation of all products to be destroyed. Day-to-day expiry management processes encounter more challenges. First expired, first out (FEFO) is not consistently adhered to, although expiry is entered into SAGE system.	20%
Temperature Control	The existing depots have limited, insufficient temperature control to accommodate Burundi's humid, high-temperature climate. Warehouses lack adequate air-conditioned facilities and adequate natural air flow.	20%
Storage Conditions & Capacity	Currently, warehouse capacity is insufficient for the volume of products required at CAMEBU. Additional transit warehouse space is rented to accommodate bulk and overflow of products that cannot fit in the existing depots. Storage conditions are also inadequate. Shelving is limited shelving, air flow is poor and some depots are cleaned infrequently.	40%

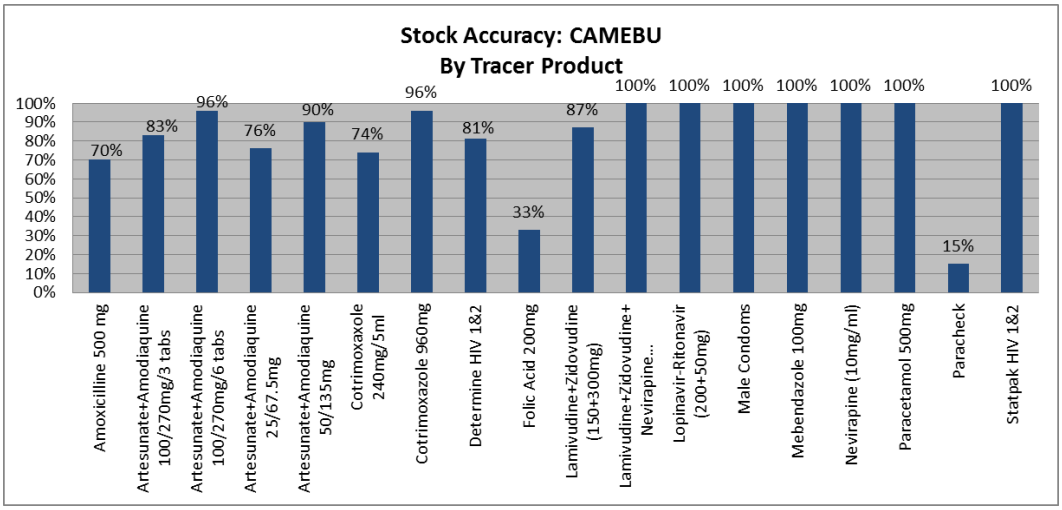
Figure 20 shows current conditions in CAMEBU depots.

Figure 20. Photos of current CAMEBU depots

Inventory management at CAMEBU

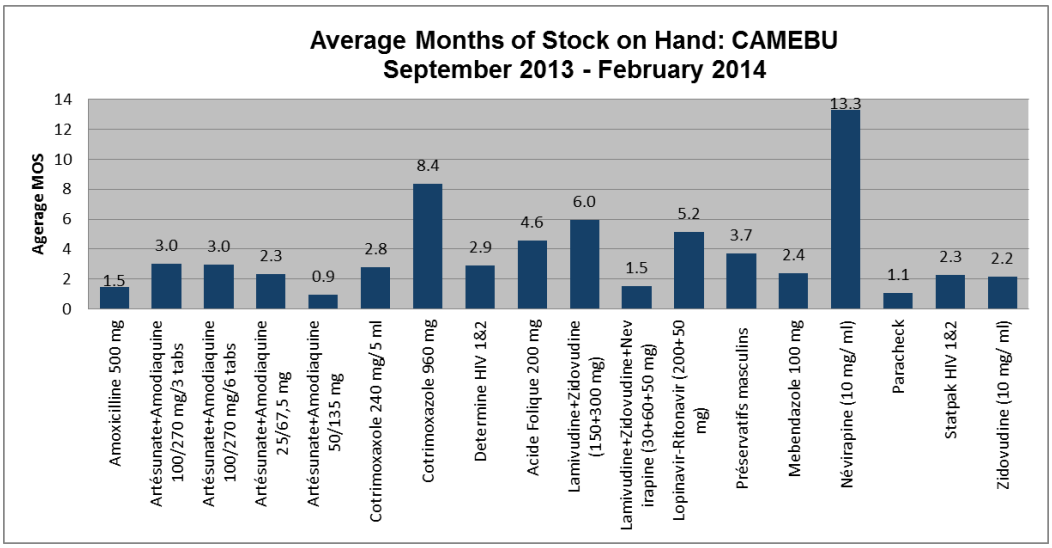
Despite infrastructure constraints most of the tracer products assessed had stock accuracy above 85 percent (see Figure 21). The two tracer products with low stock accuracy include Lamivudine+Zidovudine+Nevarapine (30+60+50mg), which experienced recent stockouts. Stock entered and exited the warehouse rapidly, potentially leading to inaccurate stock recording on stock cards. The other, Paracheck, was housed across several warehouses, including a transit warehouse, potentially impacting stock record accuracy.

Figure 21. Stock accuracy by tracer product



Of the 18 tracer products assessed at CAMEBU, only 44 percent were stocked between the established minimum (3 months) and maximum (18 months) stock levels. The 10 products that were not stocked according to plan fell below the established minimum levels (see Figure 22).

Figure 22. Average months of stock on hand at CAMEBU, September 2013–February 2014



Future state of CAMEBU

CAMEBU has transitioned into its new warehouse space, which includes two large, newly constructed depots equipped with adjustable pallet racking (see Figure 23). Product is systematically being transitioned into an integrated warehousing system, where the same product, regardless of funder, will be stocked in its defined location. Additional spaces have been clearly demarcated for key warehousing functions of receiving, picking (fine and bulk) and dispatch. At the same time, best-practice warehousing and inventory management standard operating procedures (SOPs) are being developed. These SOPS will outline the processes required to operate the warehouse in the new infrastructure..

Figure 23. Photos of the new depots at CAMEBU

Order fill rate at CAMEBU and district pharmacy orders

Order fill rate: 36%

Low stock levels for the tracer products likely correspond with the low order fill rate between CAMEBU and the district pharmacies. To measure order fill rate, the total quantity ordered was compared with the total quantity collected using district pharmacy records (see Table 20). At 36 percent, order fill rate performance indicates that CAMEBU's stock levels are not adequate to meet the needs of its primary clients.

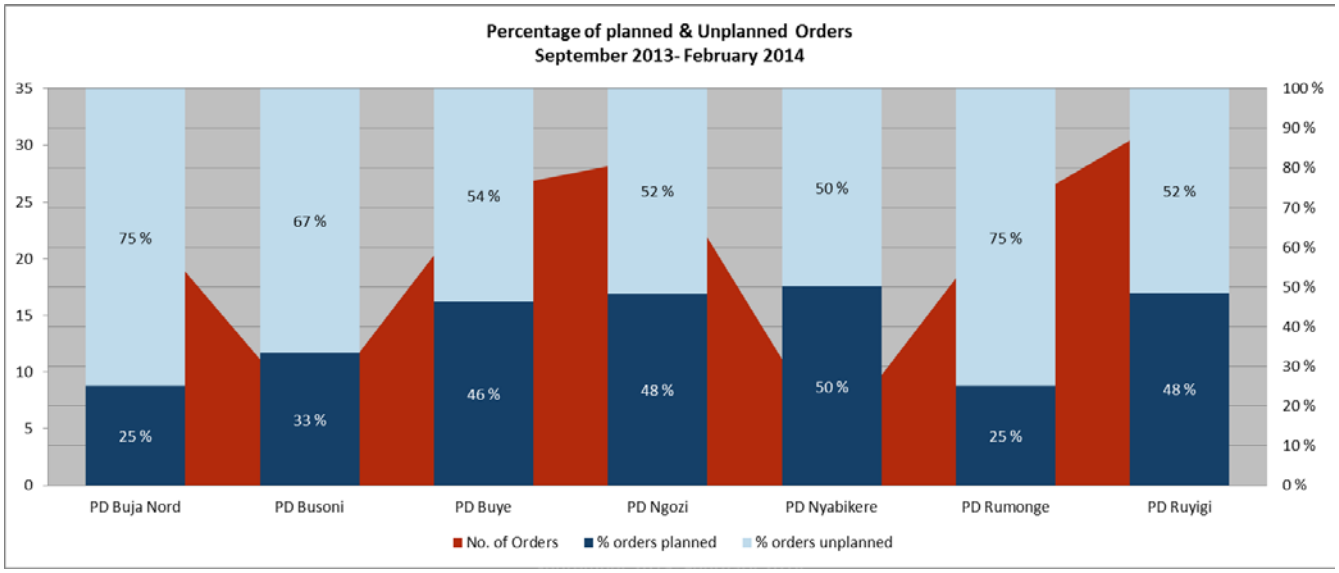
Table 20. Order fill rate for CAMEBU to District Pharmacies

	Quantity Ordered	Quantity Delivered	Order Fill Rate-6 Month Average
PD Busoni	1906539	555446	29%
PD Cibitoke	5467181	1383493	25%
PD Kibumbu	463138	390586	84%
PD Muramvya	1873923	722757	39%
PD Ngozi	2587320	2381381	92%
PD Nyabikere	2610156	792229	30%
PD Nyanza Lac	642	337[16]	52%
PD Rumonge	4103643	950397	23%
PD Ruyigi	4188028	1518221	36%
PD Ryansoro	78042127.32	2837626	4%
PD Kabezi	3265548	1097828	34%
PD Buja Nord	499827	198744	40%
PD Gahombo	3775685	1026625	27%
PD Kiremba	6544439	2303794	35%
Grand total	37286069	13321838	36%

Burundi's supply chain system is designed for CAMEBU and the public supply chain to completely fulfill public health facility needs. Although stock levels at CAMEBU are not adequate to fulfill this function, the private sector provides a secondary supply option for district pharmacies. Data collected at district pharmacies indicates private vendors account for 60 percent of orders placed (see Figure 24).

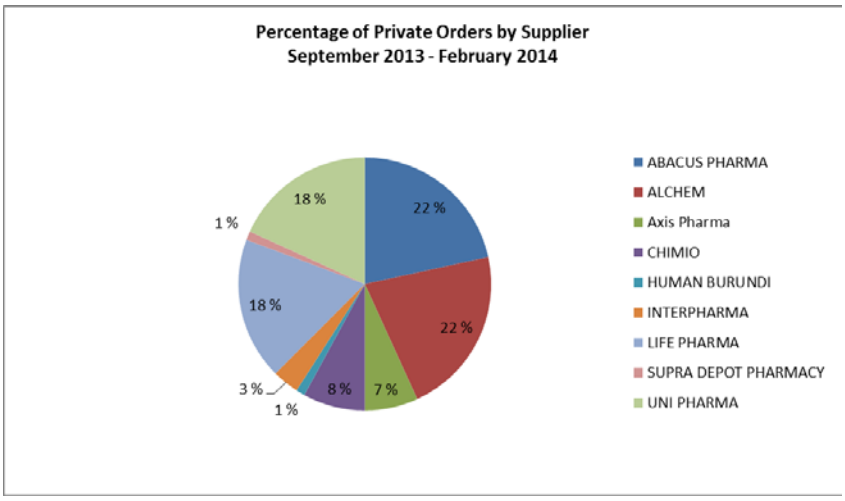
[16] PD Nyanya Lac data was collected based on number of products fulfilled rather than unit quantity.

Figure 24. Percentage of district pharmacy orders placed as planned and unplanned, September 2013–February 2014



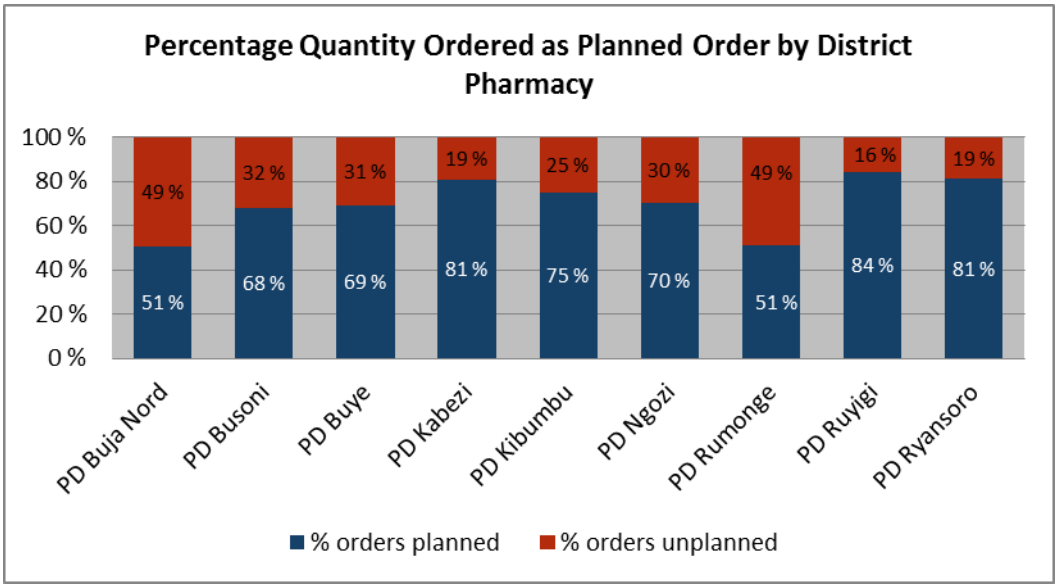
Orders are placed to a wide variety of private vendors. The three major vendors are ABACUS Pharma (22 percent), Alchem (22 percent) and Life Pharma (18 percent) (see Figure 26).

Figure 25. Percentage of district pharmacy unplanned orders placed with private vendors, September 2013–February 2014



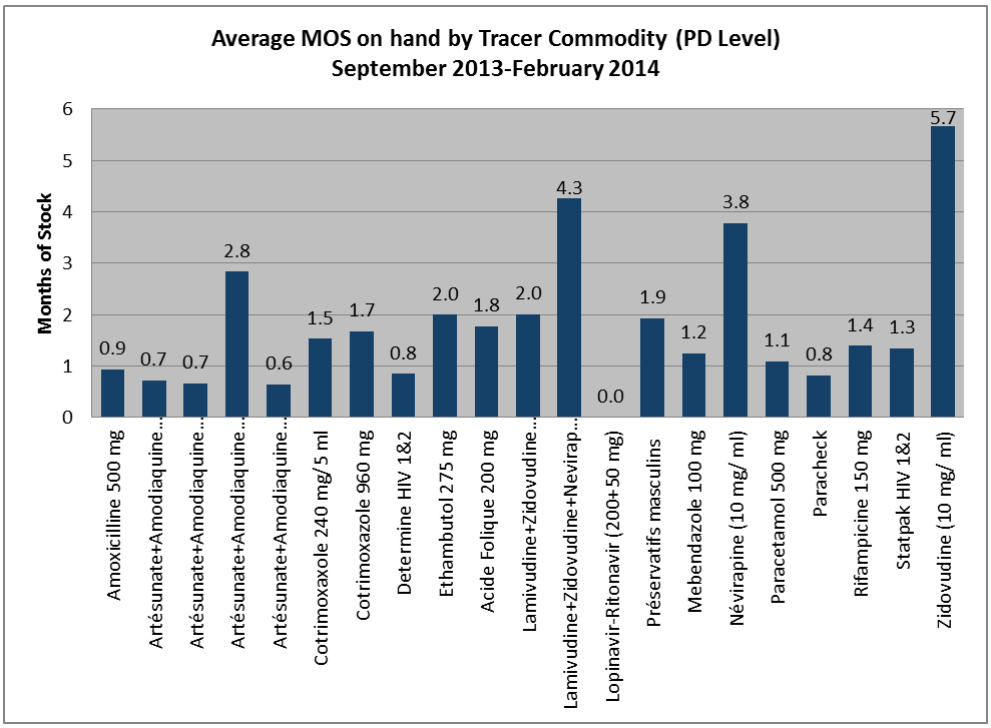
Although a large portion of orders are placed with private vendors, the quantity of these orders is not as significant at most of the district pharmacies sampled. In many of the pharmacies sampled for this data collection, 80 percent, or 8 of 10, planned orders fulfill over 60 percent of the quantity needed for these facilities (see Figure 26).

Figure 26. Quantity of products ordered as planned or unplanned orders[17]



Overall stock levels at district pharmacies indicate that the system using CAMEBU and private vendors is potentially insufficient to maintain adequate stock levels of both program and essential medicines at the supply chain's district pharmacy level. Analysis indicated 71 percent of tracer products had stock levels below two months (see Figure 27).

Figure 27. Average month of stocks on hand for tracer products, September 2013–February 2014



[17] Due to data collection challenges, some district pharmacies were excluded from this calculation.

Warehousing and inventory management: FOSA level

Warehousing and inventory management capability

Of the key warehousing capabilities assessed at this level, several scored a 40 percent or above (see Figure 28), including storage of products, cold chain temperature control and security. In addition to these successes, there were several capability challenges (see Table 21).

Figure 28. Warehousing and inventory management capability at health facilities and district pharmacies

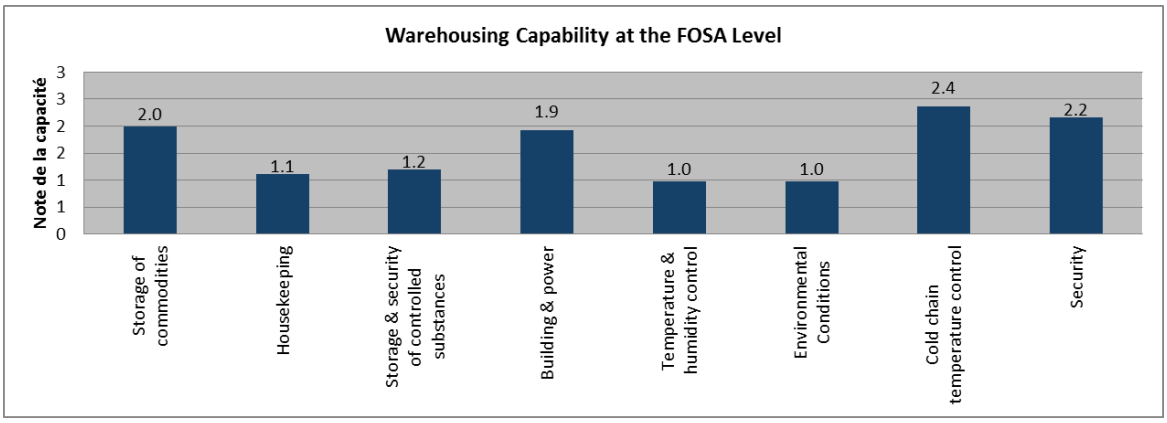


Table 21. Capability challenges, warehousing and inventory management

Capability	Key capabilities	Score
Product storage	Overall observation of inventory management at the FOSA level indicated basic inventory management practices were in place, including alphabetical arrangement of products and adherence to FEFO.[18] For this indicator, 78 percent of facilities scored a 40 percent or higher.	38%
Temperature and humidity control	No facilities visited had temperature control available in their storerooms. This presents problems for product quality in some regions of the country, particularly Bujumbura, where temperatures and humidity are high. Most facilities did not have thermometers, meaning temperature is not being monitored.	20%
Cold chain temperature control	Most facilities visited had access to refrigerators, but equipment functionality depends on functioning electricity, which is not always available.	47%

Figure 29 illustrates an organized store room with products arranged alphabetically stored with their stock cards.

[18] Capability at this level is measured on a scale of 1–3 (20–60 percent), as the best practice for smaller storerooms and warehouses differs from that of a central medical store.

Figure 29. Storeroom at district pharmacy

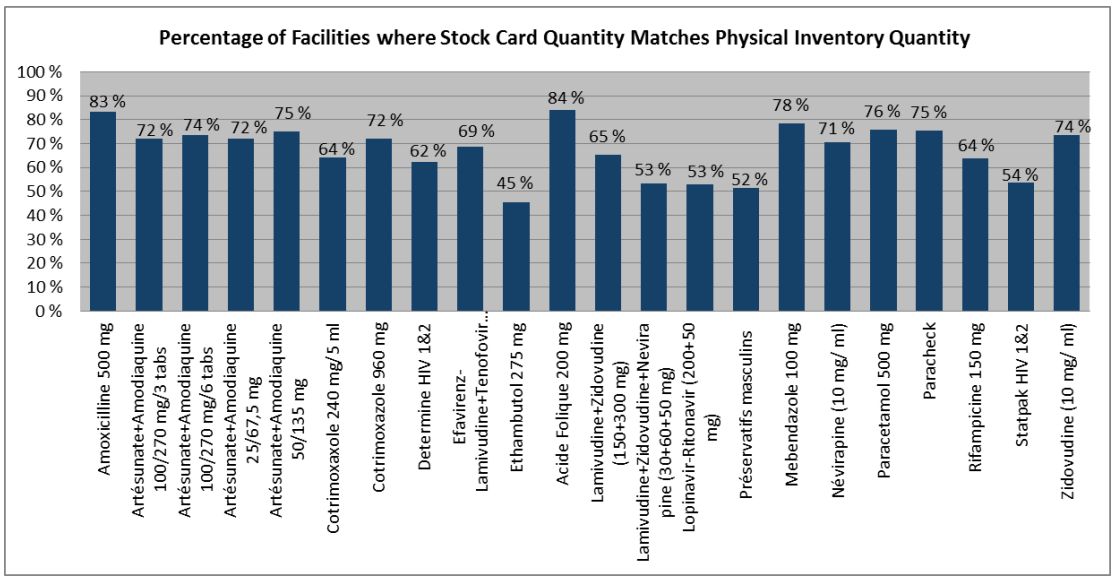
Inventory management performance: district pharmacy and FOSA levels

Several indicators were used to assess inventory management performance at the health center and district pharmacy levels.

Stock accuracy: 71%

Stock accuracy, measured by comparing the quantity in the physical inventory with the quantity recorded on the stock card for each tracer product, was 71 percent on average for all stock observations conducted at each site visit (see Figure 30). This indicates a 29 percent variance in the two quantities overall, with specific tracer products performing better or worse than this average. Several program products fall below the average stock accuracy including Ethambutol (TB) and several HIV/AIDS products (antiretrovirals (ARVs), co-trimoxazole and HIV rapid test kits).[19]

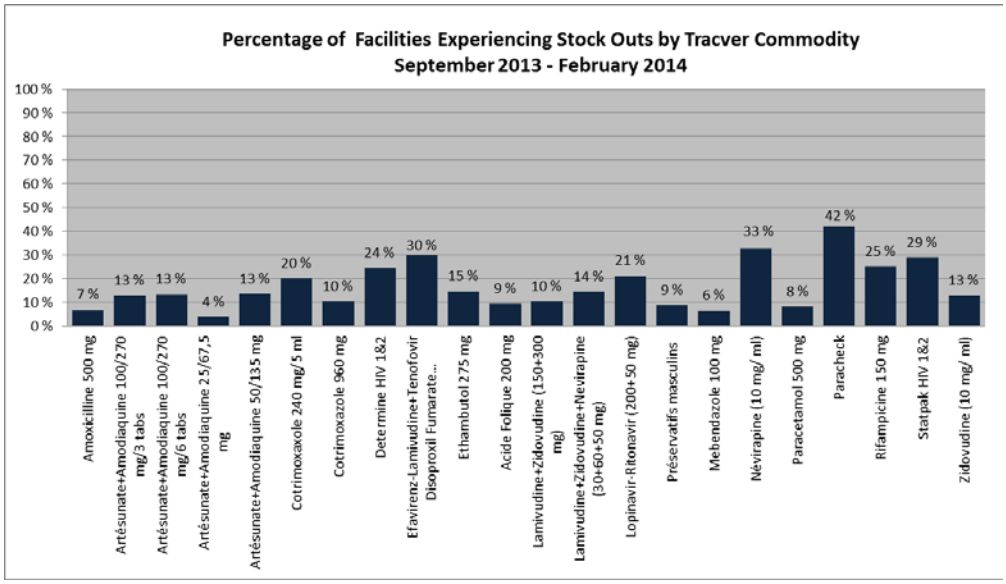
Figure 30. Stock accuracy at health facility level by tracer product



[19] Sample for HIV products is only 58 facilities of the 132-facility sample. This lower denominator could impact performance compared with other product categories carried at most facilities (i.e., malaria and essential medicines).

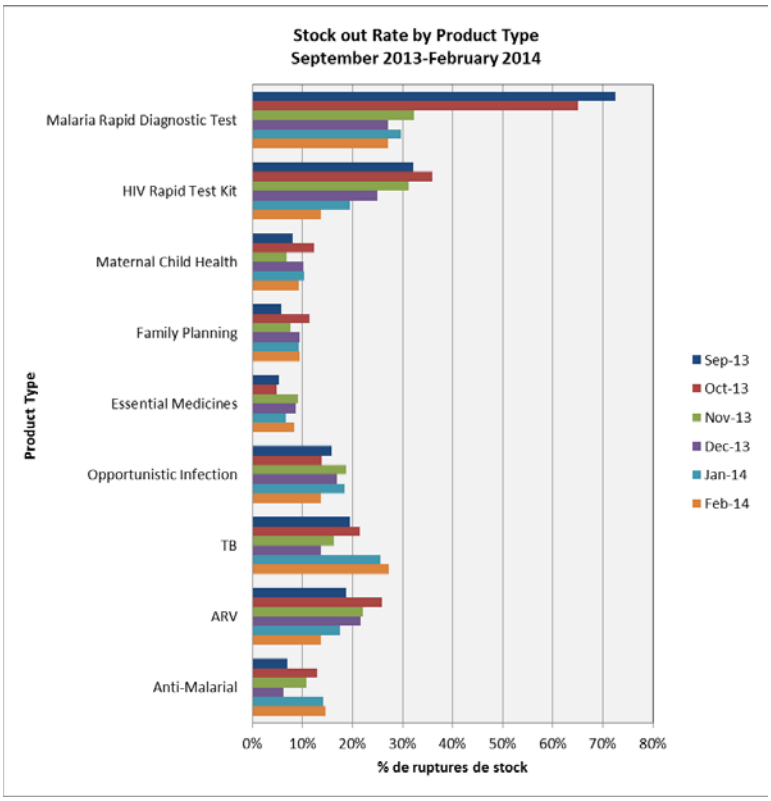
Similar to stock accuracy, the average percentage of facilities experiencing a stockout of a tracer product was higher for ARVs than for other program areas; 60 percent of ARV tracer products had a stockout rate higher than 20 percent (see Figure 31). Several potential reasons for these higher stockout rate levels may include the recent introduction into the stock of some facilities as well as the nature of the vertical supply chains. Unlike essential medicines, district pharmacies are more limited on secondary sources for some of these products such as ARVs, which can be procured only from the public sector at CAMEBU.

Figure 31. Percentage of health facilities experiencing stockouts of tracer products, September 2013–February 2014



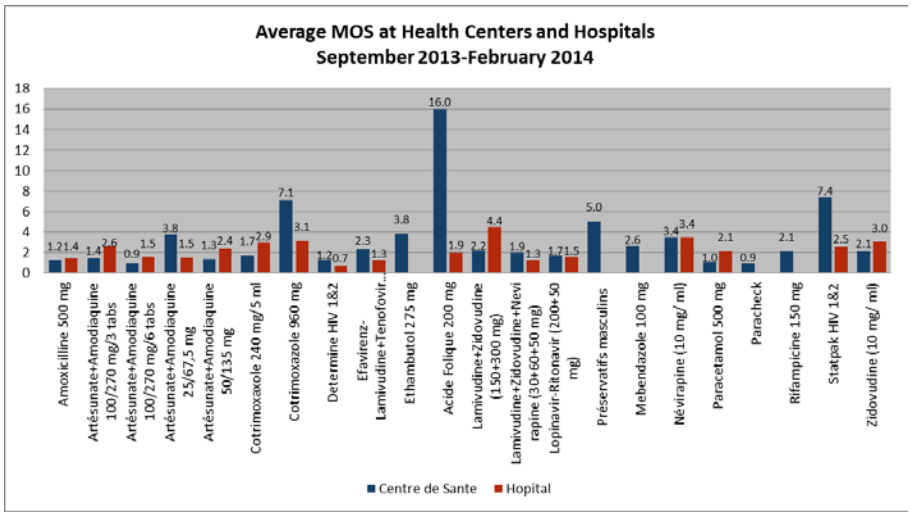
A look at stockout rates by product type for each month of the data collection period (see Figure 32) reveals that while most tracer products had a steady stockout rate for the six months, a few products had high levels of stockouts in September and October of 2013. Malaria rapid diagnostic tests (Paracheck) and HIV rapid test kits (Determine and Statpack) experienced stockout rates as high as 72 percent in September for Paracheck.

Figure 32. Stockout rates by product type and month



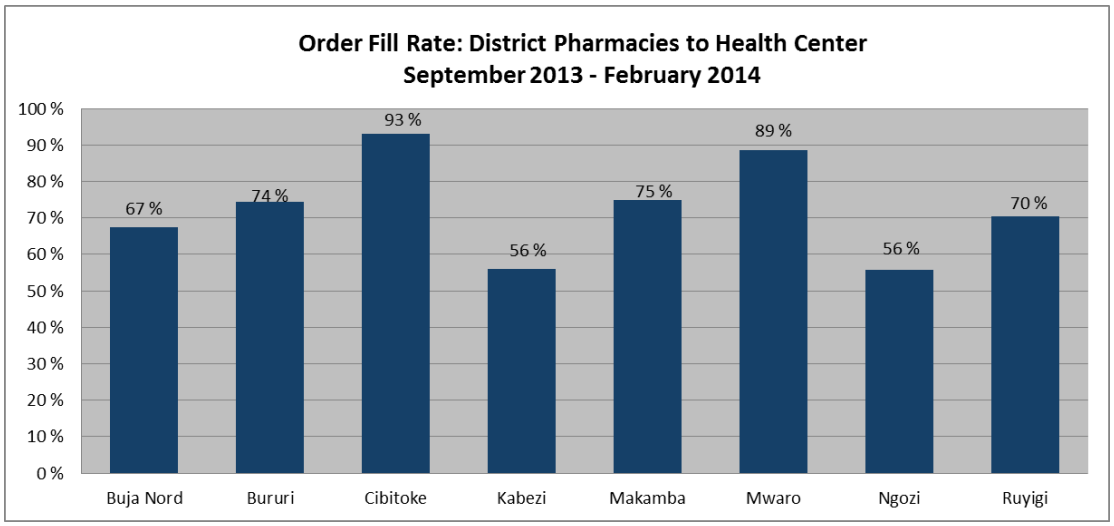
At the FOSA level of the supply chain, many tracer products had stock levels within or close to the recommended levels. With the exception of cotrimoxazole 960mg, folic acid and Statpak HIV 1&2, all tracer products had stock levels below five months (see Figure 33). This indicates a low level of risk of expiry and a moderate risk of stockouts, as many products have only one month of stock. Without adequate buffer stock, if an order at the FOSA level cannot be fulfilled, the risk of stockout is significant.

Figure 33. Average months of stock on hand at health facilities, September 2013–February 2014



Order fill rate between the district pharmacies and centre de santé provides additional insight into the potential stockout risk with stock levels at the one-month range (see Figure 34). The rate varied across the districts where this data was available. In areas where order fill rate is below 70 percent, potential for stockouts is high if the district pharmacies cannot meet the CDS demands for product. In general, order fill rate at this level of the system is higher, likely reflecting the PD's capability to use the private sector at the same time as the public sector to meet demand.

Figure 34. Order fill rate District Pharmacies to Health Facilities[20]



Recommendations

For CAMEBU:

With the recent infrastructure and operational changes, CAMEBU is on the right track to improve its warehousing and inventory management challenges. Change management of this transition, including institutionalizing the new operational processes, will be critical to successful performance improvements in this area at CAMEBU. Recommendations include the following:

- **Train warehouse staff in new operational processes (including SOPs).** Provide this training in a formal setting and reinforce it through on-the-job training over the longer term. Continued education on and support of these changes will be required to ensure that these new, best-practice processes are institutionalized. Change management will be integral to this process, ensuring that all stakeholders are trained and bought into the new system. Without change management, CAMEBU risks applying its current inventory management challenges to its new infrastructure.
- **Consider how best to use old warehousing spaces.** CAMEBU's new depots provide important integration of product storage at CAMEBU, particularly for program products such as HIV/AIDS and malaria. They also provide bulk storage and a fine pick area that should improve inventory management. The old depots can still be used to manage and store product as needed. One recommended use is to organize and manage two product groups currently managed in an ad hoc way. Consider creating separate space for quarantined product and expiries/losses/damages in the old depots. Designated spaces for both of these will significantly

[20] This indicator is calculated based on a limited sample of data that was available during data collection. Assessment teams collected data on six orders at each district pharmacy where data was available to provide a snapshot of performance.

reduce their potential integration with useable stock and improve data management and product traceability at the warehouse.

- **Monitor order fill rate by recording both the quantity ordered and quantity distributed to clients at each order.** Comparing these two data points, preferably for set of tracer products, CAMEBU can monitor whether its ability to meet its customers is improving. As LMIS data becomes available, forecasting is expected to improve, potentially enabling CAMEBU to ensure that a more adequate supply of essential medicines is available to clients and thus improving order fill rate. Collect this data for essential medicines and program products, communicating with relevant program stakeholders about consumption data as needed.

At the PD and FOSA levels:

- **Have a central-level entity routinely monitor stock levels using the new LMIS data system.** In general, the use of public (CAMEBU) and private-sector sources leads to improved order fill rate and inventory management at the lower levels of Burundi's supply chain. Targeted supervision and interventions can be applied to districts experiencing inventory management challenges by routinely analyzing this data.
- **Until overall performance improves, consider increasing stock levels to include adequate buffer stock for products with normal shelf life and no infrastructure specific requirements such as cold chain.** This buffer stock would enable better stock availability to patients should supply be disrupted.
- **Consider addressing cold-chain infrastructure and temperature control challenges at the FOSA level.** The lack of adequate, reliable infrastructure for these could be having a significant impact on the quality and efficacy of medicines because of their exposure to a humid climate or a breakdown in cold-chain storage. Addressing this issue would likely include ensuring adequate power availability at FOSAs as well.

3.5 Transportation

The transportation system at all levels of the supply chain in Burundi is ad hoc. At each level of the supply chain (CAMEBU-District and District-FOSA), orders are collected primarily by the receiving facility. The receiving facility is responsible for securing the necessary means of transport and visiting the distributing facility for its product.

The following analysis applies only to capacity of transport. Data collection feasibility is limited by the ad hoc transportation system for health products in Burundi.

Transportation capability: CAMEBU

Capacity of transportation remains low. Only two capabilities, fleet management and security management, scored above 40 percent. Other capabilities are shown in Figure 35, while key capabilities are described in Table 2.

Figure 35. Transportation capability by enabler, CAMEBU

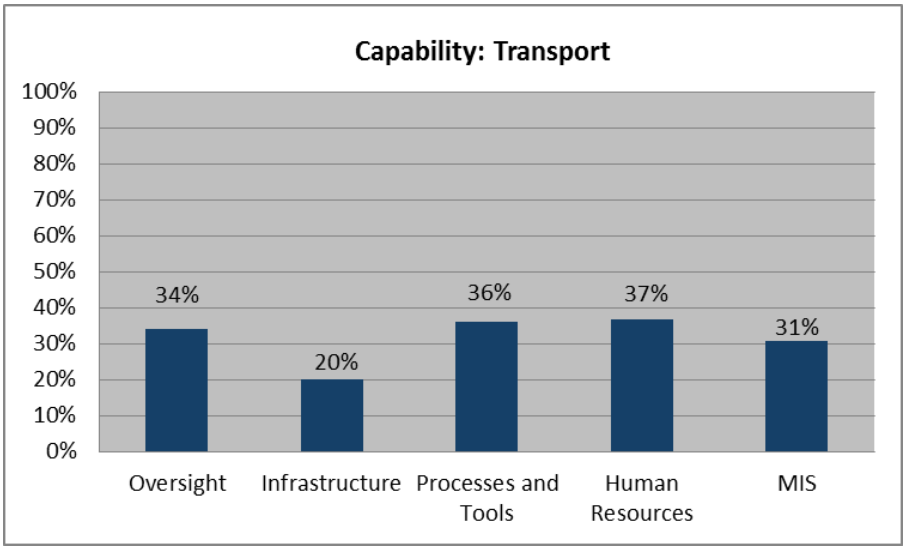


Table 22. Capability challenges, transportation

Capability	Description of key capabilities	Score
Capacity to meet demand	Current transportation infrastructure at CAMEBU is limited to two vehicles: one large-capacity and one medium-capacity truck (see Figure 36). These vehicles are not sufficient to meet the potential demands for transportation ate the district level, evidenced by the policy of providing transportation only for high-value orders. CAMEBU will deliver orders to the district pharmacies for orders over 25 million Burundian francs, although this is well above the normal value of a	20%
Fleet management	CAMEBU provides regular, preventative maintenance to its existing vehicles.	40%

Figure 36. Truck for distribution at CAMEBU

Transportation capability: district pharmacy and FOSA levels

Similar to the transportation between CAMEBU and the districts, capacity is also low between districts and FOSA. Infrastructure at lower levels of the supply chain also remains limited. Many facilities collect their products using a bicycle or moto (see Figure 37). Small orders are collected each month from the district pharmacy.

Figure 37. Products transported between a district pharmacy and health facility by bicycle

Recommendations

For CAMEBU:

- **Consider options for implementing an active distribution system to deliver products to clients with a routine delivery schedule.** Although CAMEBU does not have the capacity to meet the demands of its district-level clients, the current collection system is adequate to ensure that districts are supplied with CAMEBU products. Long-term improvements could include contracting transportation to the district level with a third-

party provider to establish a transportation system where CAMEBU would manage the contract.

3.6 Dispensing

Ensuring quality medication is available throughout the supply chain does not necessarily ensure patient compliance with or completion of treatment regimens. When a full course of treatment is not completed or medicines are used improperly, the result can be poor health outcomes for the patient, longer and more costly treatment regimens, and the potential of contributing to developing antimicrobial resistance. Adherence to medication is a multidimensional issue related not only to the patient, but also to the health care provider.

Good dispensing practices

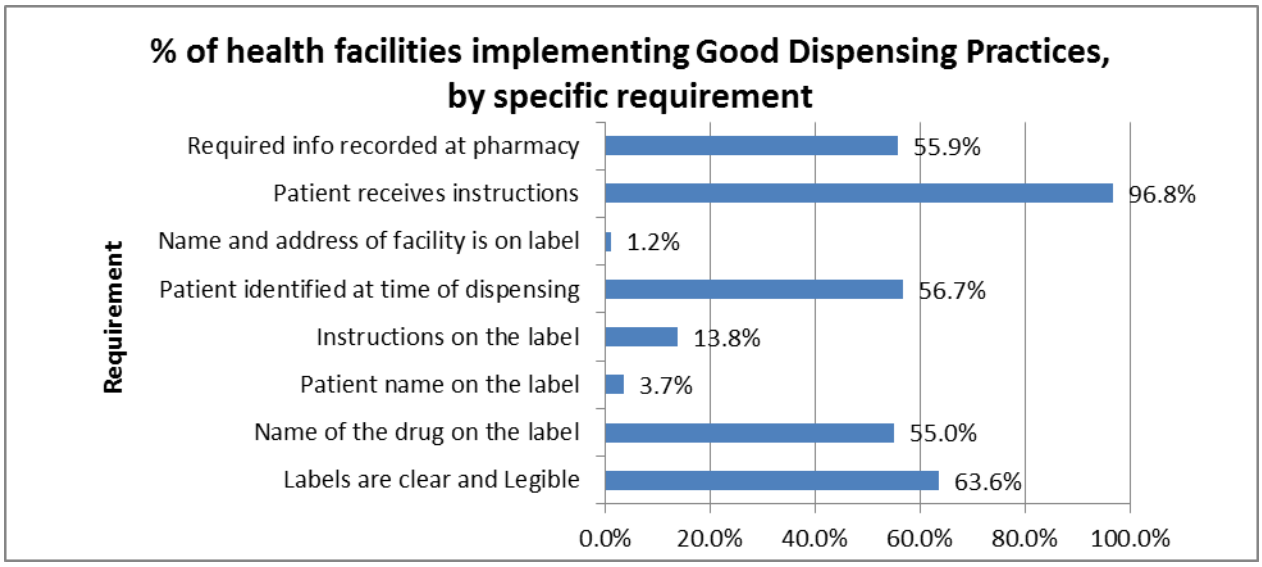
Percent of health facilities implementing good dispensing standards for medicine dispensing: 0%

Good dispensing practices ensure that an effective form of the correct medicine is delivered to the right patient, in the correct dosage and quantity, with clear instructions, and in a package that maintains the medicine's potency.

The baseline survey found that 0 percent of health facilities complied with all criteria of GDPs for Burundi.

The survey assessing GDPs was designed to consider an interaction as "compliant" (counted in the numerator) if it met all requirements. With these results, showing that no health facility sampled met all requirements for any patient, we examined the specific questions and possible criteria that were most often not met (see Figure 38).

Figure 38. Percentage of health facilities implementing GDPs, by specific requirement



Data indicate medication labels often did not contain the patient's name or the facility's name and address. On the positive side, the patient was likely to receive instructions on taking the medication, a criterion we believe to be a better determinant of treatment adherence than the missing labeling information. Further analysis on the correlation between these variables is ongoing.

Patient knowledge

Percent of patients surveyed who know correct information about their medications: 50.9%

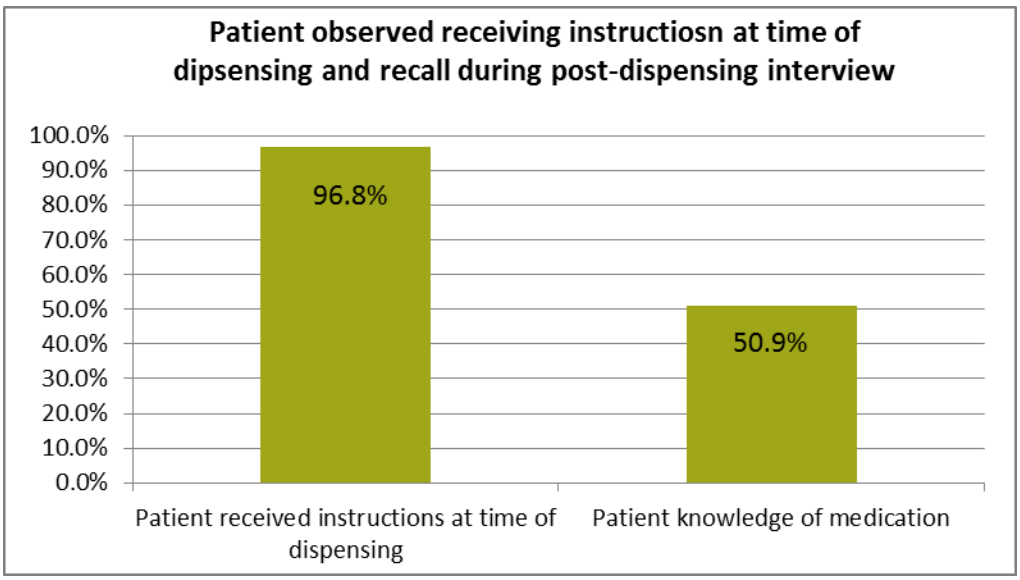
Availability is one aspect of correct and consistent use of medicines; knowledge (of the patient) is another and is a recognized determinant of behavior. This indicator captures how well patients have been prepared (presumably by the pharmacist, or dispenser) to use prescribed medications based on information during the consultation or dispensing process. At a minimum, patients should be able to identify:

- The name of the medication
- How often they are required to take the medication (frequency per day)
- Amount of medication to take each time (dosage)

The baseline survey found that 50.9 percent of survey respondents could answer all three questions about all medication received during the day of the visit. This result indicates a weakness in patient comprehension of their recently prescribed medication (patients interviewed post-dispensing). Considered with the baseline results for good dispensing practices, the results likely show that deficiencies in the dispensing process are affecting patient knowledge

As part of the GDP survey, dispensers were assessed on providing instructions at time of dispensing (see Figure 39). While almost 97 percent of patients were observed receiving instructions by the dispenser, the recall of those patients who were interviewed post-dispensing was fairly low (51 percent). This comparison indicates an issue more with patient recall, rather than with dispenser provision of instructions, and warrants further investigation.

Figure 39. Patients observed receiving instructions at time of dispensing and recall during post-dispensing interview



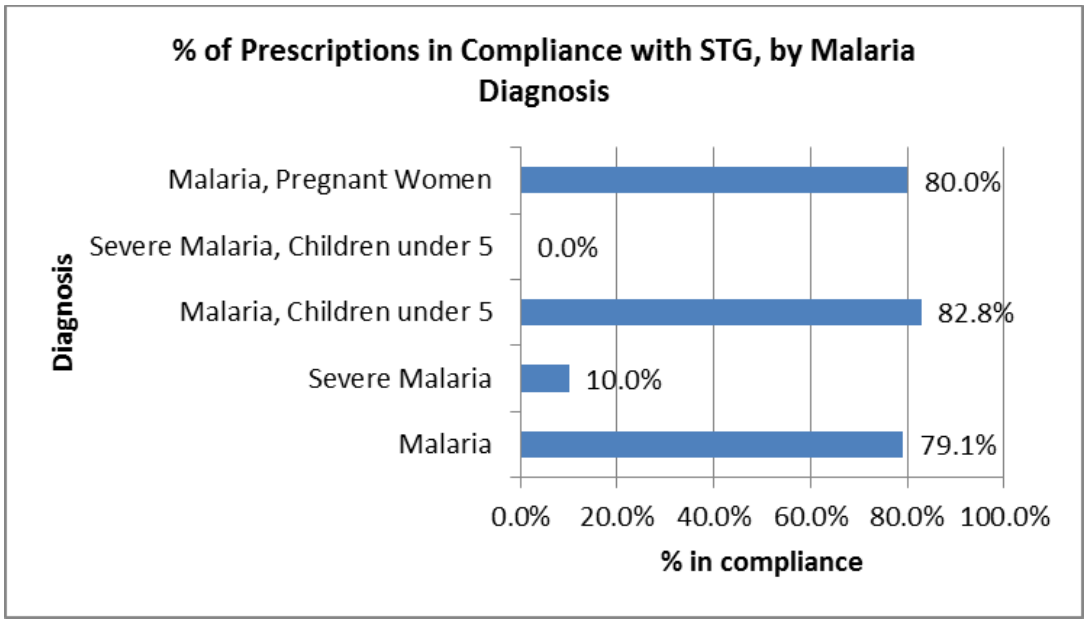
Standard treatment guidelines

Percent of prescriptions in compliance with STGs: 76.7%

Effectively implemented STGs are an evidence-based way to standardize and improve the use of medicines. As in the previous indicator, good guidelines are often produced, but they are not properly implemented. This indicator measures the degree of adherence to such guidelines. By tracking longitudinally the degree of compliance to what the guidelines recommend, this indicator helps to monitor potential adherence improvements over time.

Results show an overall percentage of compliance of 77 percent; however, differences are found based on type of malaria diagnosed (see Figure 40). While our sample is not large enough for statistically significant analysis to be done by diagnosis, the data does show a trend toward differences in prescription compliance between malaria and severe malaria in adults and children.

Figure 40. Percentage of prescriptions compliant with malaria STGs



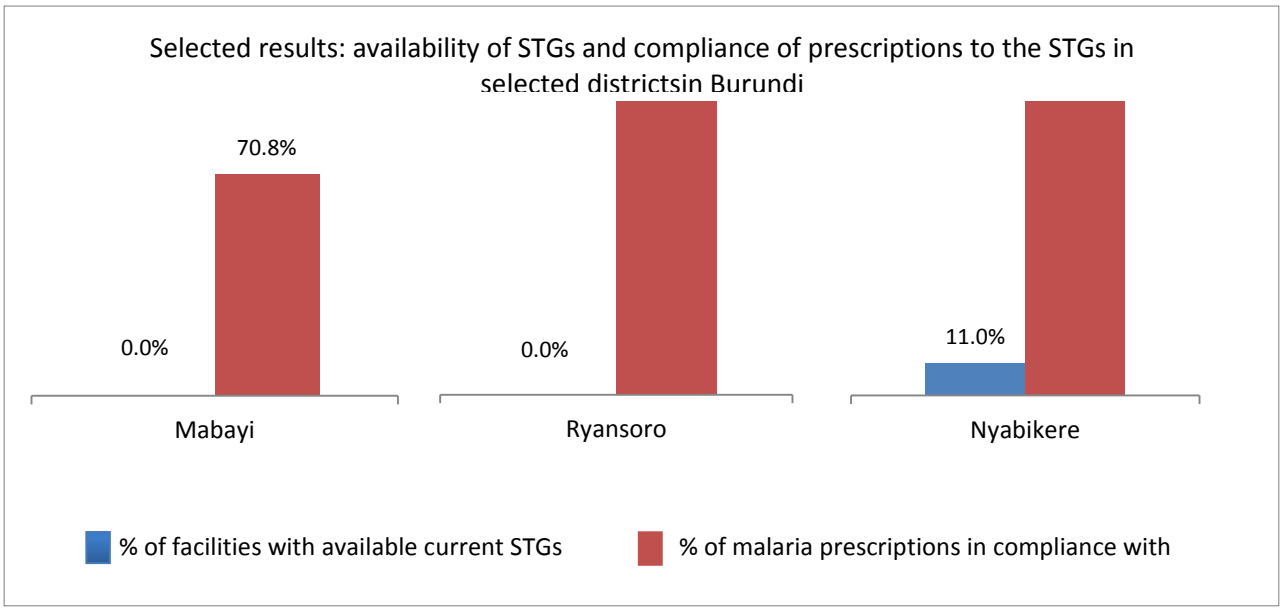
Percent of facilities with available copy of the STGs for Burundi: 39.8%

Often, STGs are developed, but inadequately distributed. Many surveys have shown that these important documents are not available in many facilities. The degree of availability of STGs is an important measure of the provision of current and up-to-date information available to health care providers.

As part of this baseline survey, data collectors physically verified the presence of a copy of the most recent version of Burundi's STGs, on site. At almost 40 percent of health facilities surveyed a copy of the STG was verified. This result will serve as the baseline value; however, during FY 13, SIAPS assisted the PNILP in disseminating 1,200 copies of the new malaria STGs to all health facilities. Because of the specific efforts dedicated to disseminating the STGs, results are lower than expected.

While the expectation is that presence of STGs would translate to increased prescription adherence, data showed the opposite (see Figure 41).

Figure 41. Availability of malaria STGs at health facilities



In the examples shown in Figure 41, no relationship is found between the presence of the STGs and malaria prescribing practices in health facilities in the districts selected. Dissemination of guidelines likely needs to be accompanied by training sessions and practical sessions for prescribers. While the presence of the STGs serves as a reference document, without proper implementation, behavior change is unlikely.

Recommendations

Patient knowledge and dispensing practice

Patient knowledge and dispensing practices have implications for treatment adherence, therapeutic effectiveness and containment of antimicrobial resistance. Because none of the surveyed facilities was found to be in compliance with GDPs, this area warrants particular attention, including taking the following steps:

- **Further investigate and emphasize patients' adherence to their medications.** This is critical to containing antimicrobial resistance and improving outcomes for patient treatment. Methods for improving instruction presentation and retention should be assessed for viability and application in Burundi.
- **Ensure widescale distribution of Burundi's GDP manual. The survey** found the presence of the manual was physically verified at fewer than 13 percent of health facilities. This is an important tool that must be available for reference.
- **Provide trainings and follow-up supervision for medicine dispensers.** In addition to availability of GDPs and/or SOPs for dispensing, individuals responsible for dispensing

should be trained in the practices and provided with on-site supervision.

- **Complete further analysis of the relationship between the requirements for meeting good dispensing practices.** With this data and any correlations shown, or lack of, a more detailed assessment can be made, including a plan for additional action items if necessary.
- **Develop job aids on good dispensing practices.** These will be used at the dispensing window to remind dispensers of the key areas of compliance. Specific attention should be given to labeling requirements, including printing the patient's name.
- **Help patients better understand their treatment and adhere to it accordingly.** SIAPS should assist CAMEBU in developing best practices in availing "dispensing bags" highlighting morning, midday and night with visible signs and dosages.

Standard treatment guidelines

- **Further investigate trainings and tools to ensure prescription compliance in-country.** This will help determine what leads to increased compliance and correlates with compliance (other than or in addition to STGs).
- **Distribute standard treatment guidelines to facilities in Burundi.** While the percentage of compliance for malaria prescriptions is fairly high, considering that less than 40 percent of facilities had a copy of the STGs, practitioners and prescribers need appropriate guidelines to make correct decisions.
- **Provide refresher trainings and/or on-site mentorship for health center staff (trained in FY13).** Expand on last year's training to include hospital staff. In accordance with the FY14 workplan, focus specifically on managing severe malaria cases.

3.7 Waste management

Similar to transport, waste management capacity in Burundi is limited. With the exception of CAMEBU, waste management is conducted on an ad hoc basis and is the responsibility of the site where the product becomes unusable.

Most areas of waste management have minimal capacity, indicating infrastructure, processes and information on this supply chain function, are limited. Because of these limitations, performance indicators could not be analyzed during the assessment.

Waste management capacity: CAMEBU

CAMEBU has a formal, well-documented process for annual destruction of waste. A committee with all relevant stakeholders convenes to approve of the destruction, including partners who have stock that will be destroyed. This process provides highly transparent processes for product destruction. It includes the government of Burundi and other stakeholders such as donors. Figure 42 illustrates the report used to detail expiry.

Figure 42. Snapshot of expiry report 2013

LISTE DES MEDICAMENTS PERIMES ET ABIMES INVENTORIES ET DETRUITS POUR L'EXERCICE 2013

I, LES PRODUITS PHARMACEUTIQUE DE LA CAMEBU PERIMES EN 2013

A, Médicaments

n°	DESIGNATION DU PRODUIT	Lot	Peremption	Quantité	PU	PT
		NYM104-106	May-13	89,800		
		NYM101-103	Apr-13	71,290		
		NYM101-104	Jun-13	88,400		
1	Nystatine sirop 100 000 UI	Total		249,490	465.45	116,124,621.52

Although the documentation and approvals process for product destruction are thorough processes for are not in line with best practices. All products are destroyed using a fire in an open field. Destruction requirements vary for different pharmaceuticals, including incineration and internment. The current mechanism for destruction likely does not meet most of the requirements, including proper temperature levels for incineration, and is leaking toxins into the environment (air, soil and potentially water).

Waste management capacity: district pharmacy and FOSA levels

Waste management capacity is also low at the district pharmacy and FOSA levels (see Figure 43). No systems have been set up for waste management of pharmaceuticals and consumables. Additional challenges in waste management are described in Table 23.

Figure 43. Waste management capacity at district pharmacies and health facilities

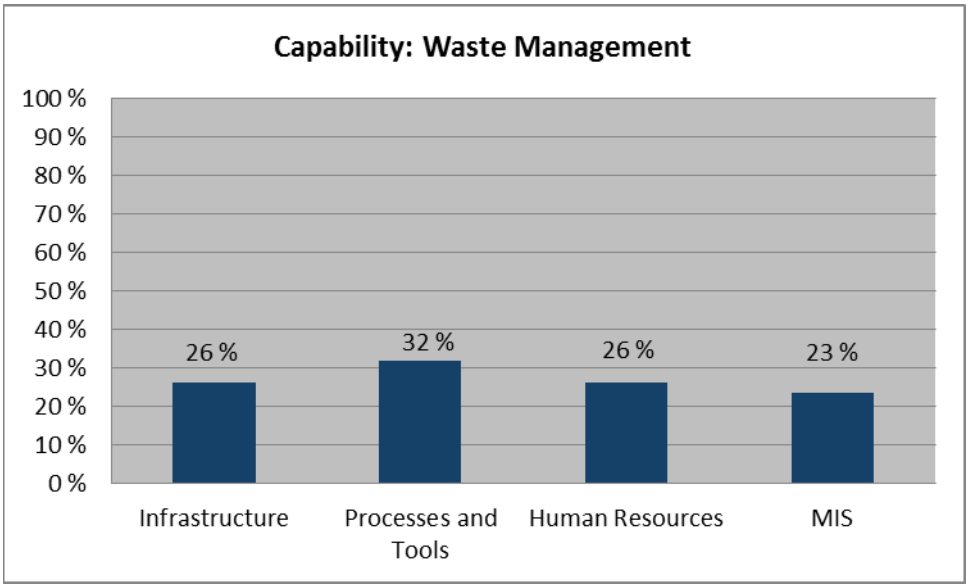


Table 23. Capability challenges, waste management

Capability	Key capabilities	Score
Identification, segregation and storage of unusable pharma	The average score indicates that although a process for storing and managing unusable pharma is not in place, there is typically a segregated space for this product.	41%
Handling and transport of unusable pharma	At the district pharmacy and FOSA levels, facilities have at best an ad hoc system for transporting unusable pharma.	38%

Recommendations

Short-term

For CAMEBU:

- Address potential stockpiles of expired products. Although expiry of the selected tracer products was limited during data collection, the lack of reverse logistics and destruction mechanisms at lower levels of the supply chain indicates the potential of stockpiles of expired product. In the short term, the supply chain could potentially use its existing collection system to return expired or otherwise unusable products. Facilities could transport this product to the next level of the supply chain (FOSA→ PD→CAMEBU) on a monthly basis when collecting their orders. This will alleviate any space constraints caused by existing unusable product stockpiles and mitigate any risks of this product mixing with any usable product and potential dispensation to patients.

Long-term

For CAMEBU:

- Along with other supply chain stakeholders, consider evaluating and designing a waste management system for pharmaceutical and consumable waste. Capability assessment indicates an immature waste management system in Burundi. The assessment should include the identifying, managing, transporting, treating and disposing of this waste based on best-practice requirements.

4.0 Overall Recommendations

Short-term

LMIS

For the Ministry of Public Health and Fight Against AIDS:

- Continue to work toward implementing the new paper based LMIS system. Strong supply chains rely on access to data. This information is used to actively manage core supply chain functions that ensure product availability. Stakeholders should analyze data routinely so that key stakeholders can monitor stock levels and maintain product availability. The Ministry should also work with in-country stakeholders to establish minimum and maximum months of stock on hand requirements for each level of the supply chain (CAMEBU, pharmacie de district and FOSA).

Product selection

For the DPML and relevant stakeholders:

- Develop comprehensive STGs for all primary medicine and priority diseases for Burundi, requiring expansion of existing STGs and creation of STGs where they do not already exist. These documents will provide personnel at health facilities the required information they need to properly dispense medicines to patients as well as inform key strategic decisions like forecasting and supply planning at the central level (both CAMEBU and programs).

Quantification

For CAMEBU:

- Replace current use of CAMEBU sales data with LMIS consumption data in the 2015 forecasting process. This data will provide a more accurate representation of the quantity of products being consumed at the health facility level, enabling CAMEBU to ensure more accurate forecasts of essential medicines demands.
- Introduce second method into the forecasting process, such as the morbidity-based method. By using several methods, CAMEBU can see a variety of estimates and determine its order quantity using multiple data points, potentially improving forecast accuracy.
- Conduct an ABC analysis, in the absence of sufficient funding, to ensure that limited funds are prioritized in maintaining appropriate stock levels for investments in high-use products. Considering sales data and records of orders placed by clients will be important to this analysis as sales data does not comprehensively reflect demand.

Procurement

For CAMEBU:

- Identify potential efficiency improvements in the current procurement process to reduce the 202-day delay between creating tenders and placing orders. Conduct a detailed review of the

procurement process to determine specific parts of the processes that should be shortened.

- Consider implementing a vendor management program, routinely monitoring performance and communicating successes and challenges with vendors. Although supplier fill rate is high, vendor on-time delivery remains a challenge, particularly for some local vendors. Routine monitoring and reporting of performance levels to suppliers can provide incentives for improving vendor performance, ensuring that vendors provide accurate lead times and encouraging them to deliver on time. CAMEBU should also incorporate past performance into the tender evaluation process, where poor or high levels of performance are also contributing to future procurement decisions.

Warehousing and inventory management

For CAMEBU:

- Ensure there is focus on change management during infrastructure and operational changes designed to improve warehousing and inventory management, including emphasizing institutionalization the new standard operational processes. With the appropriate infrastructure and process documentation in place, it will be important that CAMEBU adequately train staff and monitor that processes are followed as the transition to the new depots continues.

Dispensing

For supply chain stakeholders:

- Further investigate and emphasize patient adherence to medications.
- Assess methods for improving instruction presentation and retention for their viability and application in Burundi.

Waste management

For the supply chain:

- Consider use the existing collection system to return expired or otherwise unusable products. Facilities could use their vehicles to transport these products to the next level of the supply chain (FOSA→ PD→CAMEBU) each month. This will alleviate any space constraints caused by existing unusable product stockpiles and mitigate any risks of this product mixing with any usable product and potential dispensation to patients.

Long-term

Quantification

For CAMEBU:

- Consider introducing long-term forecasting that can be used as a funding advocacy tool with the Ministry of Finance and other stakeholders. Even with an improved methodology and data quality for forecasting, CAMEBU will likely experience budget shortfalls. By understanding long-term demand, CAMEBU can provide price estimates to its funders, potentially increasing its budget and meeting more client demands.
- Working with program stakeholders, consider integrating quantification processes,

particularly coordinated supply plans. Integrated planning would improve stakeholders' ability to advocate for funding, improve product availability and enable better sightlines into shipments that will be require storage at CAMEBU.

Procurement

For CAMEBU:

- Consider exploring the option of vendor prequalification with relevant in-country stakeholders, including the public market if public procurement laws offer this flexibility. Currently, procurement regulations lack the flexibility for agile responses to fluctuating stock levels at CAMEBU. By prequalifying some key local and regional vendors, CAMEBU could quickly alleviate stock shortages with pre-negotiated prices. This program could reduce the time it takes to fulfill urgent supply needs and ensure good prices are attained for unplanned orders.

Warehousing and inventory management

For CAMEBU:

- Monitor key supply chain data from the paper-based LMIS on a routine basis to ensure that a more adequate supply of essential medicines is available to clients (improving order fill rate and stock levels between recommended minimum and maximum levels). Understanding demand will allow for more timely response to urgent needs by CAMEBU and reduce partial fulfillment of clients orders and stock outs.

Transportation

For CAMEBU:

- Consider options for implementing an active distribution system to deliver products to clients with a routine delivery schedule. This could include contracting transportation to the district level with a third-party provider to establish a transportation system with CAMEBU managing the contract.

Dispensing

For CAMEBU:

- Ensure that regular on-site supervision includes spot checks at dispensing sites and random review of malaria prescription compliance.
- When warranted, arrange onsite trainings in deficient areas.
- Continue to emphasize patient adherence to treatment, addressing patient education and dispensing practices.

Waste management

For CAMEBU and other supply chain stakeholders:

- Consider evaluating and designing a waste management system for pharmaceutical and consumable waste. This should include identifying, managing, transporting, treating and disposing of this waste based on best-practice requirements.

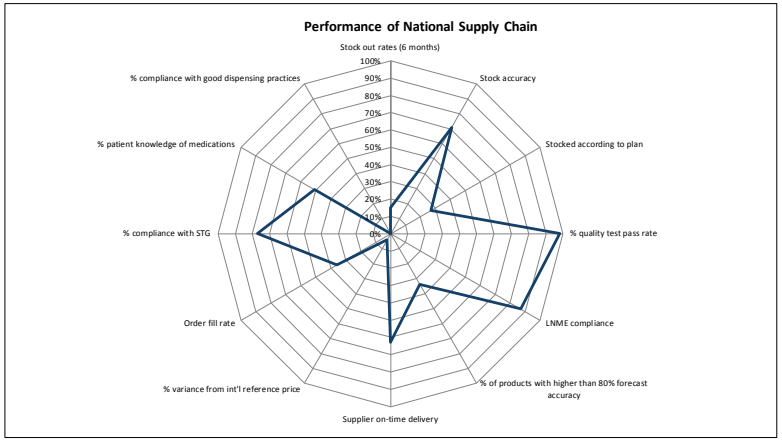
Annex 1. Supply chain assessment results

Burundi supply chain assessment dashboard

National Supply Chain Assessment: Burundi

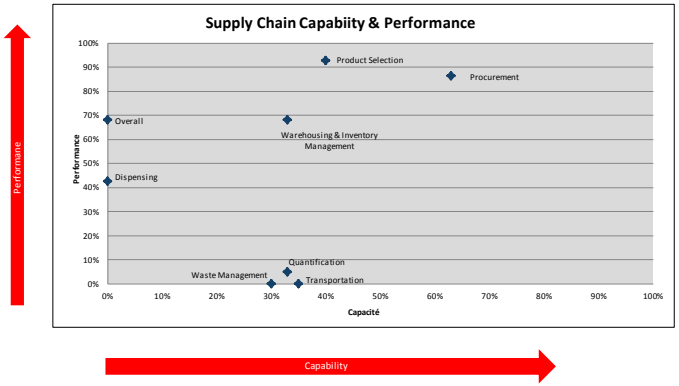
Results of National Supply Chain Assessment

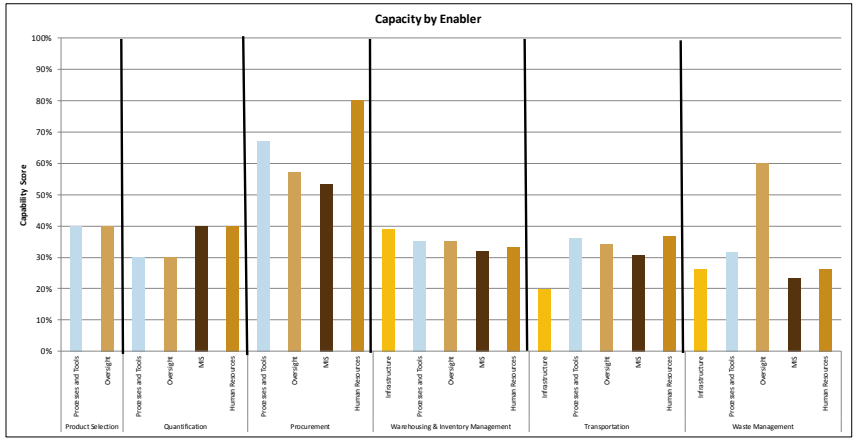
Functional Areas	Capability	KPIs	
Overall		Stock Out (6 month average)	15%
		Stock Out (day of visit)	11%
		Stock Accuracy (PD & FOSA level)	71%
		Stocked According to Plan	27%
Product Selection	40%	% products tested conforming to quality standards	98%
		% procurement compliant with LNME	87%
Quantification	33%	% of products with higher than 80% forecast accuracy	5%
Procurement	63%	Supplier On-time delivery	68%
		% product quantity ordered as emergency order	14%
		Order fill rate	99%
		% variance between prices paid and int'l reference price	8%
Warehousing & Inventory Management	33%	Expiry (CAMEBU)	$ 163,770
		Stock Accuracy (CAMEBU)	85%
		Stock Out Rate (CAMEBU)	9%
		Average % of unplanned orders placed by district pharmacies	60%
		Order fill rate (CAMEBU-district pharmacy)	36%
Transportation	35%		
Waste Management	30%		
Dispensing		% prescription compliance to STG	77%
		% patients with knowledge of medicines	51%
		% compliance with good dispensing practices	0%



Capability by Supply Chain Level

Functional Area	CAMEBU	District Pharmacy	FOSA	National
Product Selection	40%			40%
Quantification	33%			33%
Procurement	63%			63%
Warehousing & Inventory Management	42%	46%	41%	33%
Transporation	28%	36%		35%
Waste Management	33%	45%	28%	30%





Data was provided by many survey respondents, including USAID missions, Ministries of Health, USAID | SCMS field offices, and additional in-country partners. Responses are contigent upon knowledge of respondent. Assesment covers the time period from September 2013-February 2014 as data is available.