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USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM

Procurement and Supply Management

BURUNDI NATIONAL SUPPLY CHAIN ASSESSMENT REPORT

Capability, Maturity, and Performance Assessment

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Acronyms

ABREMA	Regulatory Authority for Foods and Medicines for Human Use
CAMEBU	Central Medical Stores [Centrale d'Achats des Médicaments Essentiels du Burundi]
CCTV	closed-circuit television
CDS	health center
CMM	Capability Maturity Model
DQA	data quality assessment
eLMIS	electronic logistics management information system
FASP	forecasting and supply planning
GHSC-PSM	Global Health Supply Chain Program-Procurement and Supply Management
GOB	Government of Burundi
HDI	Human Development Index
HR	human resources
HRH	human resources for health
INSP	National Institute of Public Health
ISO	International Organization for Standardization
KPI	key performance indicator
LMIS	logistics management information system
M&E	monitoring and evaluation
MSPLS	Ministry of Public Health and AIDS Control
NDQL	National Drug Quality Control Laboratory
NEML	National Essential Medicines List
NSCA	National Supply Chain Assessment
PBF	performance-based financing
PEV	Expanded Immunization Program
PNILP	National Integrated Malaria Control Program
PNLS	National AIDS Control Program
PNLIT	National Tuberculosis and Infections Control Program
PNP	National Pharmaceutical Policy
PNSCA	National Health Supply Chain Strategic Plan
POD	proof of delivery
PPN	National Pharmaceutical Policy
PPP	public-private partnership
PRONIAUT	National Integrated Food and Nutrition Program
SATP	stocked according to plan
SCMS	Supply Chain Management Systems
SIAPS	Systems for Improved Access to Pharmaceuticals
SOA	state of the art
SOP	standard operating procedure
SOW	scope of work

SSA	Sub-Saharan Africa
STGs	Standard Treatment Guidelines
SWOT	Strength, Weakness, Opportunities, and Threats
UHC	Universal Health Coverage
UNICEF	United Nations Children Emergency Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

The Ministry of Public Health and AIDS Control (MSPLS), National Supply Chain Assessment (NSCA) Technical Committee, United States Agency for International Development (USAID), and USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project conducted fieldwork in Burundi for the NSCA 2.0 from May 15 to May 30, 2023. The NSCA measures the capability, functionality, and performance of supply chain functions at all desired levels of a national health supply chain system. The assessment toolkit collects information through three primary methods: a supply chain system mapping exercise, the Capability Maturity Model (CMM) questionnaire, and the collection of key performance indicators (KPIs). The 11 functional areas of effective supply chains assessed by the CMM survey are shown in Exhibit 1.

Exhibit 1. NSCA 2.0 CMM Functional Areas
Strategic Planning and Management
Policy and Governance
Human Resources (HR)
Financial Sustainability
Forecasting and Supply Planning
Procurement and Customs Clearance
Warehousing and Storage
Distribution
Logistics Management Information System (LMIS)
Quality and Pharmacovigilance
Waste Management

The primary objectives of this assessment were to:

- Inform the country strategic planning and performance management processes.
- Inform national supply chain policies and decisions with data on broadly accepted metrics and analytics.
- Analyze and measure the performance, operational capacity, and capability of the national public sector–financed health commodity supply chain.
- Identify the performance gaps (bottlenecks, root causes, and opportunities for improvement) to guide system-strengthening investments.
- Assess Government of Burundi (GOB) progress to date in implementing the country's National Supply Chain Strategy (PNSCA 2021–2025).

The assessment focused exclusively on the public-sector supply chain, or that which is directly financed by the GOB or public-sector funding. The assessment sampled health centers (CDS) and sub-national hospitals (district hospitals, communal hospitals, and other hospitals) and censused the two national referral hospitals and the 49 district pharmacies. At the central level, the central medical stores (CAMEBU), the central supply coordinating entity

(ABREMA), and the national public health programs were assessed on appropriate technical areas, yielding 171 sites for the assessment.

PNSCA 2021–2025 is a key driving document for supply chain interventions in Burundi, so the NSCA examined the priorities set out in the document and identified opportunities to reform and improve the supply chain. It documented the presence of existing capabilities and levels of performance across each level of the supply chain (central, intermediate, and peripheral). The performance gaps documented through this NSCA set out the priorities for the MSPLS and GOB in the final two years of the PNSCA 2021–2025. Some of the challenges or priorities delineated in the strategic plan persist even though much progress has been made in other areas. Thus, the results of this NSCA are detailed in the context of PNSCA 2021–2025 priorities and the NSCA CMM and KPI scores obtained for each technical area.

Based on the findings, the authors of this report recommend strengthening institutional capacity at all levels of the supply chain, particularly at the central level, to improve overall governance and leadership for the system. Currently, ABREMA, which assumes central-level coordination responsibility for the supply chain, is neither mandated by its establishing law nor existing regulations to perform this function, thus making such a critical component of the health system an auxiliary function of ABREMA. CAMEBU, the central medical stores, performed creditably in most of the NSCA technical areas assessed. It is therefore well positioned to fulfil its mandate of making quality affordable medicines accessible to its clients. However, CAMEBU has no direct supervisory relationship with other entities in the supply chain, particularly the district pharmacies, to facilitate continuous skills transfer. The PNSCA 2021–2025 proposes to construct three regional storage hubs to address the long-standing concern of inadequate storage space at CAMEBU and decentralize its operations. However, it is recommended that the country complement the findings of the NSCA with a comprehensive warehouse capacity assessment and a network optimization study to determine optimal options for warehouse capacity improvements before proceeding with these major investments.

At the peripheral levels (district pharmacies, hospitals, and CDS), considerable capacity enhancements are required so that policies, guidelines, and standard operating procedures (SOPs) developed at the national level inform practice by end-users. For instance, the district pharmacies will require sustained investments in capacity and infrastructure so that they can play an intermediary role between the central level and the SDPs. This may imply positioning some of the district pharmacies as hubs to provide support to others or outsourcing some services, such as transport, to reduce the need for upfront investments by the government. The sub-national hospitals and CDS must become the focus of training, mentoring, and supervision to bring about change and improvements. One thing that was noticeable was the positive impact of performance-based financing (PBF) schemes on product availability rates in the health facilities. Such incentive structures can be extended to address gaps and promote learning outcomes among personnel at this level.

Remarkably, ongoing initiatives hold significant promise for the future supply chain system. These include such measures as developing the electronic LMIS to provide end-to-end data visibility for decision making, upscaling last-mile delivery, and developing the national quantification guidelines. Such initiatives must be combined with a clear approach to providing resources and capacity enhancements so responsible entities perform at optimum levels.

To assist the country in prioritizing supply chain interventions and reforms, the recommendations below have been selected for focus, as they are critical for improving the country's supply chain. Rather than being a finalized list, they should serve as a guide—and a stimulus for a critical and inclusive exercise of prioritization by the MSPLS and GOB. To ensure that workstreams stay on track for implementing supply chain priorities, the MSPLS and GOB should consider prioritizing the following recommendations:

- Create a specialized entity within the MSPLS to provide leadership and operational oversight for the public health supply chain, given that ABREMA's mandate over the supply chain remains undefined. Such an entity should be strategically positioned to provide technical and operational support from central to peripheral levels.

- Consider developing a national supply chain policy that would provide a framework for supply chain governance and clarity around its technical scopes, such as human resources for supply chain, financing, and accountability. This would help distinguish supply chain management from pharmaceutical management so that each function is not usurped by the other.
- Make a census of existing policies and guidelines and develop a comprehensive plan to review and update them within defined timelines. The MSPLS should also explore innovative approaches to enhance the dissemination of existing documents to end-users. These could be through mandatory professional development programs, special bulletins, and structured supervisions to identify and resolve challenges.
- Develop a structured plan to institutionalize tracking and reporting for KPIs to reinforce a culture of data use for decision making.
- As the timeframe of "Strategic Plan for the Development of Human Resources for Health 2019–2023" ends, ensure the inclusion of health supply chain staff in the next iteration of the plan so their needs for staffing, capacity building, and staff motivation can be included in work and funding streams.
- Institutionalize the practice of regular financial audits in health institutions, particularly the peripheral levels of the supply chain since they are actively involved in financial management.
- In addition to having an approved vendors list, procurement inefficiency and price variations at different levels of the supply chain can be reduced through introducing framework contracts and centralized negotiated prices. Also, the MSPLS should prioritize the introduction of ethics and anti-corruption programs for persons involved in procuring and institutionalizing annual audits for entities that conduct procurements.
- Invest in strengthening logistics management capabilities at the sub-national level (district pharmacies, hospitals, and CDS). It is not enough to have in place the SOPs manual for logistics management; a clear plan is needed for dissemination, training, and use by supply chain actors at the last mile. We recommend that the MSPLS develop a learning agenda and dissemination plan to ensure the SOPs for logistics management are available, accessible, and used to inform decision making across the supply chain.
- Leverage the ongoing process for developing an eLMIS to automate the process for tracking logistics management indicators. If the new eLMIS is expected to collect and report data at each level of the supply chain, then it should be an opportunity to improve the process of collecting data and tracking performance indicators.
- Strongly consider leveraging private-sector participation in commodity distribution to the last mile. Whereas using a government fleet remains a viable option, involving the private sector will reduce the need for government to make initial capital investments.
- Invest incrementally in the National Institute of Public Health laboratory toward attaining International Organization for Standardization (ISO) certification or WHO prequalification but also create an enabling environment for private-sector participation in quality assurance testing. This could attract ISO-certified laboratories to establish local branches for pharmaceutical quality testing in Burundi.
- Adopt a strategic approach to waste management within the health commodity supply chain, developing policies, regulations, and strategies to prioritize resources for improvement in this technical area.

Overall, this assessment found widespread capabilities across the 11 supply chain technical areas assessed. It presents the MSPLS with a detailed and updated understanding of Burundi's public health supply chain so that it can prioritize investments for improvement. The authors of this report are confident that with empowered leadership, strategic targeting of supply chain weaknesses, and a commitment to equity within the health system, Burundi can implement appropriate reforms to further strengthen the supply chain and to realize the country's vision of universal access to high-quality health care.

Background

Burundi's Public Health Context

Burundi is a low-income country, located in the Great Lakes region of Africa. The country has boundaries with Rwanda to the north, Tanzania to the east, and the Democratic Republic of the Congo to the west. With a total land area of 27,834 km² (10,745 mi²), Burundi is one of the smallest African countries. It is ranked 147th worldwide in size although it is one of the most densely populated countries with 451 inhabitants per km.[21] The population of Burundi has reached 13.2 million (2023 projection) with an annual population growth rate of 2.7 percent and an average life expectancy at birth of 62 years.[2] In 2021, Burundi scored 0.426 points to rank 187 out of 191 countries on the United Nations Human Development Index (HDI). This score represents an average annual growth of 1.25 percent growth in HDI in the past three decades (1990 to 2021) and indicates modest progress in the development of key social sectors, such as health, education, and standard of living outcomes for the population.[3]

As part of its efforts to achieve the Millennium Development Goals, the Government of Burundi (GOB) developed and implemented strategic frameworks for growth and the fight against poverty. Consequently, significant progress has been made in the prevention, protection against, and repression of gender-based violence and universal access to health. According to the results of the demographic health survey in 2010 and 2017, the contraceptive prevalence rate increased from 22 percent to 29 percent; antenatal care coverage, from 21 percent to 47 percent; and the proportion of women who had at least four antenatal visits, from 33 percent to 49 percent. HIV prevalence fell from 1.4 percent to 0.9 percent and the prevalence of tuberculosis patients fell from 16 percent to 11 percent from 2010 to 2017. Although the introduction of free maternal and child health services in 2006 and performance-based financing (PBF) has opened access to care, mortality rates are still significant. Under-five mortality in Burundi of 78 per 1,000 is slightly higher than the sub-Saharan African (SSA) average (75.5/1,000 in 2017) and maternal mortality is at 392 per 100,000. The total fertility rate of 5.5 children per woman in 2016–17 is much higher than the SSA average (4.8 in 2016–17).[4]

Burundi's health system requires adequate infrastructure, human resources, and equipment to provide efficient services and to meet the population's health needs. The country's vision for economic development and socio-political stability encompasses quality Universal Health Coverage (UHC) for the population.[5] To achieve UHC, the GOB plans to build a high-performing resilient health system and scale up social health insurance schemes through public-private partnerships, and individual and collective initiatives to achieve the right to health for all, especially the most vulnerable groups. The right to health is guaranteed by the March 18, 2005, constitution of the Republic of Burundi, which stipulates that "the state recognizes citizens the right to health, and it works to promote this right." The right to health imposes an obligation on the state to promote, protect, and restore the health of the population. The National Health Policy 2016–2025 intends to deploy a multifaceted approach to achieve the best health outcomes for the population as part of the nation's sustainable development agenda. The policy aims to reduce the scale (incidence, prevalence)

[1] WorldData.info (2023) . Retrieved from WorldData.info: https://www.worlddata.info/africa/burundi/index.ph
[2] The World Bank. (2023). The World Bank . Retrieved from https://data.worldbank.org/country/BI
[3] United Nations Development Program. (2022, June). Human Development Report 2021/2022. New York: UNDP. Retrieved from undp.org.
[4] Ministry of Public Health and AIDS Control. (2018). National Health Sector Developement Plan 2019-2023
[5] Ministry of Public Health and AIDS Control 2016; National Health Policy 2016-2025

and severity (morbidity, mortality, disability) of priority diseases, including malnutrition, improve the performance of the national health system, and strengthen intersectoral collaboration for better health.[6]

Organization and Management of the Burundian Health System

Burundi's health system shapes up as a pyramid with four levels: central, intermediate, peripheral, and community. Each level is described below.

Central: Includes the:

- Ministry of Health and AIDS Control (MSPLS), its directorates, agencies, and public health programs
- National AIDS Control Program (PNLS)
- National Integrated Malaria Control Program (PNILP)
- National Tuberculosis Control Program (PNLIT)
- National Integrated Food and Nutrition Program (PRONIAUT)
- Expanded Immunization Program (PEV)
- National Reproductive Health Program (PNSR)
- National Integrated Program to Combat Non-Communicable and Chronic Diseases
- National Integrated Program to Combat Neglected Tropical Diseases

The programs focus on managing and preventing priority diseases, such as malaria, acute respiratory infections, diarrheal diseases, malnutrition, HIV/AIDS, and tuberculosis, as well as non-communicable and chronic diseases.[7]

Intermediate: A decentralized level of the MSPLS, including 18 Provincial Health Bureaus whose mission is to oversee implementation of health policy in the provinces.

Peripheral: Includes 49 health districts and is the operational level of the health system.

Community: Includes community relays, such as local associations, community health workers, community health agents, health committees, traditional birth attendants, and traditional healers. The role of these relays is to provide certain services at the community level and act as a bridge between the community and the health service.

The community level provides preventive and promotional care and ensures the management of ailments, such as malaria, diarrhea, and pneumonia. The health center (CDS)—the gateway to the health care network—offers the primary health care package. Burundi has 1,051 CDSs, including 587 public, 330 private, and 137 faith-based nonprofits. The health standards document published in 2012 indicates that 80 percent of households in Burundi live less than 5 km and less than a two-hour walk from a CDS.[8]

The district hospital is the first level of referral for patients from health centers. In addition to district hospitals, public, religious, and private hospitals offer a package of services comparable to that of the district hospital. The regional hospital is defined as a second referral level that receives patients from district hospitals, however, in practice it functions as a district hospital. The national hospitals are the apex of the health care network, providing specialized services.

[6] Ministry of Public Health and AIDS Control 2016; National Health Policy 2016–2025
[7] Ministry of Public Health and AIDS Control. (2018). National Health Sector Developement Plan 2019–2023
[8] Ministry of Public Health and AIDS Control. (2018). National Health Sector Developement Plan 2019–2023

Burundi Public Health Supply Chain

As a fundamental component of the overall health system, an effective and efficient public health supply chain ensures that quality-assured medicines and medical supplies are available when and where they need to be and in the right quantities to be effective in meeting the health needs of the population. Burundi considers the pharmaceutical sector and the public health supply system as key components of the health system, critical to achieving its objectives of UHC, and has developed and implemented laws, decrees, policies, guidelines, laws, and policies to regulate the sector.

The public health supply chain system is a three-tier hierarchy. It includes the:

- Central level, which has the central warehouse "Centrale d'Achats des Médicaments Essentiels du Burundi" (CAMEBU)
- Intermediate level, consisting of 49 district pharmacies
- Peripheral level, with the service delivery points (hospitals and health centers)

Since the year 2000, the national supply of pharmaceutical products in Burundi has mainly been the responsibility of CAMEBU, a state entity created to guarantee the health of the population for sustainable development through regulation of the foods and pharmaceutical sector. CAMEBU's mission is to contribute to attaining the objectives of the national pharmaceutical policy through the sustainable supply of essential medicines, medical devices, materials, and laboratory products. According to government decree no. 100/035 of 2000, which established CAMEBU, it is expected to:

- Ensure an adequate supply of medicines, medical devices, and laboratory products for its clients.
- Improve the availability and affordability of supplies.
- Achieve cost recovery.
- Stabilize essential drug prices.

CAMEBU is expected to collaborate with the MSPLS and stakeholders to supervise the managers of health supplies and carry out all activities related to its corporate purpose.[9] CAMEBU purchases pharmaceutical and other health products from manufacturers and/or wholesalers and distributes them to its customers; national hospitals, health districts (district pharmacies), faith-based health facilities, approved private health structures, and district hospitals.

The district health offices, through their district pharmacies, obtain their supplies from CAMEBU as a matter of priority, and in turn supply the pharmacies in the district hospitals, community hospitals, and health centers. Medicines are dispensed to patients at the health facilities and community levels. If the district pharmacy is out of stock, it is authorized to place the order directly with CAMEBU, with the district medical officer's approval. However, in a stock shortage at CAMEBU, the health district or district hospital may procure supplies from private wholesale pharmacies in compliance with the public procurement rules.

The National Pharmaceutical Policy (PPN) 2012 seeks to ensure better access to medicines and other essential health by ensuring rational use, quality, and affordability. The PPN also aims to establish an efficient supply system and develop an appropriate pharmaceutical industry, as well as establish efficient pharmaceutical information and pharmacovigilance systems.[10]

The PPN considers national health priorities and focuses, among other things, on:

- Sustainable availability of essential medicines

[9] Ministry of Public Health and AIDS Control (2019), CAMEBU Strategic Plan 2019–2024
[10] Ministry of Public Health and AIDS Control. (2018). National Pharmaceutical Policy 2019–2023

- Rational prescription, dispensing, and use of essential medicines at all levels of the health system
- Quality control of imported and locally manufactured medicines

In 2020, the GOB through a decree created Regulatory Authority for Foods and Medicines for Human Use (ABREMA) as an agency of the MSPLS to regulate the pharmaceutical and food sectors. ABREMA's mandate is to regulate the supply of pharmaceuticals and other health care products, such as medicines for human use, cosmetics, and dietetics, processed foods, herbal medicines, traditional medicines, and medical devices, by promoting the quality and safety of these products to protect public health. ABREMA's responsibilities include overseeing the public health supply chain and supply of medicines in the country. The creation of ABREMA appears to have subsumed the functions of the Department of Pharmacy, Medicines, and Laboratory of the MSPLS. In 2014 the MSPLS supported by USAID conducted a national supply chain assessment to gain a broad understanding of the supply chain capabilities and performance within the country. After this assessment, the country developed the first national supply chain strategic plan for health products from 2016 to 2020. After its expiration, the MSPLS developed the National Supply Chain Strategic Plan (PNSCA 2021–2025) to ensure availability, and accessibility to quality health products at all levels of the health system.

Despite these aspirations, many challenges and constraints persist in the supply chain, including;

- Stockouts of essential medicines and other medical consumables (according to the Service Availability and Readiness Assessment survey 2016[11]: the availability index of essential medicines is 29 percent)
- Weak regulation of the pharmaceutical sector
- Lengthy public procurement procedures and quantification of needs not based on consumption data
- Limited capacity for transporting pharmaceutical products from the central level to peripheral structures (district, hospital, CDS)
- Low storage capacity for pharmaceutical products at central and operational levels
- Insufficient quantity and quality of qualified personnel in the field
- Several parallel pathways for ordering pharmaceutical products
- Illicit marketing of pharmaceutical products
- Low capacity for local production of medicines
- Ineffective coordination of stakeholders in the regulatory decision-making process
- Low capacity of the pharmacovigilance system at all levels of the medicines management circuit
- Low visibility of activities related to the biomedical laboratory
- Low capacity of the quality control system in the pharmacy and laboratory sector, both public and private
- Low maintenance capacity for laboratory equipment
- Inadequate package of laboratory services offered at all levels of the health care system
- Lack of interconnection and interoperability of the various software packages (Sage, Chanel, DHIS2) for managing pharmaceutical products at the national level

[11] Ministry of Public Health and AIDS Control (2019) , CAMEBU Strategic Plan 2019–2024

Overview of the Supply Chain Assessment Activity

Under the leadership of the MSPLS, ABREMA, the National Supply Chain Assessment (NSCA) Technical Committee, USAID, and GHSC-PSM provided support for the requisite fieldwork for the NSCA in Burundi from May 1 to June 3, 2023. The main objective for conducting the NSCA is to provide enough evidence and information about the current state of Burundi's health commodity supply chain to inform long-term strategic planning. Specifically, the assessment will:

- Inform the country strategic planning and performance management processes.
- Inform national supply chain policies and decisions with data on broadly accepted metrics and analytics.
- Analyze and measure the performance, operational capacity, and capability of the national public sector-financed health commodity supply chain.
- Identify the performance gaps (bottlenecks, root causes, and opportunities for improvement) to guide system-strengthening investments.
- Assess GOB progress to date in implementing the country's supply chain strategic plan (PNSCA 2021–2025).

The NSCA 2.0 includes three distinct elements:

1. Results in a visual representation of the country's supply chain
2. Measures of the overall capability, resources, processes, and functionality of the country's supply chain
3. Collection of site-level data on KPIs to measure supply chain performance.

Based on the findings, the GOB, in collaboration with key supply chain stakeholders, can revisit and refine strategic priorities and operational plans, leverage a shared understanding of the current context to build stakeholder support for collective action, and follow up on flagged areas of poor relative performance with targeted root-cause analyses. The NSCA focused on those parts of the Burundian health supply chain directly financed or directed by the GOB. The assessment team collected capability and performance metrics on ABREMA, which is the national supervisory agency for the supply chain, and CAMEBU, which serves at the Central Medical Stores (CMS), the public health programs, district pharmacies, hospitals, and health centers. Donors play a key role in Burundi's public health system, especially in procuring key commodities, and their actions certainly affect the public system. However, the extent that donors feature in the NSCA is to assess how Burundi's public health actors effectively manage relations with them, rather than to assess donor capabilities or performance directly. Similarly, the private health market is an influential actor in Burundi's health system, but one that remained mostly outside the scope of this assessment. Future assessments on donor effectiveness and the private health market would be welcome complements to the NSCA. As is, the NSCA's value is in focusing on the public dimensions across 11 technical areas and multiple levels to inform future public health system strengthening.

The following discussion offers interpretations of the capability and performance results and translates them into recommendations for future supply chain interventions. The Summary of Findings and Conclusions section highlights key takeaways and suggestions for future analysis. The report annexes, offered in a second volume, provide the complete assessment tools and other detailed information.

Methodology

Over a nine-month period from October 2022 to June 2023, the assessment team engaged relevant in-country stakeholders to define the scope of work (SOW), determine the tracer commodities for the assessment, and assemble and train data collection teams. This approach simultaneously aimed to strengthen buy-in and investment in the exercise from the MSPLS, the NSCA Steering Committee, USAID, and other key supply chain stakeholders. The team used the NSCA 2.0 toolkit to guide planning, data collection, and analysis. This section describes in greater detail this process and the assessment's methodology.

The National Supply Chain Assessment Toolkit

The NSCA 2.0 is an updated toolkit that measures the capability, functionality, and performance of supply chain functions at all desired levels of a national health supply chain system. It includes three primary assessment elements: supply chain mapping, the Capability Maturity Model (CMM) tool, and the KPI assessment tool (see Exhibit 2). It also includes resources for planning and implementing the assessment activity and for analyzing and disseminating findings. The toolkit is freely available for download at www.ghsupplychain.org.

Exhibit 2. Overview of the Three Elements of NSCA 2.0 Assessment

ACTIVITY	DESCRIPTION
Supply chain mapping	The objective of mapping is to obtain an in-depth understanding of the supply chain, including the roles and responsibilities of key supply chain actors. This is achieved through facilitated group work to identify similarities and differences among various product groups flowing through the system.
CMM diagnostic tool	This tool assesses capability and processes across functional areas and cross-cutting enablers (e.g., human resources (HR), financial sustainability) using interviews and direct observation.
Supply chain KPIs	The KPIs measure supply chain performance in selected functional areas.

Scope of Work

The SOW required the assessment team to conduct a comprehensive assessment of Burundi's public health system across levels: central, provincial, and service delivery points. Also, the assessment disaggregates data across multiple facility types: health centers, district hospitals and national referral hospitals, and district pharmacies. At the central level, the team carried out assessments at ABREMA, CAMEBU, and the Public Health Program (PNLS, PNILP, PNLIT, PRONIAUT, PEV). Exhibit 2 in the following section lists all sites where data were collected in May and June 2023. The complete SOW is attached to this report in the Annex.

The NSCA 2.0 was designed to assess country-level supply chain infrastructure, with disaggregation at the level of facility type. Some facility types were lumped together to account for similarities in size and capability and to reduce overall sample size. In Burundi, the sample frame consisted of all public health facilities across the country for which the national government has a census of sites.

The sampling frame thus consisted of 828 CDSs, 66 sub-national hospitals (district hospitals, community hospitals and other hospitals), two national hospitals, and 49 district pharmacies. The central medical stores (CAMEBU), ABREMA, and the public health programs (PNLS, PNILP, PNLIT, PRONIAUT, PEV) were also assessed for their roles in the supply chain. The sample frame excluded fully private facilities, as this assessment focused on public-sector entities.

The assessment team determined the minimum sample size using the hypergeometric sample size formula, assuming a margin of error of +/– 10 percent, and a 90 percent level of confidence as the NSCA 2.0 guidance suggests. The team used a randomized two-stage process to select health centers. The sample size was initially calculated for the number of districts, and later calculated for the number of health facilities needed, based on the above parameters and assuming a design effect of 1.6. The design effect used is based on post-assessment analysis of NSCA 2.0 pilots. Districts were selected with the probability of inclusion in the assessment proportional to the number of health facilities in each district. The final sample is detailed below along with the full sample frame (see Exhibit 3). We assessed a total of 172 sites. The full list of selected sites is provided in the annex report of the NSCA.

Exhibit 3. NSCA Frame and Selected Sample

Facility type	Population	Sample
Health centers	828	83
Hospitals	66	29
National hospitals*	2	2
District pharmacies*	49	49
Central warehouse (CAMEBU)*	1	1
Central-level entities* (ABREMA and the public health programs)	7	7
Total	**952**	**171**

*Denotes that this facility type was censused

At each selected facility, data collectors completed a CMM survey and collected data on KPIs. In all facilities, they sought to talk with key informants most qualified to speak on given assessment modules or technical areas (e.g., financial sustainability, warehousing and storage, policy, and governance). In larger facilities, this often resulted in multiple interviews per site—e.g., with the financial officer, warehouse manager, and head pharmacist. This was especially the case for the central levels, where we conducted over a dozen interviews to fully complete the CMM assessment. Conversely, in smaller facilities, individual staff members (e.g., the lead pharmacist) often played multiple supply chain roles and thus answered multiple modules within the assessment.

Team Composition and Training

Central-level and field teams were formed and trained to conduct this assessment. Central-level interviews with ABREMA, CAMEBU, and the public health programs were led by the GHSC-PSM team. At the subcentral sites, 15 two-person teams (30 members total) traveled to 163 sites over 15 days to collect data. Public servants from the various departments of health and the public health programs were nominated by the MSPLS to participate as data collectors in this national assessment. Selection was based on a set of outlined skills and credentials, including a deep understanding of key health care commodities, comfort with diverse supply chain functional areas, experience with large assessments, high levels of professionalism, and ability to operate with significant autonomy. All data collectors participated in an intensive five-day training on the assessment tools, SurveyCTO, tracer commodities, and best practices in

survey methods. On the fourth day of training, participants conducted pilot assessments of five health facilities in Bujumbura and Bujumbura Marie. The pilot served as a practice exercise for data collectors, a low-stakes chance to troubleshoot technology, and a final opportunity to provide targeted feedback to the assessment team to further refine the survey to the Burundian context.

Procedures

Before the start of data collection, MSPLS-endorsed letters were sent to district health offices to inform them that facilities in their respective province had been randomly selected to participate in a national assessment of the health supply chain system. District health offices were responsible for communicating the exercise to the main points of contact at each health facility under their oversight. Data collectors also carried with them a copy of the notification signed by the MSPLS, in case of communication failure, and were trained to explain or further reinforce the purpose and value of the assessment upon arrival.

Subcentral data were collected from May 15 to May 31, 2023. On average, teams spent one full day assessing health centers and one to one-and-a-half days at hospitals and district pharmacies, with travel days in between. One team member would lead the CMM survey interviews, while the other collected KPI data. If one team member completed their respective interview early (usually the CMM lead), data collectors would support the team member. In a handful of cases, teams included a third member to support KPI data collection at large and predictably difficult sites.

The central-level team collected data from ABREMA, which is the MSPLS supervisory entity for the public health supply chain, the public health program, and CAMEBU. Access was facilitated with scheduling support by key ABREMA representatives and the GHSC-PSM staff, and reflected relationships developed throughout the planning process with key stakeholders in the MSPLS. Central-level interviews were conducted over a two-week period, from May 22 to June 2, 2023.

The CMM questionnaire measures the level of capability and functionality present in the supply chain across 11 functional areas, including storage and warehousing, distribution, financial sustainability, waste management, and human resources. Only relevant modules were assessed at specific sites, depending on their facility level. For example, health facilities were not assessed on their capabilities in forecasting and supply planning. Relevance was determined by consultations with NSCA technical working groups to understand what supply chain functions were expected at different facility types throughout the system.

The survey consists primarily of an extensive set of binary yes/no-type questions that establish the presence—or lack thereof—of a set of supply chain capabilities, processes, and best practices. The structure facilitates collection of data in a standardized way, reduces the impact of subjectivity in the assessment (compared to NSCA 1.0), and improves the comparability of the results across countries and time.

Data were collected through a mix of key informant interviews, direct observation, and verification through supporting documents. Data collectors were trained to ask to speak with the facility staff best suited to respond to each module, based on the respondent's area of operation. For example, where present, a stock manager would be considered best suited to answer questions on warehousing and storage and the lead accountant to answer questions on financial sustainability. As part of the tool, a subset of respondent answers was paired with structured requests for documentation to verify the response (e.g., logistics reports, standard operating procedures (SOPs), and financial records). In the warehousing and storage module, data collectors were instructed to conduct the interview itself in the storage space and directly observe capabilities (e.g., packets, generators, safety equipment). Depending on the number of modules completed, availability of key informants, and speed of retrieving verification documents, the CMM questionnaire might take several hours to a full day to complete. Data was collected electronically using the SurveyCTO platform on individual tablets.

Exhibits 4 and 5 provide an overview of the functional areas addressed in the CMM questionnaire by type of facility. The annexes include a complete list of the facilities assessed and the geographic coverage in a map.

Exhibit 4. CMM Functional Area by Level in the Burundi Supply Chain System—Noncentral Levels

#	FUNCTIONAL MODULES ASSESSED	District pharmacies	National hospitals	Sub-national hospitals	Health centers
1	Strategic Planning and Management				
2	Human Resources	✓	✓	✓	✓
3	Financial Sustainability	✓	✓	✓	✓
4	Policy and Governance	✓	✓	✓	✓
5	Quality and Pharmacovigilance	✓	✓	✓	✓
6	Forecasting and Supply Planning (FASP)				
7	Procurement and Customs Clearance	✓	✓	✓	
8	Warehousing and Storage	✓	✓	✓	✓
9	Distribution	✓			
10	Logistics Management Information Systems	✓	✓	✓	✓
11	Waste Management	✓	✓	✓	✓

✓ denotes yes and x denotes no.

Key Performance Indicators

Exhibit 5. CMM Functional Area by Level in the Burundi Supply Chain System—Central Level

FUNCTIONAL MODULES ASSESSED	ABREMA	CAMEBU	Public health programs
Strategic Planning and Management		✓	
Human Resources	✓	✓	
Financial Sustainability	✓	✓	
Policy and Governance	✓	✓	
Quality and Pharmacovigilance	✓	✓	
FASP	✓	✓	✓
Procurement and Customs Clearance		✓	
Warehousing and Storage	✓	✓	
Distribution		✓	
Logistics Management Information System	✓	✓	✓
Waste Management	✓	✓	

KPIs are used to measure current supply chain performance. The assessment teams used the KPI assessment tool to collect granular quantitative data for a core set of indicators aligned with international standards for health supply chain management. KPIs included stocked according to plan percentages (by tracer), stock card accuracy, stockout rates (by tracer commodities), and temperature excursions, The full list of KPIs and the facility level at which they were collected is presented in Exhibit 6. Data sources for

KPI data included stock cards, the logistics management information system (LMIS), and eLMIS reports, invoices, orders, proof of delivery notes, temperature monitoring logs, and dispatch notes. Retrospective data (six months to one year) were also collected in some cases to better illustrate the consistency of past performance. Depending on the size of the facility, availability and state of documentation, and quantity of stock on hand, KPI data collection could be a time-consuming endeavor, requiring one data collector to spend anywhere from several hours reviewing reports and counting stock to up to two full days. Data was collected on tablets using SurveyCTO.

Exhibit 6. KPIs by Level in the Burundian Supply Chain System

#	Key performance indicators	Public health programs	CAMEBU	District pharmacies	National hospitals	Sub-national hospitals	Health centers
1	Stock data	--	✓	✓	✓	✓	✓
2	Delivery data			✓	✓	✓	✓
3	Human resource		✓				
4	Facility reporting rates						
5	Temperature excursions		✓	✓	✓	✓	✓
6	Forecast accuracy	✓	✓				
7	Supply plan accuracy	✓	✓				
8	Source of funds data	✓	✓				
9	Prices paid		✓		✓	✓	

✓ denotes yes and x denotes no.

In collaboration with the GOB NSCA Steering Committee, the tracer commodities shown in Exhibit 7 were selected for the NSCA. Collectively, they provide a fair representation of the commodity types that can be found in the Burundian public health supply chain, account for unique supply chain challenges (e.g., cold chain transport), are nominally available at the health center level, and provide enough information to inform strategic decision making.

xhibit 7. Tracer Commodities				
#	PRODUCT NAME	DOSAGE	DOSAGE FORM	PRODUCT CATEGORY
1	Albendazole	400mg	Tablets	Essential medicines
2	Amoxicillin suspension	125mg/5ml	Bottle	Essential medicines
3	Sulfamethoxazole/trimethoprim	400/80mg	Tablets	Essential medicines
4	Artemether/lumefantrine (AL) 6x4	20/120 mg	Blister of 24 tablets	Malaria
5	Malaria rapid diagnostic tests	Piece	Kit	Malaria
6	Artesunate injectable	60 mg	Vial	Malaria
7	Depot medroxyprogesterone acetate (DMPA)	150 mg/mL	Vial	Reproductive health
8	Male condoms	Piece	Pieces	Reproductive health
9	Pentavalent vaccine	Vial	Vial	Vaccine
10	Rifampicin/isoniazid/pyrazinamide/ ethambutol (RHZE150/75/400/275)	150 mg/75 mg/ 400 mg/275 mg	Ampoule	TB
11	Rifampicin/isoniazid (RH-75/50)	75 mg/50 mg	Kit	TB
12	Abacavir/lamivudine	120/60 mg	Bottle of 60 tablets	HIV
13	Lamivudine/tenofovir/dolutegravir (TLD90)	300/300/50 mg	Bottle of 90 tablets	HIV
14	HIV 1+2, Determine Early Detect, rapid test kit	Piece	Kit	HIV
15	Ready-to-use-therapeutic food (RUTF)	92 mg	Sachet	Nutrition

Data Management

Each data collector was provided with an individual tablet programmed with SurveyCTO to electronically collect, enter, and upload data. All completed CMM and KPI questionnaires were uploaded daily to the SurveyCTO secure data server. After upload, a team of four monitoring and evaluation (M&E) specialists from GHSC-PSM reviewed submitted data daily for quality assurance. In cases of data oddities or discrepancies, the specialists followed up directly with the data collection teams (through a Quality Assurance WhatsApp group, supplemented by direct calls from the logistics lead) to confirm data points, resolve issues, and provide future guidance. This structured process served to verify that all answers were correctly coded and nonresponse data points removed, facilitating more efficient analysis. Further, the frequency of this data review (sometimes referred to as "cleaning") enabled us to quickly identify unexpected issues, which were systematically addressed. After this daily review and response process, validated data were accepted by the M&E team for inclusion in the final datasets.

SurveyCTO exports data using a comma-separated values format. Data analysis workbooks that are part of the standard NSCA 2.0 toolkits were coordinately designed in Microsoft Excel to leverage this format. This minimized the data transformation process, streamlined data cleaning, and significantly increased the automation of KPI calculation during data analysis. By using coding values that created clear "signal spikes," nonresponse values were easily identified by the values populating a summary metrics page. The data analysis workbooks also produced charts, graphs, and data dashboards to enable top-line analysis that contributed

to field-based debriefs for local stakeholders. Results will be discussed by examining all three components of the data collection: the supply chain map, CMM interviews, and KPI data collected.

Limitations

Comparison to NSCA 2014 Results

In 2014, the MSPLS requested technical assistance from the USAID program's Supply Chain Management System (SCMS) and Systems for Improved Access to Pharmaceuticals (SIAPS) in conducting a baseline assessment to gain a broad understanding of the supply chain capabilities and performance within the country. However, this assessment was conducted using the NSCA 1.0 methodology, which has technical differences from the NSCA 2.0 methodology that was used in this assessment. Technical variations are found across the CMM and KPI questionnaires in the NSCA version 1.0 and the NSCA version 2.0. Hence, a direct comparison of CMM module scores from the 2014 assessment and the 2022 assessment is not strictly appropriate, as the methodologies (number of questions, nature of questions, etc.) are varied.

To circumvent this issue for analyzing the current state of the supply chain in Burundi, the authors of this report used comparisons at the question level rather than the module level. For example, instead of drawing a comparison by saying that district hospitals scored higher on the LMIS module in 2023 than in 2014, the report details more granular comparisons like 80 percent of district hospitals reported using LMIS reports to inform ordering and inventory management, an increase from 50 percent in 2014. This statement is illustrative and does not represent the actual situation in 2014 or 2023 for district hospitals.

Sensitivity to Country Context

Implementation of this NSCA was sensitive to the social and political context in the country as guided by the in-country technical oversight committee led by ABREMA. Major decisions on the scope of implementation and areas of assessment were all approved by the technical committee before configuration of tools assessment and deployment. Where the technical committee expressed concerns about the potential sensitivity or suitability of specific NSCA questions to the country context, the appropriate adjustment or amendments were made. For example, questions related to financial data and human resource counts were excluded at peripheral facilities because these were considered as non-essential to understanding the state of the supply chain at this time.

Comparing CMM and KPI Scores

The NSCA 2.0 uses a two-stage cluster approach designed to yield a maximum error of ±10 percent. We used this approach to ensure a representative sample of public health facilities and to leverage statistical principles to extrapolate the findings back to the larger population of health facility entities in the country. The NSCA 2.0 data analysis template in its current format does not calculate standard error for the numerous variables assessed with the collected data. Without the standard error, the precision of the KPI or CMM module score value is unknown (but presumably <±10 percent).

While individual scores are meaningful, comparisons between two facility types for any CMM score or KPI are more challenging. Without calculated errors, any differences less than 20 percent (assuming the maximum possible error of ±10 percent) cannot be stated with complete confidence. Therefore, to err on the side of caution, this report will not attempt to interpret differences between facility types within a CMM module, unless the computed difference is greater than 20 percent. Each KPI will be examined individually, by facility type, within the context of that facility type, rather than drawing comparisons across the supply chain. For facility types that were censused (provincial hospitals, referral hospitals, RMS branches, CMS, and central-level entities), no error is associated with those scores.

This does not imply that scores or KPIs are unimportant, or the underlying data are not useful. It is simply a function that limits the discrimination of small differences of scores because the precision is too low or unknown. In this case, making definitive statements about one score being higher than the other (unless the scores differ by more than 20 percent) is not appropriate. The underlying questions asked in the CMM are still insightful and will help drive analysis and recommendations.

Summary of Results

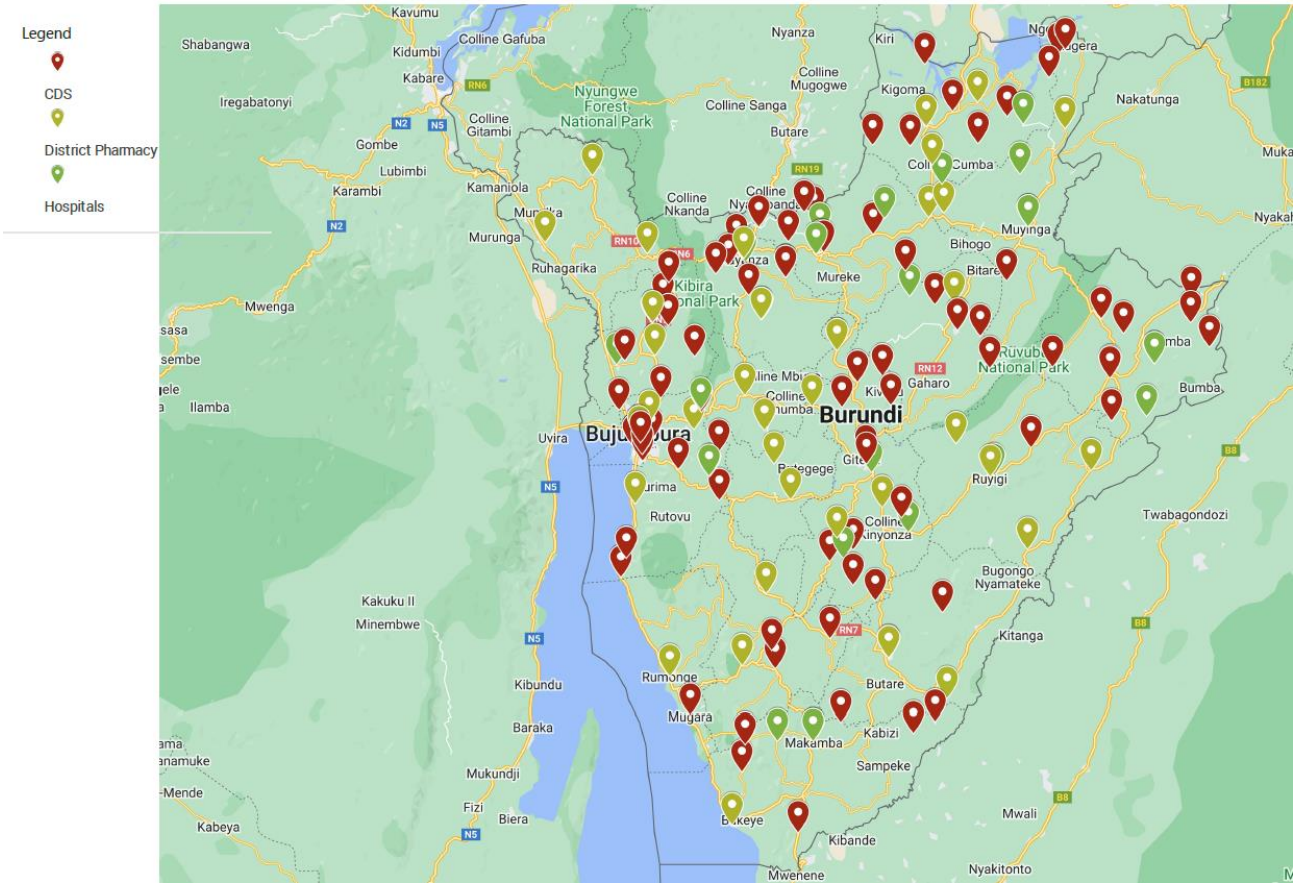
Overall, we collected data from 171 sites across all levels of the Burundian public health supply chain system, including:

- Central level (n=1), including the ABREMA, CAMEBU, and the Public Health Programs (PNLS, PNILP, PNLIT, PRONIAUT, PEV)
- District pharmacies (49)
- Service delivery points, including health centers (n=72), district and other hospitals (n=29), and national hospitals (n=2)

Some questions and responses were obtained for a fewer number of facilities due to missing data, exclusions through data, or non-applicable questions.

In this section, we provide a snapshot overview of collected data. The supply chain maps are presented first to establish the flow of products and information through the Burundian public health supply chain system. Next, an overall table of CMM results, followed by select KPIs, synthesizes assessment findings. In other sections of the report, results and findings are detailed first for each functional module and then for each level of service. Within each module, we present CMM scores first and then relevant KPIs. Discussion and recommendations specific to that module or service level follow the presentation of findings

Exhibit 8. Location of Sites Visited for Data Collection Using Geocodes



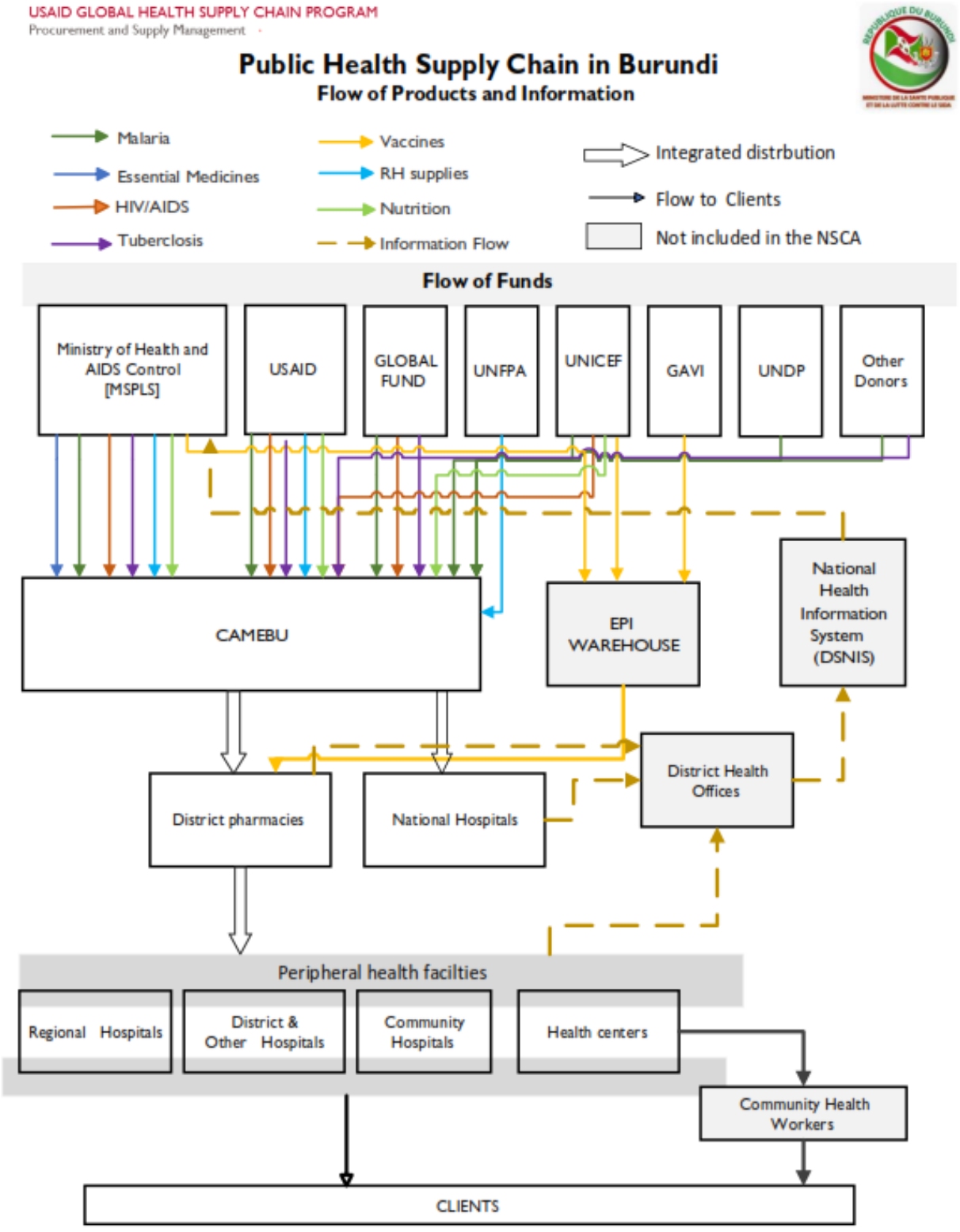
Supply Chain Maps: Commodity and Information Flows

All NSCA 2.0 implementations include, as a first step, a participatory exercise to map comprehensively the national supply chain. The objective is not only to obtain an in-depth understanding of the structure and processes of the supply chain but also to create an opportunity for key stakeholders to contribute meaningfully to this assessment. The activity pushes participants to go beyond distribution routes, to elaborate on the roles and responsibilities of key participants; clarify information flows; differentiate between various program streams and commodity paths; and identify strengths, weaknesses, and opportunities throughout the system.

On May 26, 2023, 20 participants convened for the one-day supply chain mapping workshop in Bujumbura, Burundi. They included representatives from the NSCA technical working group, the national health programs, supply chain partners, and invited professionals (see report annex for the workshop slides, agenda, and final participant list). Participants were organized by their expertise into four working groups based on salient vertical programs, and each team was asked to produce a comprehensive map of commodity and information flows from procurement to service delivery. After the workshop, the assessment team integrated these maps into an illustration of the Burundian public health supply chain with the goal of illuminating bottlenecks, inefficiencies, and opportunities for improvement.

Exhibit 9 illustrates the organization and elements within the Burundi supply chain as well as the flow of commodities and information through the system. The final versions presented here have been reviewed and endorsed by the in-country NSCA technical committee.

Exhibit 9. Map of Commodity and Information Flow



These illustrations of commodity and information flows through the Burundian public health supply chain help to highlight several key facets and challenges of the current system:

Distribution system integration. Commodity distribution becomes increasingly integrated as one moves down the supply chain system. Multiple entities procure health commodities for storage at the central medical warehouse (CAMEBU). Commodities are bundled for distribution to district pharmacies, which are managed by the district health bureaus. Per design the district pharmacies are expected to conduct an integrated distribution of commodities to the SDPs, but this sparsely happens because of resource constraints. Exhibit 8 makes clear the exceptions to this path, vaccine commodities, which are stored and distributed from the EPI warehouse.

Multiple procurers. Multiple entities—governmental and donor—are procuring health commodities for the public health system, typically with multiple procurers per program area. While increasing the funds available for commodities, this also complicates coordination, as entities procure products on separate timelines.

Downstream procurement. For essential medicines and non-donor-funded commodities, the Government of Burundi and MSPLS through CAMEBU procures and distributes commodities for the entire public health chains system. However, CAMEBU is often unable to satisfy the needs of commodities for the public sector, so the district pharmacies and SDPs request for authorization to satisfy their needs from the private sector when shortages occur at CAMEBU. This situation creates a scenario where multiple entities at each level of the supply chain engage in procuring health commodities. Whereas this might be the most feasible option available to satisfy clients' needs, this situation deprives the system of potential benefits, such as central quality control and economies of scale.

District pharmacies. This mapping calls attention to the role of the district pharmacies in the warehousing and distribution of commodities used in the health system. Whereas this practice decentralizes warehousing and distribution to the lowest levels, the role of district pharmacies needs to be considered in future efforts to improve and strengthen supply chain efficiency. For example, when it comes to equipping the district pharmacies for distributing commodities to the last mile, it should be possible to consider pooling resources rather than acquiring assets such as vehicles for each entity.

Information flow: The current system for information flow relies on a paper system for data capture at the peripheral levels and entry into the DHIS2 web platform at the district level for about 120 tracer commodities. The DHIS2 captures only reported data and does not support supply chain transactions. The country has now taken steps to transition to an electronic LMIS that provides an end-to-end supply chain management solution, including stock management, report and requisitions, and other stock transactions.

Understanding the CMM Results

A review of the CMM results presented below must consider how scoring was completed. The capability and processes were assessed based on a maturity model, adapted from private-sector best practices to fit the public health context. For more information on how international benchmarks were considered in designing the CMM modules, review the NSCA 2.0 toolkit. Within each functional module, each question (or item) assessed has one of four maturity levels assigned to it, ranging from basic to state of the art (SOA); the overall CMM score for each module is the sum of scores at each maturity level. Exhibit 10 provides an overview of each level of maturity, its definition, and its overall contribution to the functional area's overall CMM score.

This functional area overall CMM score is a composite derived from results of the questions across the maturity levels. Of a total possible 100 percent CMM score, **basic** items contribute 50 percent, **intermediate** items 30 percent, **advanced** items 15 percent, and **SOA** items 5 percent. The scores are not directly interpretable (e.g., a score of 50 percent does not indicate that all the basic items are in place in all facilities). However, the scores are comparable across the functional areas. The components that make up the basic level are scored separately from those associated with the intermediate level; scoring is done this way to recognize that even within a function, maturity levels may be mixed. The overall score for a single function is a composite of all basic, intermediate, advanced, and SOA scores. An overall maturity score for intermediate, then, does not necessarily indicate that every aspect of that function has achieved that level of maturity.

Exhibit 10. Definitions of Level of Maturity and Contribution to the Overall CMM Score

Level of maturity	Definition	Maximum contribution to the CMM score
Basic	**Must-have** policies, structures, processes, procedures, tools, indicators, reports, and resources to operate a supply chain system (e.g., a stock card as a tool for inventory management).	50%
Intermediate	Not must-haves but **intermediate**-level policies, structures, processes, procedures, tools, indicators (e.g., Excel).	30%
Advanced	**Nice-to-have** policies, structures, processes, procedures, tools, indicators, reports, and resources to operate a supply chain system (e.g., Rx solution, a stock management electronic tool).	15%
State of the art	**Nonessential, SOA** policies, structures, processes, procedures, tools, indicators, reports, and resources for a supply chain system (e.g., an enterprise resource planning system for stock management and control).	5%

Benchmarks in the NSCA

NSCA methodology does not benchmark scores against a set of standards to denote a specific technical area having attained a specific level. As explained above, a mix of levels is expected in the final CMM score. To help provide some structure around the analysis, the report authors use an 80 percent benchmark around which to discuss CMM scores. This benchmark has also been used in previous NSCA reports.

The logic behind this 80 percent benchmark is simple; to achieve such a score, most points must be in the basic and intermediate levels to mathematically reach 80 percent. If your supply chain has demonstrated capabilities across the basic and intermediate levels for a particular technical area, then most likely you do not need to prioritize this technical area for improvement in your next strategic planning process. Achieving 80 percent is certainly possible without completely filling basic and intermediate capabilities. This gap becomes a recommendation to focus on for that technical area. Overall, this benchmark's main purpose is to help separate technical areas that are relatively more advanced than others and allow for pragmatic prioritization in improving the public health supply chain.

Capability Maturity Model: Summary Tables

Exhibits 11–14 present a summary of key data findings for capability maturity metrics across the 11 technical areas and seven facility disaggregation types.

Exhibit 11. CMM Scores, Average, and Ranges Presented by Level of Facility for Each Functional Module

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
	83	28	2	48	1	1
Strategic Planning and Management	--	--	--	--	62%	50%
Policy and Governance	--	20% (0–85%)	44% (0–89%)	21% (0–83%)	59%	27%
Human Resources	48% (0–76%)	41% (16–70%)	36% (34–38%)	48% (20–70%)	49%	40%
Financial Sustainability	73% (53–88%)	71% (59–87%)	72% (66–78%)	66% (45–85%)	77%	45%
Forecasting and Supply Planning	--	--	--		41%	52%
Procurement and Customs Clearance	--	27% (0-61%)	60% (60-60%)	26% (4-56%)	65%	--
Warehousing and Storage	40% (26–64%)	43% (29–60%)	54% (50–59%)	43% (30–70%)	70%	--
Distribution	--	--	--	25% (3–54%)	60%	
Logistics Management Information System	57% (4–81%)	58% (3–84%)	75% (74–77%)	49% (4–76%)	42%	--
Quality and Pharmacovigilance	6% (0–70%)	4% (0–38%)	25% (21–29%)	4% (0–54%)	74% (8–68%)	33% (0–53%)
Waste Management	24% (0–58%)	24% (3–45%)	44% (44–48%)	27% (0–60%)	42%	26%

Select KPIs: Summary Tables

Exhibit 12. Select Key Performance Indicators, Average, and Ranges Presented by Level of Facility

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
	n = 83	n = 28	n = 2	n = 48	n = 1
Stocked according to plan (tracer commodities)	23% (14–35%)	20% (6–32%)	20% (0–50%)	28% (27–55%)	0%
Stockout on day of assessment	8% (1–24%)	6% (0–20%)	15% (0–100%)	7% (0–21%)	0%
Average number of stockout days for 181-day period*	3.5 days (2%)	4.2 days (2%)	13.3 days (7%)	7.6 days (4%)	--
Average number of days per month with stockouts, given that there was a stockout	1.6 days	2.3 days	14.6 days	3.5 days	--
Stock card accuracy: percentage of facilities at 100 percent accuracy	72%	71%	92%	65%	--
Stock card accuracy: average deviation from 100 percent accuracy across facilities (no deviance = 0)**	47%–2,152%	17%–2,216%	50%–700%	60%–1,339%	--
eLMIS record accuracy: percentage of facilities at 100 percent accuracy	52%	42%	--%	54%	--
eLMIS record accuracy: average deviation from 100 percent accuracy across facilities (no deviance = 0)	10%–432%	24%–8,686%	0%–0%	29%–1,644%	--
Waste from damage, theft, and expiry: damaged, lost, and expired stock as a percentage of the total stock available	2%	0%	0%	0%	--

Exhibit 13. Heat Map, Capability Maturity Model

Module	Level of the supply chain					
	CDS	Sub-National Hospitals	National Hospitals	District Pharmacies	CAMEBU	ABREMA
	n = 83	n = 28	n = 2	n = 48	n = 1	n = 1
Forecasting and supply planning						
Procurement and customs clearance						
Warehousing and storage						
Distribution						
Waste management						
Strategic planning and management						
Human resources						
Financial sustainability						
Policy and governance						
Quality and pharmacovigilance						
Logistics management information system						

Exhibit 14. Heat Map, KPI Scores, Non-Central Facility Levels

KPI	CDS	Sub-National Hospitals	National Hospitals	District Pharmacies
	n = 83	n = 29	n = 2	n = 49
Stockout				
Stockout on day of assessment, average across tracer commodities				
Stockout days for period November 2022 through April 2023				
Average # of days per month with stockout, if there was a stockout				
Accuracy of stock records				
Stocked according to plan				
Stock card accuracy: Percentage of facilities at 100% (Paper)				
Stock card accuracy: Percentage of facilities at 100% (electronic)				
Distribution - Responsiveness				
Order turnaround time				
Percentage of orders delievered in-full				
Percentage of orders as emergency orders				
Percentage of orders delivered on or before promised delivery date				
Percent of total stock lost, damaged or expiry during December-May				
Other				
Percentage of days with a temperature excursion in cold storage				

Analysis, by Functional Module: Capability Maturity and KPI Results

This section systematically presents context, findings, and analysis across each of the 11 technical areas assessed in the NSCA.

Strategic Planning and Management

Strategic planning and management ensure that supply chain priorities are identified, roles and responsibilities clarified, goals and changes directed, and frameworks for monitoring progress and performance established. Strategic planning and management are the purview of the MSPLS, but all health system levels are responsible for understanding their role in the strategic plans. Major areas that were factored into the scoring for this CMM module are the existence of strategic plans; appropriate monitoring mechanisms, such as formal oversight committees that have broad stakeholder inclusions; risk management; and clear plans for private-sector engagement (see Exhibit 15).

Exhibit 15. Examples of Scored Strategic Planning and Management Capabilities

Basic	Presence of an approved supply chain strategic plan (or awareness of it for lower-level entities) Monitoring of supply chain implementation plan and presence of specific subsections Formal biannual assessment of supply chain risks
Intermediate	Strategic planning process that includes stakeholder mapping exercise Presence of a supply chain implementation plan Biannual updates to the supply chain strategic plan or implementation plan Actions to reform the supply chain system included in the strategic plan or implementation plan Coordination or engagement with the private sector to improve the supply chain within the last year
Advanced	Monthly meetings of stakeholder groups to review supply chain performance Presence of a risk management and mitigation/prevention plan Formal strategy for using public-private partnerships to improve supply chain performance
SOA	Formal and continuous assessment of supply chain risks

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

The National Health Supply Chain Strategic Plan (PNSCA) 2021–2025 establishes the foundation around four general objectives on how to achieve the plan's state vision of "By 2025, the Burundian population will have access to drugs and other health products of good quality, safe, effective and at a good price. " The four general objectives are classified under technical domains as follows:

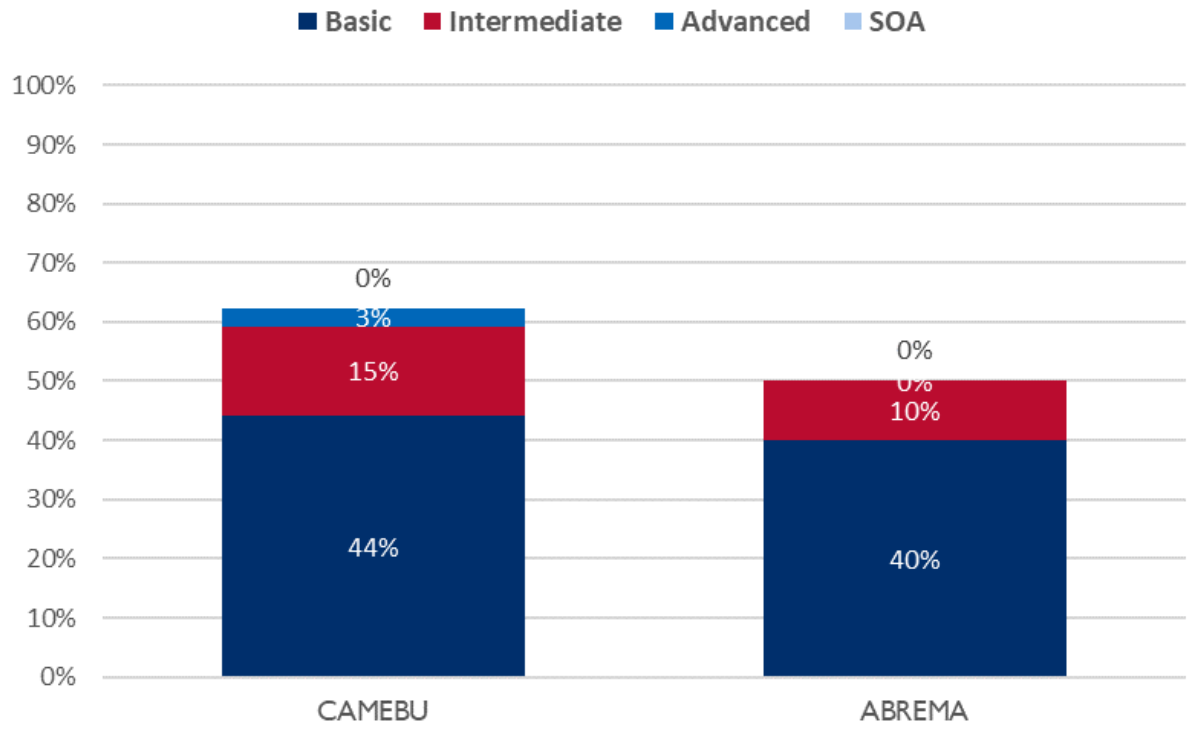
1. [Registration, Selection, Quantification, and Rational Use]. Achieve at least 70 percent availability of quality medicines and health products at all levels of the health system by 2025.
2. [Procurement and Supply Management]: Improve the availability of quality pharmaceutical products, at affordable prices in the shortest possible time at all levels of the health system, to at least 80 percent of needs by 2025.
3. [Warehousing and Distribution]: Increase capacity for storage and safety for the transport of health products at all levels of the health care system by 2025.

4. [Logistics Management Information System]: Ensure 100 percent availability of quality logistics data in real-time for administrative, technical,l and logistics action by 2025.

Each general objective is broken down into sub-technical domains and their associated specific objectives. Each proposed activity includes a timeframe, a responsible entity, an expected result, and a KPI to monitor progress. Sources of financial support are identified for some but not all activities, though the document does note that additional donor support is being pursued to fully finance the proposed activities. Components from the plan will be referenced throughout this document to contextualize findings and provide recommendations for adjustments to implementation as well as other potential reforms not identified in the strategic plan.

2023 NSCA Findings and Analysis

Exhibit 16. Strategic Planning and Management Capability



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent), and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

Strategic planning and management capabilities were assessed at two central-level facilities, ABREMA and CAMEBU. The capability maturity scores and illustrative responses on select capability questions are presented in Exhibits 16 and 17. While both institutions had more than three quarters of basic capabilities in place for this module, capability scores were much lower in the intermediate, advanced, and state-of-the-art categories. This helps contextualize the scores each entity received, with CAMEBU scoring 62 percent and ABREMA scoring 50 percent in this module. These capabilities scores are examined in more

detail under subsequent subsections of strategic planning, implementation planning and management, public-private partnerships, and supply chain performance monitoring and risk management.

Strategic planning capabilities. ABREMA and CAMEBU have solid strategic planning and management capabilities with over 80 percent of basic items in place. Both institutions have approved strategic plans, and each plan contains all the technical areas that the NSCA methodology expects would be components. Both strategic plans contain content and themes that align with the national pharmaceutical sector policy, and each has an accompanying supply chain implementation plan. However, these strategic plans have gaps, including the absence of stakeholder mapping,

Implementation Planning and Management. Part of this technical area focuses on the presence, implementation, and monitoring of supply chain implementation plans. Both institutions assessed reported having supply chain implementation plans and operational plans associated with their strategic plans. CAMEBU's operational plan is only one year long while ABREMA's is set for five years. Both institutions confirmed that these plans are actively monitored annually. The plans are used to mobilize resources, promote supply chain efficiencies \, improve supply chain management and leadership, and improve partnerships and collaboration. Both plans contain all expected components, such as timeframes, mission/vision, objectives, roles, and responsibilities assigned to specific people, and Strength, Weakness, Opportunities, and Threats (SWOT) analysis, but notably are missing stakeholder mapping as well as available funding to support each activity. While both entities reported using these plans for a variety of activities to improve their supply chains, both notably omit any actions to reform supply chain design, streamline governance, and improve coordination.

Exhibit 17. Strategic Planning and Management Capabilities Maturity Scores and Select Question Responses

	CAMEBU	ABREMA
n =	1	1
Overall maturity score (range)	62%	50%
Presence of an approved supply chain strategic plan	✓	✓
Is the supply chain strategic plan updated yearly or more often?	X (every 3 years)	X (every 5 years)
Stakeholder mapping exercise	X	X
Presence of a supply chain implementation plan of at least one year's length	✓	✓ (5 years)
Supply chain implementation plan is monitored (timeframe)	✓(Annually)	✓ (Annually)
Supply chain system design reforms are being implemented	X	X
Formal structure in place to monitor supply chain performance at this level	✓	X
Existence of performance monitoring plan tracking supply chain performance	✓	X
Existence of a risk management and mitigation/prevention plan	X	X
Coordination or engagement with private-sector companies	✓	X

✓ denotes yes and x denotes no.

Public-Private Partnerships. The NSCA did not find evidence of any strategy from the MSPLS regarding the use of public-private partnerships (PPPs) to implement needed supply chain functions. While the strategic plans of ABREMA acknowledged the presence of the private sector in the pharmaceutical supply chain, the plan doesn't explicitly refer to how those engagements would be developed and for what objective or functional area. However, CAMEBU did report that it has an official policy outside of its strategic plan for engaging with the private sector and has engaged with a private entity within the last year. CAMEBU's work with the private sector focused specifically on the use of 3PLs in quality assurance, warehousing, and distribution and influence the maturity score obtained by the entity.

Supply Chain Performance Monitoring and Risk Management. Performance monitoring and risk management are nascent areas that continue to slowly grow and develop in Burundi. Currently, ABREMA does not have a formal structure to monitor supply chain performance, something it acknowledged as a weakness in its current strategic plan. In its governance SWOT analysis, ABREMA noted "absence of a monitoring and evaluation mechanism for projects and programs in charge of the supply chain." CAMEBU did confirm it has a formal structure and a performance monitoring plan to use for supply chain performance monitoring. Looking more closely at risk, the assessment of risks inherent to the country's health supply chain is not conducted. Both institutions reported that they did not have a risk management and mitigation plan. Also, they both reported that no formal risk assessment is conducted by either institution. However, each institution could identify its top perceived risks in the supply chain, as detailed in Exhibit 18. Also, both institutions reported that they have some risk mitigation measures in place, primarily for inaccurate forecast data, non-competitive prices, fraud, prolonged procurement delays, and supply of inferior quality medicines.

Exhibit 18. Top Risks Experienced in the Supply Chain

	CAMEBU	ABREMA
n =	1	1
Financial	X	✓
Human resources	X	✓
Economic (e.g., exchange rate)	✓	✓
Political	✓	X

✓ denotes yes and x denotes no.

Recommendations

The National Health Supply Chain Strategic Plan 2021–2025 has identified clear and compelling priorities for improving overall supply chain operations within the health system. However, key gaps must be addressed to ensure long-term sustainability of the national health supply chain. To this end, the MSPLS should:

- Strongly consider creating a specialized entity within the MSPLS to provide leadership and operational oversight for the public health supply chain. Such an entity should be strategically positioned so that it can provide technical and operational support from the central to peripheral levels. This is because neither the existing law nor regulations that set up ABREMA mentions supply chain management as one of its core functions. Hence, such a critical health sector function is not clearly designated to any specific entity of the MSPLS.

- Strategically position supply chain management as a function in the health sector, so that it is not an appendage to pharmaceutical management or services. This will ensure that specific provision is made for its prioritization and professionalization in the health sector.
- Review and update the current country supply chain strategic plan (PNSCA 2021–2025) to accommodate the findings of the NSCA.
- Provide guidance and tools to encourage supply chain operational planning at sub-national levels, particularly the district pharmacies. This will ensure that these levels of the supply chain develop specific operational plans that align with the country's supply chain strategy and provide clarity for financial and human resource planning.
- Formalize the process of risk assessment, management, and mitigation. This should be a component in any supply chain strategic plan to ensure the country is prepared for shocks and disruptions to the system.
- In implementing its strategic vision for the health supply chain, consider how partnering with the private sector to realize key functions could bolster its efforts. The MSPLS does not need to keep and master every capacity internally if it can establish partnerships to achieve its vision.

Supplemental Exhibit

Exhibit 19. SPM: Distribution of Questions and Assignment of Weight Across Capability and Facility Levels

	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
CAMEBU (1)	36	1.4%	13	1.2%	6	2.5%	1	5.0%
ABREMA (1)	36	1.4%	21	1.4%	10	1.5%	1	5.0%

Note that interpretations of the scoring, and discussions of "differences" in the scores, need to be recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending upon the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Policy and Governance

Clear policies, guidelines, and oversight are important to ensuring that public health systems are procuring essential medicines, practicing effective medicine, and revising policies to reflect changing best practices and onboarding new technologies. For the supply chain, national policies and governance should inform the full system, from procurement to patient treatment, ensuring that all actors operate based on standardized guidance. Major areas that were factored into the policy and governance capabilities scoring in this assessment are outlined in Exhibit 20, including the existence of a national medicines policy with supply chain components, an active oversight committee with broad representation from all levels of government and civil society, drug registration lead times, and Standard Treatment Guidelines (STGs).

Exhibit 20. Examples of Scored Policy and Governance Capabilities

Basic	Existence of a national medicines policy that includes objectives for supply chain management. Five-year updates of national policies related to supply chain management. Existence of national STGs and a National Essential Medicines List Existence of a process for registering new drugs, products, and technologies Publicly available list of registered drugs and products
Intermediate	Quarterly meetings by a supply chain oversight and governance body to discuss supply chain issues Adaptation of national STGs from universal clinical guidelines
Advanced	Existence of a formal, high-level body that provides oversight and governance for the supply chain
SOA	Civil society is a part of the formal supply chain oversight and governance body

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

Over the years, Burundi has developed a number of laws, decrees, policies, and regulations to govern the pharmaceutical sector. These include laws that establish key pharmaceutical institutions such as ABREMA, CAMEBU, the Pharmacy Council, and the National Standards Authority, as well as ministerial decrees that govern food and pharmaceutical registration, controlled substance classification, National Essential Medicines List (NEML) revision, product quality control testing, and granting of customs exemptions. Key documents are in place, such as the Public Health Code, National Health Policy, National Supply Chain Strategic Plan (PNSCA 2021–2025), National Pharmaceutical Policy, National Guidelines for Pharmacovigilance, National Quality Assurance for pharmaceuticals, National Guidelines for the Quality Assurance of Medicines and Medical Supplies, and guidelines for managing unusable pharmaceutical products.

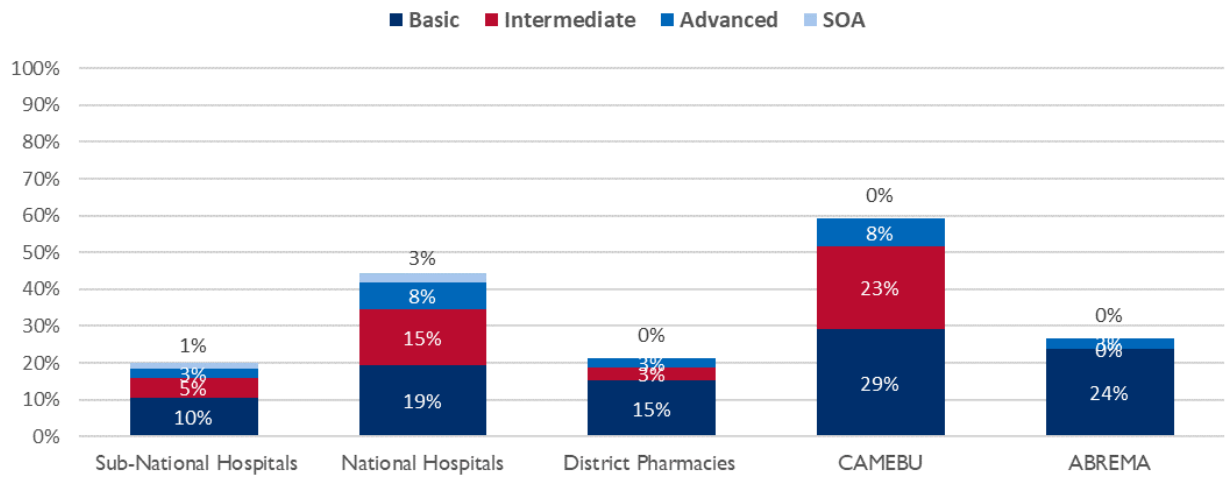
The National Pharmaceutical Policy (PNP) was adopted by the government in July 2012, with an objective to ensure better access to medicines and other essential products by ensuring their quality, their rational use, and their financial accessibility. The PNP targets developing an efficient supply system and responsive pharmaceutical industry as well as establishing an effective pharmaceutical and pharmacovigilance system. This objective is echoed by directive principles in the National Health Policy (PNS), which promotes universal access to quality generic essential medicines at an affordable cost as an essential component of the right to health.

Despite the above, the PNSCA 2021–2025 cites the absence of policy monitoring and evaluation mechanisms, weakness in coordinating various supply chain actors, shortcoming in accountability among pharmaceutical managers, and upsurge of the illicit drugs market as important challenges confronting governance and leadership in the supply chain sector, although stakeholders acknowledge support, including the government's strong commitment, support from technical and financial partners, and some existing global and regional initiatives as potential levers to drive change.

2023 NSCA Findings and Analysis

Exhibits 21 and 22 show the NSCA results assessing the policy and governance capabilities in Burundi's current public health supply chain. The presence of policy and governance maturity capabilities recorded at each level is well below the 80 percent desirable score. At the central level, ABREMA obtained a low capability maturity score of 27 percent with just 47 percent of basic elements in place. The low score obtained at ABREMA is attributable to the lack of defined timelines for updating existing polices and guidelines, the absence of definitive polices on procurement, finance and human resources for the supply chain, the absence of national standards treatment guidelines, and coordination gaps. CAMEBU obtained a higher maturity score of 77 percent with 58 percent of basic elements because of the presence of many external and internal capabilities that support its operations. Much lower scores of 20 percent, 21 percent, and 44 percent were obtained by the sub-national hospitals, the district pharmacies, and the national-level hospitals, respectively. Scores for policy and governance capabilities are not presented for the CDS, since only one assessment question regarding the availability of STGs was administered at this level.

Exhibit 21. Policy and Governance Capability



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent,) and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, or each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

Exhibit 22. Policy and Governance Capability Scores and Basic Items in Place

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Overall maturity score (range)	N/A	20% (0–85%)	44% (0–89%)	21% (0–83%)	59%	27%
Percent of basic items in place (range)		21% (0–100%)	39% (0–78%)	58% (0–92%)	58%	47%

Exhibit 23. Key Central-Level Policy and Governance Capabilities and Gaps

MOH establishment of a National Pharmaceutical Policy	✓
Formal body that provides oversite and governance for the supply chain	✓
Frequency of governance body meetings	Undefined schedules
Existence of national STGs	None except individual treatment protocols of the various health programs
Adaptation of STGs from the universal clinical guidelines	✓
Frequency of revision of national STGs	---
Process for registering new drugs, products, and technologies	✓
Time it takes to register a new drug on average	6–12 months (ABREMA)
Public list of registered products	Not done

✓ denotes yes, x denotes no, and – indicates not applicable.

The existence of policies and guidelines. Burundi's public health supply chain has in place a broad range of formal policies and guidelines that govern practice, yet gaps still exist in their access and use at the peripheral levels. As Exhibit 24 indicates, many of the policies that have developed at the central level are not widely accessible at the district pharmacies and sub-national hospitals. Although major policies and guidelines are present at the national level, these do not cover critical areas, such as procurement, finance, and human resources for the supply chain while the national FASP guidelines are yet to be finalized. Where policies and guidelines exist, timelines are not defined for making updates or revisions, so they always remain relevant. For example, the national pharmaceutical policy (PNP) was developed in 2012 but is yet to be revised. Although the country has a NEML that guides the procurement of medicines, absence of a national STG beyond the various treatment protocols developed by the individual public health programs is a major risk to rational use of drugs and optimal therapeutical outcomes.

Exhibit 24. Supply Chain System Guidelines and SOPs Available

	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	2	28	1	1
Guidelines or SOPs for the supply chain system exist, covering:	18%	50%	38%	✓	✓
Storage	29%	50%	40%	✓	✓
Inventory management	29%	50%	42%	✓	✓
LMIS	25%	50%	38%	✓	✓
Quality assurance	20%	0%	25%	✓	✓
Forecasting and quantification	--	50%	25%	X	X
Supply planning	--	50%	40%	X	X
Waste management	26%	50%	63%	✓	✓
Procurement	21%	50%	35%	✓	X
Financing	6%	50%	17%	X	X
Human resources	6%	50%	17%	X	X
None of the above	0%	50%	2%	--	--

✓ denotes yes, x denotes no, and – indicates not applicable.

Dissemination of policies. Dissemination of policies is good at the hospital level of the public health systems, as shown in Exhibit 25.

Exhibit 25. Availability of National STGs

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
STGs available at site (physically verified)	✓	✓	✓	--	--	x

✓ denotes yes and x denotes no.

Caveat on implementation. One caveat to this section is important. This portion of the NSCA assessed policy and governance capabilities by determining the existence of fundamental building blocks—policies, laws, and regulations along with institutions and formal processes to support them. This section of the assessment does not, however, attempt to measure the level of implementation nor effectiveness of these planning and governance policies, laws, and regulations in Burundi, because existence cannot be automatically equated with effective implementation.

Recommendations

For policy and governance, maturity score range was generally low among the entities assessed except for CAMEBU, which obtained a score of 77 percent. At lower levels of the supply chain, maturity scores ranged between 20 and 44 percent, which is attributable mainly to the sparse availability of policies and guidelines at these levels of the supply chain. The authors of this report offer the following recommendations:

- Consider developing a national supply chain policy that would provide a framework of supply chain governance and provide clarity around its technical scopes, such as human resources for supply chain, financing, and accountability, among others. This would help distinguish supply chain management from pharmaceutical management so that each of these functions is not usurped by the other.
- Make a census of current policies and guidelines and develop a comprehensive plan to review and update them within defined timelines. timelines.
- Revamp the existing national level supply chain coordination committees to improve governance for the supply chain. This should involve updating the terms of references and calendars of events so that stakeholders can fully participate in planned activities.
- Explore innovative approaches to enhance the dissemination of current documents to user points. These could be through mandatory professional development programs, special bulletins, and structured supervisions to identify and resolve challenges.
- As recommended during the 2014 NSCA, the MSPLS should strongly consider developing comprehensive STGs 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 medicine.

Supplemental Exhibit

Exhibit 26. Policy and Governance, Distribution of Questions, and Assignation of Weight Across Capability and Facility Levels

MODULE	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
Sub-national hospitals (23)	9	5.6%	1	30.0%	1	15.0%	1	5.0%
National hospitals (2)	9	5.6%	1	30.0%	1	15.0%	1	5.0%
District pharmacies (48)	12	4.2%	4	7.5%	2	7.5%	1	5.0%
CAMEBU (1)	12	4.2%	4	7.5%	2	7.5%	1	5.0%
ABREMA (1)	19	2.6%	8	3.8%	5	3.0%	1	5.0%

Note that interpretations of the scoring, and discussions of "differences" in the scores, need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending on the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Human Resources

Effective supply chains require significant human resources across a wide range of technical areas, all levels of the health care system, and all geographic areas of the country to ensure that quality health commodities are distributed safely and promptly. The NSCA outlines core HR supply chain capabilities and performance metrics to assess the extent to which facilities have the needed resources, supply chain functions have formally allocated responsibilities, and staff have the necessary training, knowledge capacity, time, and scope to support supply chain operations. Major areas that were factored into the scoring for this CMM module are the presence of appropriate supply chain functions in job descriptions, regular capacity-building efforts for staff, and mechanisms for supportive supervision and performance improvement (see Exhibit 27).

Exhibit 27. Examples of Scored Human Resource Capabilities

Basic	At least two capacity-building sessions (e.g., LMIS, waste management, reporting) within the last year SOPs or training guides/materials
Intermediate	Human resource workforce plan that projects future needs for supply chain personnel Unified supply capacity-building plan Supportive supervision of supply chain functions within the last year Presence of appropriate supply chain functions in job descriptions
Advanced	Quarterly staff performance reviews Most (51–99 percent) staff have participated in capacity training in the last two years Database tracking of staff' attendance at capacity-building sessions in supply chain management Advanced supply chain–specific capacity-building programs available in country (e.g., e-learning, certificate, diploma programs)
SOA	Participation by all staff in supply chain capacity training within the last two years Bachelor's degree or master's program in supply chain available in country

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

While the PNSCA 2021–2025 does not have a specific strategic objective around human resources, it does note that ABREMA is responsible to "Ensure the management and development of its human resources." Also, a SWOT analysis within the PNSCA for supply chain HR identifies several key HR challenges that the supply chain is facing. Specifically, it identifies:

- Insufficient qualified human resources in all areas of the public and private pharmaceutical sector
- Lack of continuous staff training
- Lack of a training course in health logistics
- Lack of staff motivation
- Staff turnover
- Poor consideration of the issue of supply chain management in training curricula
- Lack of dissemination of the documents governing the health standards of human resources

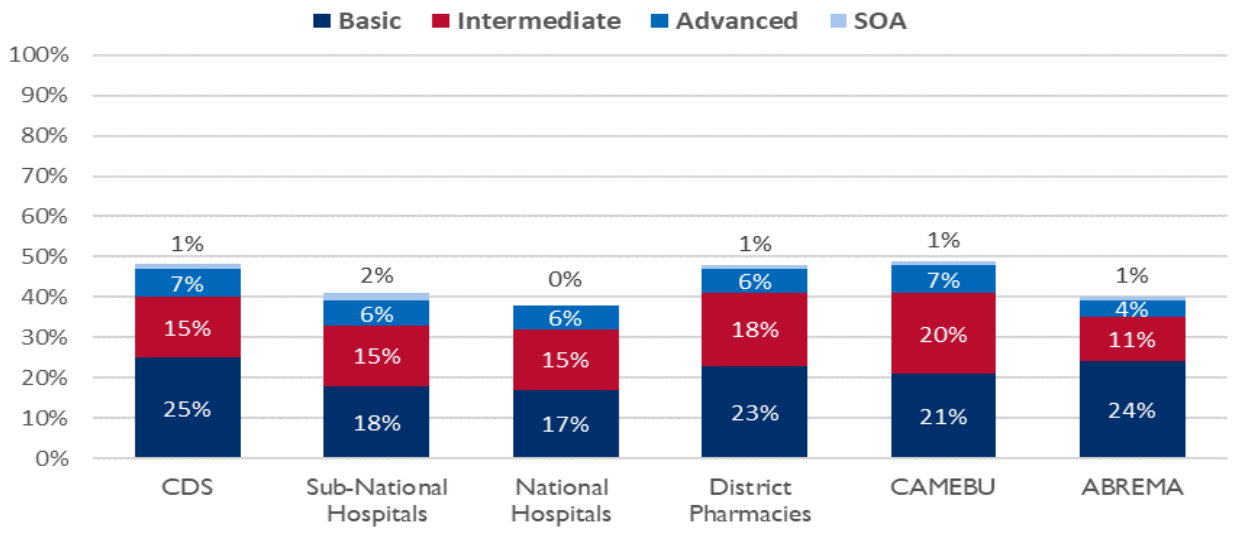
There is, however, a standalone MSPLS plan, the "Strategic Plan for the Development of Human Resources for Health 2019–2023," that guides HR development strategies for the health sector in Burundi. It outlines:

- Current situation for Human Resources for Health Burundi
- Avenues for training new staff within post-secondary institutions in Burundi
- Projections of need for health workers and projected graduates from various institutions

2023 NSCA Findings and Analysis

In Burundi, HR capabilities were found to be consistent across all facility types assessed for the NSCA. All facilities in Burundi scored between 38 and 49 percent in this module. This is counter to the trend typically encountered with higher maturity scores at central institutions and lower scores at the peripheral levels of the health system. Exhibits 28 and 29 detail HR capability scores. Generally, scores were strong at the district pharmacies and CAMEBU.

Exhibit 28. Human Resources Capability Maturity Model Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent), and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Overall maturity score (range)	48% (0–76%)	41% (16–70%)	38% (37–40%)	48% (20–70%)	49%	40%
Percent of basic items in place (range)	50% (0–83%)	36% (21–63%)	33% (25–42%)	46% (15–77%)	42%	47%

Central Level. Typically, capabilities are strongest at the central level and decrease at the lower levels of the supply chain. Seeing scores relatively even across all entities assessed was therefore surprising. Looking more closely at the scores obtained by ABREMA, it is encouraging to see an HR workforce plan is in place that projects future need, as was cited above. However, the supply chain workforce is represented only

within that document as pharmacists. There is no reference to pharmaceutical logisticians, which are key HR needs for a well-functioning health supply chain. ABREMA also does not have a staff recruitment policy for supply chain personnel, nor a general one applied to supply chain personnel. Therefore, it is not surprising to see that the institution does not have a formal list of qualifications for the head of logistics at the central level. At the time of the writing of this report, we understood that there is also no dedicated supply chain unit within ABREMA, despite its mandate for a supply chain. Of those staff who have some supply chain responsibilities in their job description, less than half have received any kind of capacity-building opportunity within the last year. ABREMA will need to define its own supply chain human resources to better support the health supply chain.

As the other central level entity of note, CAMEBU is in a similar position to ABREMA, with a few more key capabilities in place. CAMEBU has an HR workforce plan, but it does not have any recruitment policies or a unified supply chain capacity-building plan. Encouragingly, it does have a job description with formal qualifications for its supply chain lead. CAMEBU also has a wide variety of training materials available for its staff, including SOPs, training guides, and other materials. The institution reported that most of its staff have received capacity-building opportunities within the last year, focused on FASP, procurement, inventory management, and changes in national policy. CAMEBU also assesses staff performance quarterly and ensures timely feedback is given to its staff. The institution has many promising practices for HR but is missing a few key strategic pieces that can help ensure its long-term sustainability.

Exhibit 30. Select Supply Chain Human Resource Capabilities at Central and District Facilities

Document		Sub-national hospitals	District pharmacies	CAMEBU	ABREMA
An HR workforce plan that project future needs for supply chain personnel	16%	100%	15%	✓	✓
General staff recruitment policies that are applied to supply chain personnel	10%	0%	15%	X	X
A unified supply chain capacity-building plan or staff development plan for current employees	9%	0%	2%	X	X
A job description with appropriate qualifications for the supply chain lead at that level	34%	42%	100%	✓	X

✓ denotes yes and x denotes no.

Dedicated Supply Chain Staff. Results from the 2023 NSCA reveal that the definition of supply chain functions and responsibilities in the job descriptions of last-mile facility staff is still not optimal. At the CDS level, core logistics functions are found in formal job descriptions less than 45 percent of the time. Sub-national hospitals performed better in this area, with all core logistics functions appearing at least 50 percent of the time with many as often as 60 percent. Results are detailed in Exhibit 31. This is a key area of improvement to focus on. As part of the strategic human resources for health (HRH) plan referenced in this section, a key result area is strengthening the governance of HR for the health system. Standardizing job descriptions for supply chain staff should be included in this workstream. District pharmacies can be used as a model here, as all core logistics functions are almost universally represented in staff job descriptions, most being present at least 80 percent of the time.

Exhibit 31. Supply Chain Functions and Job Descriptions

Supply chain functions are included in the job descriptions for at least one site personnel, including:	*Percent of facilities reporting:*				
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
	83	28	2	48	1
Procurement	--	56%	0%	83%	✓
Storage and Inventory management	40%	60%	100%	88%	✓
Ordering and reporting	42%	61%	100%	90%	✓
LMIS	39%	57%	100%	71%	✓
Waste management	35%	55%	50%	67%	✓
Quality and/or pharmacovigilance	14%	2%	50%	6%	✓

✓ denotes yes, x denotes no, and -- indicates not applicable.

Supply chain capacity-building training. As part of the "Strategic Plan for the Development of Human Resources for Health 2019–2023," a key result is "Result 1.2: Continuous training of health personnel is improved" with an associated priority action of "Priority action 1.2.1: Establishment of mechanisms for regular monitoring of the continuing education of health personnel." Looking at Exhibit 32, the NSCA findings detail that significant progress is still needed in on-the-job training in key supply chain functional areas. More than half of health centers report receiving no capacity-building sessions of any kind in the last year. Hospital-level training is even scarce with 77 percent of facilities reporting that they received no capacity-building training within the last year. ABREMA should use these NSCA findings to guide its strategy in filling key capacity gaps across their supply chain workforce.

Exhibit 32. Areas Covered in Capacity-Building Sessions in the Last Year

	Percent of facilities reporting:					
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
Warehousing and inventory management	33%	20%	50%	56%	100%	100%
LMIS	39%	13%	50%	56%	0%	100%
Ordering and reporting	34%	20%	50%	56%	0%	100%
Medicine quality assurance	18%	15%	50%	15%	0%	0%
Treatment guidelines	25%	14%	0%	10%	0%	0%
Forecasting and quantification	--	--	--	--	100%	100%
Procurement	--	12%	0%	40%	100%	100%
Distribution	--	18%	50%	56%	100%	100%
None of the above	54%	77%	50%	33%	0%	0%

✓ denotes yes, x denotes no, and -- indicates not applicable.

While creating opportunities for capacity building is a key step that ABREMA must help facilitate, it is not the only component to the HR challenge. Staff must also be encouraged and allowed the space in their workload to actively participate in such opportunities. Exhibit 32 demonstrates the proportions of staff that were able to join a capacity-building session within the last year. At the health center and hospital levels, the most common response was "none." The second most common response was "some but less than half of staff" for both facility types. Structural changes are needed at the governance level of the supply chain to adjust expectations, work responsibilities, and allow more systematic participation of staff in capacity-building opportunities. As the 2019–2023 HR plan ends, these inputs should be used to inform the next iteration of that plan.

Understanding the barriers to these opportunities is a key analytical activity that will better inform the strategic approach to correcting the current state. Looking more closely at self-identified barriers to training, Exhibit 34 details the most common challenges in implementing training opportunities. Overwhelmingly, the most common responses were finances and workloads. As the MSPLS has identified staff motivation and retention as a key objective in the HRH strategic plan, softening the impact of these

observed barriers will be a necessary step in realizing the desired improvements in the state of the supply chain workforce.

Exhibit 33. Proportion of Staff Participating in Capacity-Building Sessions in the Last Year

	Percent of facilities reporting:					
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
None	33%	55%	0%	8%	0%	0%
Minimal (1–25%)	22%	18%	50%	13%	0%	0%
Some (26–50%)	28%	18%	0%	27%	0%	100%
Most (51–99%)	13%	5%	50%	25%	100%	0%
All (100%)	0%	4%	0%	21%	0%	0%

Exhibit 34. Critical Barriers to Supply Chain Management Capacity-building Programs

	Percent of facilities reporting:					
	Health centers	Hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
Finances	77%	94%	50%	90%	0%	100%
Workload	29%	8%	0%	17%	100%	100%
Skilled trainers	8%	7%	0%	2%	0%	0%
Materials	12%	9%	0%	2%	0%	100%
Language	2%	0%	0%	0%	100%	0%
Perceptions	0%	0%	0%	0%	0%	0%
Lack of interest	4%	7%	0%	0%	0%	0%

Supportive Supervision. A key cornerstone of any workforce development strategy, supportive supervision is critical to ensuring staff are appropriately supported, understand work responsibilities, and receive the training and coaching needed to succeed in their roles. Exhibit 35 details the prevalence of supportive supervision across the facility types assessed. Except for national hospitals, there is a high degree of coverage of facilities with supportive supervision in Burundi. Over three quarters of SDPs and warehouses reported receiving supportive supervision in the last year. With almost the same degree of incidence, staff receive immediate feedback on the visits and implement corrective actions based on visit findings. These are actions critical to ensuring that the observations and insights generated during a supportive supervision visit are applied and implemented to improve supply chain operations. The MOH should continue to use these touchpoints as a method for better understanding challenges facing their health facility supply chain staff so they can develop policies and programs to help address these issues.

Exhibit 35. Supportive Supervision

	Percent of facilities reporting:				
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
Supply chain staff received supportive supervision in the last year	81%	72%	0%	92%	0%
Staff received immediate feedback after supportive visits	76%	72%	0%	88%	0%
Corrective actions are taken following supervision visits	80%	68%	0%	92%	0%

Recommendations

While it is encouraging to see that the MSPLS has identified the state of human resources for health within its context, more needs to be done on a governance level, using a systematic approach to realize any marked improvements in the capabilities of the supply chain workforce. Also, as the entity mandated with overseeing all aspects of the pharmaceutical health care supply chain in Burundi, ABREMA needs to commit to further defining and implementing its own HR policies that can serve as a guide for improving HR governance across the supply chain. To this end, the NSCA findings point to the following recommendations:

- Develop a supply chain human resource capacity-building plan and recruitment policy for the central-level entities (ABREMA and CAMEBU). These institutions have mandates that oversee the supply chain and should lead by example in this area.
- As the timeframe of "Strategic Plan for the Development of Human Resources for Health 2019–2023" ends, ensure the inclusion of health supply chain staff in the next iteration of the plan so their needs for staffing, capacity building, and staff motivation can be included in work and funding streams.
- Work to develop standard job descriptions for supply chain functions at all levels of the supply chain by clearly spelling out supply chain roles and the personnel expected to perform such roles. Realize that there may not be adequate numbers of supply chain professionals at all levels of the systems, hence clarity is needed in job descriptions and roles when auxiliary personnel and other health personnel perform supply chain roles.
- Leverage the opportunities within supportive supervision exercises to improve the uptake of supply chain policies and standard operating procedures at the peripheral levels of the supply chain.

Supplemental Exhibit

Exhibit 36. Human Resources: Distribution of Questions and Assignation of Weight Across Capability and Facility Levels

	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
CDS (n=83)	18	2.8%	14	2.1%	7	2.1%	3	1.7%
Sub-national hospitals (28)	21	2.4%	17	1.8%	8	1.9%	3	1.7%
National hospitals (2)	21	2.4%	17	1.8%	8	1.9%	3	1.7%
District pharmacies (48)	23	2.2%	27	1.1%	10	1.5%	6	0.8%
CAMEBU (1)	23	2.2%	27	1.1%	10	1.5%	6	0.8%
ABREMA (1)	16	3.1%	24	1.3%	9	1.7%	6	0.8%

Note that interpretations of the scoring, and discussions of "differences" in the scores, need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending on the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Financial Sustainability

Effective supply chains require sufficient and predictable funding streams, supported by sound financial management practices. The NSCA assesses financial sustainability across all levels of the health system to ensure that supply chain operations are sufficiently funded, that facilities practice good financial management techniques, and that any financing gaps are identified. The CMM module places greater emphasis and scoring value on using prudent financial management and understanding operating costs rather than the self-sufficiency of the entity to finance itself. While it is difficult to get a high score without having some degree of self-sufficiency, the intent of the module is to understand how facilities manage the funds they receive.

Exhibit 37. Examples of Scored Financial Sustainability Capabilities

Basic	Supply chain costs (e.g., products, warehousing, distribution, personnel, overhead, service delivery) are recorded and records maintained. Government *or* facility revenue/costs contribute minimally to total supply chain. operations budget/health commodities (less than 25 percent) Budgets are prepared annually. MOH financial unit regularly prepares and submits financial reports/profit and loss statements. MOH financial unit regularly measures liabilities/cash cycle or cash flow/depreciation/conducts. audits/inventories capital assets yearly Process exists for submitting unbudgeted requests
Intermediate	Facility's funding strategy explicitly includes supply chain costs. Government/facility revenue is a source of funding for supply chain operations. Government *or* facility revenue/costs contribute some to total supply chain operations. budget/health commodities (between 25 percent and 50 percent) Donor support is routinely tracked by MOH. Budget includes lines for miscellaneous funds
Advanced	Government *or* facility revenue/costs contribute most of supply chain operations budget/health. commodities (51–99 percent) No commodity budget shortfall in the past year Funding can be reallocated at the management level
SOA	Government *or* facility revenue/costs contribute all of supply chain operations. budget/health commodities (100 percent)

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

Like the situation in many low- and middle-income countries, financing is a major constraint for the health sector in Burundi. The country subscribes to the Abuja Declaration, which recommends that developing countries allocate 15 percent of annual revenue to the health sector, and the Millennium Development Goal 3, which recommends that developing countries commit 10 percent of national budget to the health sector. In the 2022–2023 Burundian state budget, allocation to the health sector represented 9.6 percent of the national budget in contrast to 13.4 percent in 2021–2022,[12] although there was increased spending in the agricultural and infrastructure sectors during these periods. According to National Health Accounts (2010), household contributions cover around 30 percent of health care expenditure.

Burundi has in place several healthcare financing mechanisms, including free health care for pregnant women and children under five, the medical assistance card, and the public service mutual insurance, which has

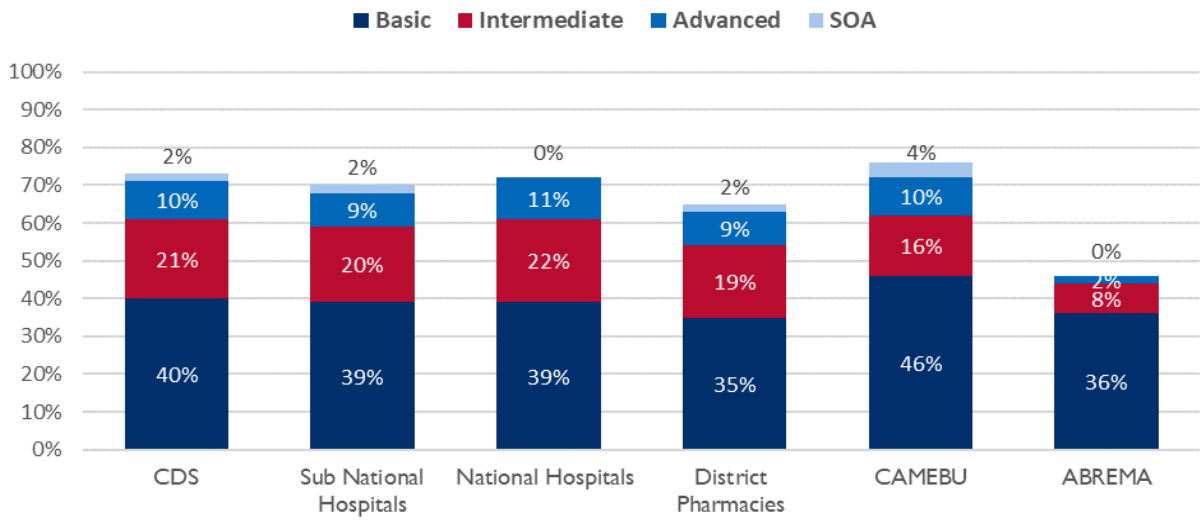
[12] UNICEF, Burundi Health Budget Analysis 2022–2023 retrieved from www.unicef.org/burundi/media/2881/file/6_ENG_Santé_BudgetBrief%202022-2023.pdf.pdf on 08.03.2024

been operational since 1980. The MSPLS also subsidizes first-line antimalarial drugs, anti-retrovirals, anti-tuberculosis drugs, and drugs for neglected tropical diseases, and community health insurance schemes cover around 2 percent of the population. Still, government funding is inadequate to cover the procurement of drugs, and cost recovery funds for drugs are affected by persisting debts between CAMEBU, the health districts, and SDPs. Payment for insurance claims is considerably delayed, and release of funds through PBF and free health care is not timely.

2023 NSCA Findings and Analysis

The capability maturity scores in this assessment reflect mostly the presence of financial management tools and best practices with a focus on supply chain activities. They are not, again, a measure of the fiscal health or solvency of the public health supply chain at large. For instance, the high percentage of facilities across all levels of the public health system that reported budget shortfalls (Exhibit 40) for health commodities and/or delays in reimbursements from insurance suggest rather that financial solvency remains a significant challenge in Burundi's public health supply chain system, independent of the simultaneous presence of key financial management capabilities.

Exhibit 38. Financial Sustainability Capability Maturity Model Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent) and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

Exhibit 39. Financial Sustainability Maturity Scores Among Entities Assessed

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Overall maturity score (range)	73% (52–88%)	71% (59–97%)	72% (66–78%)	66% (45–85%)	77%	45%
Percent of basic items in place (range)	80% (57–100%)	79% (57–100%)	79% (71–100%)	71% (71–100%)	93% (71–86%)	71% (21–100%)

Presence of financial management best practices

Financial sustainability results for maturity model scores and the percentage of facilities reporting key capabilities are shown in Exhibits 38 and 39. Scores for the entities ranged from 45 to 77 percent, which was one of the strongest performance areas recorded by the supply chain during this assessment. However, the financial sustainability in the NSCA focuses more on the sources of funding and the management process surrounding the use of available funding rather than solvent or sufficiency of funds for supply chain operations support.

At the central level, CAMEBU obtained a capability maturity score of 77 percent, which approaches the desirable NSCA benchmark score of 80 percent while ABREMA obtained a score of 45 percent. CAMEBU, as an autonomous state agency for procurement and supply of pharmaceuticals in the public sector, exhibited strong internal control systems that ensure the responsible use and management of funds. The entity prepares annual budgets that cover its operations and the procurement of drugs from private suppliers using internal funds generated through cost recovery. The entity has a dedicated financial management team that prepares annual financial reports, which are audited and available for inspection. The only gaps noticed at CAMEBU were the absence of clear procedures to address budget shortfalls and the non-existence of cost-share agreements between CAMEBU and partners who use the facility. Cost-share policies are important in setting out the parameters for documenting, accounting, and reporting partner investments and contributions to the supply chain.

The capability maturity score of 45 percent obtained by ABREMA can be attributed to factors including relatively lower government funding for its operations in comparison to donor support, the absence of a definitive funding strategy for the supply chain, and non-presence procedures for documenting supply chain costs. The national hospitals obtained a relatively stronger capability maturity score of 72 percent with 79 percent of expected basic elements in place. At this level, budgets are prepared annually, supply chain costs are documented, and funding for operations is obtained from facility revenues. Still, the budget has shortfalls, and funding that comes through insurance payments is sometimes delayed.

Among the district pharmacies, sub-national hospitals and the CDS capability maturity scores obtained ranged from 66 to 73 percent. The district pharmacies score of 66 percent was driven by the high

preponderance of preparation of annual budgets, dependence on cost recovery or government funding relative to donor funding, and regular documentation of supply-related costs. The district pharmacies prepare reports on finances, but these do not always include profit and loss statements, and methods for financial reporting are not standardized. The budget sometimes has shortfalls but no clear procedures are in place on how these should be addressed, and cost-share policies are largely absent.

Exhibit 40. Financial Sustainability Maturity Score, and Percentage of Facilities with Key Capabilities Related to Supply Chain Management in Place

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Budgets are prepared or updated annually	94%	100%	100%	98%	✓	✓
Budgets include miscellaneous funds for unexpected issues	69%%	68%	100%	60%	✓	✓
Supply chain costs explicitly are recorded and records maintained	79%	89%	100%	69%	✓	X
Funding strategy that explicitly includes supply chain costs exists	9%	11%	50%	15%	✓	X
Source of funds for supply chain operations	Government 92%; donors 20%; facility revenue 84%	Government 92%; donors 8%; facility revenue 82%	Government 100%; facility revenue 100 %	Government 92%; donors 25%; facility revenue 63%	Facility revenue (100%)	Donors (100%)
Government and/or facility contribution toward supply chain operations budget	"All" (64%) "Most" (20%)	"All" (72%) "Most" (10%)	"Most" (100%)	"All" (63%) "Most" (21%)	"Most" (100%)	"Minimal" (100%)
Source of funds for health commodities	Government 90%; donors 38%; facility revenue 86%	Government 92%; donors 22%; facility revenue 85%	Government 50%; donors 50%; facility revenue 100%	Government 94%; donors 44%; facility revenue 71%	Facility revenue (100%)	--
In the past year, was there a health commodities budget shortfall?	Yes (78%)	Yes (94%)	Yes (100%)	Yes (75%)	✓	--

✓ denotes yes, x denotes no, and -- indicates not applicable.

Sources of funding and funding shortfalls. Exhibit 40 displays information on the source of facility funds for supply chain operations and health commodities, respectively. High proportions of facilities across all levels reported that government and/or facility revenue and cost recovery contributed to their

sources of funds in these two areas (the question allowed for the selection of multiple sources). The NSCA credits supply chains where the government or facility revenue contributes substantially to supply chain operational and health commodity costs (without differentiating relative contribution values). In Burundi, most sites reported that most or all the budget in these areas was sourced from government contributions or facility revenue. That said, a substantial percentage of sites also reported a budget shortfall for health commodities in the previous year. These include 78 percent of CDS, 94 percent of sub-national hospitals, 75 percent of district pharmacies, and the two national hospitals.

Exhibit 41. Percentage of Facilities with Key Financial Sustainability Capabilities in Place

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Cost-sharing policy/plan in place with donors	6%	0%	0%	6%	x	--
Financial reports regularly prepared and submitted	--	--	--	✓	✓	--
Income or profit and loss statement is in place	--	--	--	52%	✓	--
Capital assets are inventoried yearly	--	--	--	81%	✓	--
Depreciation is measured				21%		
Health insurance accepted	98%	91%	100%	--	--	--
Insurance reimbursements are timely	77%	59%	100%			

✓ denotes yes, x denotes no, and -- indicates not applicable,

Recommendations

This assessment suggests that many best practices in the financial management of public health supply chains are currently in place, including widespread budgeting and record keeping and primary reliance on government budgets and facility revenue to fund costs. However, a lack of financial solvency throughout the system can undermine trust and have deteriorating effects on supply chain functions and ultimately health commodity availability. Thus, financial sustainability for the supply chain can be enhanced as follows:

- Consider developing cost-share policies and guidelines that will direct the use of government supply chain infrastructure.
- Institutionalize the practice of regular financial audits in health institutions particularly the peripheral levels of the supply chain since they are actively involved in financial transactions.
- Ensure that facilities across the supply chain and in all geographical locations receive guidance and support to implement basic financial management best practices in the supply chain, particularly at the peripheral levels.
- Implement actions to address funding shortages that affect adequate supply in the system.

Supplemental Exhibit

Exhibit 42. Financial Sustainability: Distribution of Questions and Assignation of Weight Across Capability and Facility Levels

	BASIC (50%)		INTERMED. (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
CDS (83)	7	7.1%	11	2.7%	7	2.1%	4	1.3%
Sub-national hospitals (28)	7	7.1%	11	2.7%	6	2.5%	4	1.3%
National hospitals (2)	7	7.1%	11	2.7%	7	2.1%	4	1.3%
District pharmacies (48)	14	3.6%	11	2.7%	7	2.1%	4	1.3%
CAMEBU (1)	14	3.6%	11	2.7%	7	2.1%	4	1.3%

Forecasting and Supply Planning

The FASP section seeks to ensure forecasts are being created using quality data and sound methodologies, monitored frequently, and ultimately used to inform procurement decisions. Areas of focus that factored into the scoring for this CMM module include forecasting involving multiple stakeholders for multiyear periods, well-established SOPs involving data from multiple sources, active supply plan monitoring, and sharing of supply plans among partners (see Exhibit 43).

Exhibit 43. Examples of Scored Forecasting and Supply Planning Capabilities

Basic	A dedicated unit within the MOH responsible for forecasting and supply planning of health commodities Forecasts are used to mobilize funding from government and donor sources
Intermediate	Data assumptions documented as part of the supply plan Data quality assessed for consumption data before use in forecasting
Advanced	Performance standards or benchmarks against which forecast accuracy is assessed Forecasting SOPs updated annually or more often
SOA	Use of specialized forecasting software that uses machine learning or advanced algorithms to determine future need Continuous or daily monitoring and updating of the supply plan

Note: These are illustrative examples of the types of capabilities scored in this module, not an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.

FASP was cited as an area of weakness during NSCA conducted in 2014 due to it disperse nature among various entities and overreliance on sales and issues data as opposed to consumption data. Consequently, the assessment team recommended greater process integration, transition to LMIS data, and forecasting for a longer time horizon as measures to improve quantification outcomes in the country. In the PNSCA 2021–2025, challenges identified for FASP activities included inadequate numbers of trained personnel, a non-functional national quantification committee, and inadequate access to tools. However, no specific interventions were recommended for improvements although access to software and protocols, and donor support, were acknowledged as opportunities to drive change.

In 2021, the MSPLS and partners initiated a process that resulted in developing draft national quantification guidelines for the public health supply chain in Burundi. These draft guidelines are designed to help users apply a systematic, step-by-step approach to quantifying health care product needs and related costs. It would be used to conduct national quantifications and to interpret results to achieve the following objectives:

- Identify financing needs and shortfalls for purchasing necessary products.
- Coordinate procurement and delivery schedules to ensure a sustainable and efficient supply of pharmaceutical inputs.
- Establish a process for reviewing and updating quantification results to maintain and improve the validity, accuracy, and usefulness of current and future quantifications.

This guide is being developed to serve as a reference document for the MSPLS program managers, procurement officers, warehouse managers, service providers, and donors to standardize national quantification exercises in Burundi.

2023 NSCA Findings and Analysis

The NSCA typically assumes and assesses FASP capabilities as a central-level function but also considers high-level referral hospitals rather than the peripheral service levels. Thus, in Burundi, the assessment of FASP capabilities was conducted at ABREMA, CAMEBU, and the public health programs [PNLS, PNILP, PNLIT, PRONIAUT, PEV], which were responsible for quantification of specific health products. Overall, the capability maturity scores obtained by the entities assessed ranged from 38 to 68 percent, which is below the NSCA benchmark score of 80 percent. This result typifies a system with dispersed capabilities across multiple entities with none of the entities achieving a desired level of system maturity.

ABREMA, the central coordinating body for supply chain activities, obtained a capability maturity score of 52 percent, which is indicative of a lack of in-depth capacity within the entity to supervise and transfer skills to other entities involved in FASP activities. This is largely because the national guidelines for FASP activities are yet to be validated, the process still relies on transactional data rather than consumption data, and performance monitoring results are not documented for reference. The absence of the finalized national guidelines and SOPs for FASP affects standardization and process monitoring across participating entities.

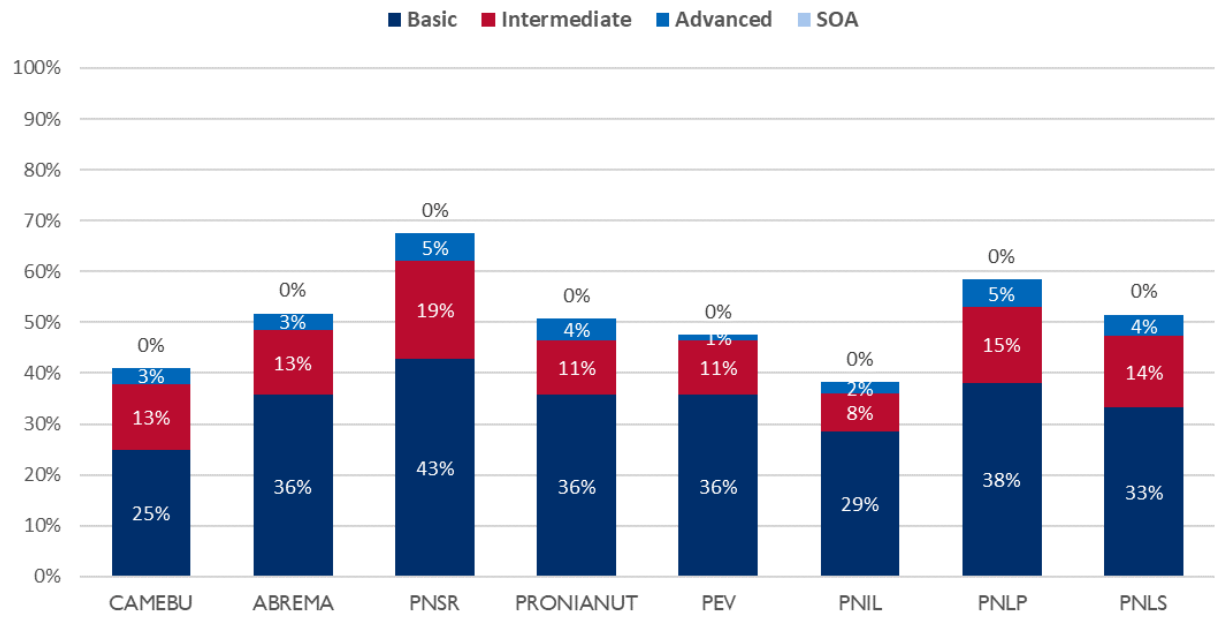
One recommendation in the 2014 NSCA report is to extend the tenure of forecasts conducted by CAMEBU to provide an estimate and funds flow beyond a single year. However, current forecasts do not exceed a year's duration, as they are tied to the annual budget cycle. Since there is no downstream data visibility, FASP is based on transactions data rather than real consumption reported from service delivery points. Also supply plans there are limited to annual revisions with no defined procedures, and results are not usually shared with external partners.

Among the public health programs, FASP capability maturity performance is similar with the primary areas of concern centering on the absence of consumption data, minimal documentation of performance measures and trends, and limited funding of FASP activities by government. Still, FASP activities are regularly scheduled, and results are shared with partners for resource mobilization.

Exhibit 44. Forecasting and Supply Planning Maturity Score, and Basic Capabilities in Place

	CAMEBU	ABREMA	PNSR	PRONIANUT	PEV	PNILT	PNILP	PNLS
n =	1	1	1	1	1	1	1	1
Overall maturity score (range)	41%	52%	68%	51%	48%	38%	58%	52%
Percent of basic items in place (range)	50%	71%	86%	71%	71%	57%%	76%	67%

Exhibit 45. Forecasting Capability Maturity Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent), and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

Forecast Methods: Exhibit 46 demonstrates the complexity of the methodologies used in the quantification process in Burundi. The approach to quantification varies or changes based on the disease area and program priorities. The use of consumption data is preferred, as it is mostly reflective of the real demand while reliance on other methodologies is often indicative of gaps in data availability and quality. Presently, the process is dispersed among the various programs, so the propensity to adopt individualized methods is high, although variations to accommodate specific program concerns are acceptable. It is therefore important to deepen centralization, and finalizing the development of national quantification guidelines will be beneficial for standardizing the process.

Exhibit 46. Forecasting Methodology Employed as Identified by Respondent, by Facility ype

Methodology	CAMEBU	ABREMA	PNSR	PRONIA NUT	PEV	PNILT	PNILP	PNLS
Morbidity based		✓	✓	✓	✓	✓	✓	✓
Consumption/transactions data	✓	✓	✓	✓	✓			
Demographic projections		✓	✓	✓	✓		✓	✓
Service statistic-based		✓		✓			✓	

✓ denotes yes, x denotes no, and -- indicates not applicable.

Financing FASP Activities: Per the evidence in Exhibit 47, there are multiple sources of funding for FASP, including government, development partners, and facility cost recovery funds. However, it is understood that government funding is limited and reliance on donor funding is unavoidable to maintain

momentum. Quantification results are used to source for funding for procuring required commodities; hence, making funds available to sustain the process is a prerequisite for commodity security.

Exhibit 47. Government Contribution to Recurring Forecasting and Supply Planning Costs

	CAMEBU	ABREMA	PNSR	PRONIANUT	PEV	PNIL	PNLP	PNLS
Government budget	✓		✓		✓	✓	✓	✓
Donor/implementing partners		✓	✓	✓	✓		✓	✓
Facility revenue/cost recovery	✓							

FASP Activities Performance Monitoring: Performance monitoring is critical for the success of FASP activities. Among the entities assessed, only CAMEBU provided evidence of regularly monitoring FASP performance by forecast accuracy and supply plan accuracy. The rest of the entities, including ABREMA, and the vertical programs, were unable to provide evidence to support performance monitoring and tracking of performance indicators. The NSCA calculated forecast accuracy for the underlisted tracer commodities in Exhibit 48 using available data for the period 2022.

Exhibit 48. FASP Accuracy for All Tracer Products

Product	Forecast accuracy	Supply plan accuracy
Albendazole 400mg	77%	100%
Amoxicillin suspension 125mg/5ml	100%	100%
Sulfaméthoxazole/trimethoprim 400/80mg	84%	100%
Artemether/lumefantrine (AL) 6x4 20/120mg	98%	100%
Rapid diagnostic tests	85%	69%
Artesunate injectable 60mg	97%	85%
DMPA 150 mg/mL	69%	90%
Male condoms	91%	44%
Pentavalent vaccine	27%	100%
Abacavir/lamivudine 120/60mg	43%	50%
TLD 90 300/300/50 mg,	98%	50%
HIV 1+2, Determine Early Detect	93%	95%
RUFT (Plumpy Nut) 92mg	--	--

Notes on Draft National Quantification Guidelines: Currently under development is the National Quantification Guidelines, which are expected to standardize and streamline the process of quantification in Burundi. The authors of this report reviewed the draft guidelines and recommended the following additions to the document:

- Include SOPs that provide a step-by-step guide on how to conduct forecasts for each program area or commodity grouping. This will codify the process and timelines for quantification and minimize variations.
- Cover the FASP aspects of the quantification process. Supply planning must be thoroughly discussed in terms of process, procedure, timelines, and performance tracking within these guidelines to produce a complete document.
- Codify the process of performance measurement and expected benchmarks so that they become standard practice for FASP activities.
- Clarify the roles and responsibilities of sub-national structures in the quantification process.

Recommendations

The NSCA found a dispersion of sub-optimal FASP capabilities across the multiple entities involved in the process. The dispersion of capabilities among multiple entities and the inability of each entity to reach the desired capability maturity level makes a compelling case for centralizing and standardizing FASP activities through the following steps:

- Complete development of the national quantification guidelines and SOPs to standardize FASP activities and clarify roles and responsibilities among the entities.
- Consider creating a strong national quantification technical unit within ABREMA to lead the process of quantification so the role of the vertical program is more toward defining program priorities. This unit should act as the pivot to revitalize the activities of the national quantification team.
- Institutionalize the monitoring and reporting of forecast accuracy and properly define the data sources for measuring FASP KPIs.
- Develop a structured approach to strengthening in-country capacity for FASP activities within the framework of supply chain HR capacity development.

Supplemental Exhibit

Exhibit 49. FASP, Distribution of Questions, and Assignation of Weight Across Capability and Facility Levels

	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
CAMEBU	20	2.5%	7	4.3%	14	1.1%	3	1.7%
Public health programs	20	2.5%	7	4.3%	14	1.1%	3	1.7%
ABREMA	21	2.4%	27	1.1%	14	1.1%	3	1.7%

Note that interpretations of the scoring, and discussions of "differences" in the scores, need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending upon the technical area and facility type.

Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions were included. Figures presented here assume all conditions are met and all questions are included.

Procurement and Customs Clearance

The procurement and customs clearance section seeks to determine that procurements are done transparently and in accordance with best practices. Major areas factored into the scoring for this CMM module are transparent, auditable procurement systems governed by policies and procedure; active management of vendor performance; and well-functioning customs clearance processes. This module was designed with public-sector procurement systems in mind. Exhibit 50 provides various examples of procurement capabilities at different levels.

Exhibit 50. Examples of Scored Procurement and Customs Clearance Capabilities

Basic	Existence of an approved vendor list All tenders include terms and conditions A documented process is in place for identifying and qualifying vendors A contract management or an order and delivery management system is in place
Intermediate	Procurements are approved by authorized personnel/stakeholders Vendor performance results are communicated to vendors Entity benchmarks or compares its purchase prices against market indices
Advanced	A procurement ethics or anticorruption program is in place External audits of the procurement system are conducted annually Procurement appeal decisions are made publicly available
SOA	Data in the contract management system are updated in real time or daily An electronic procurement (e-procurement) process is used

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

The existence of an NEML, a dedicated government budget line for procuring health products, and the presence of a vibrant private sector are recognized as key ingredients that facilitate health product procurement in Burundi in the PNSCA 2021–2025. In contrast, the absence of written procedures for updating the NEML, non-adherence to the NEML in procuring medicines by health facilities and donors, and financial difficulties across the health sectors were identified as affecting commodity procurement. The PNSCA 2021–2025 also documents inadequate regulations for procuring medicines, the lack of quality and reliable data for planning, and stockouts at CAMEBU as gaps that must be addressed around procurement. Consequently, the PNSCA 2021–2025 planned to implement measures that will improve the availability of quality pharmaceutical products that are rightly priced at all levels of the health system to satisfy at least 80 percent of requirements by 2025. In specific terms, the strategy seeks to.

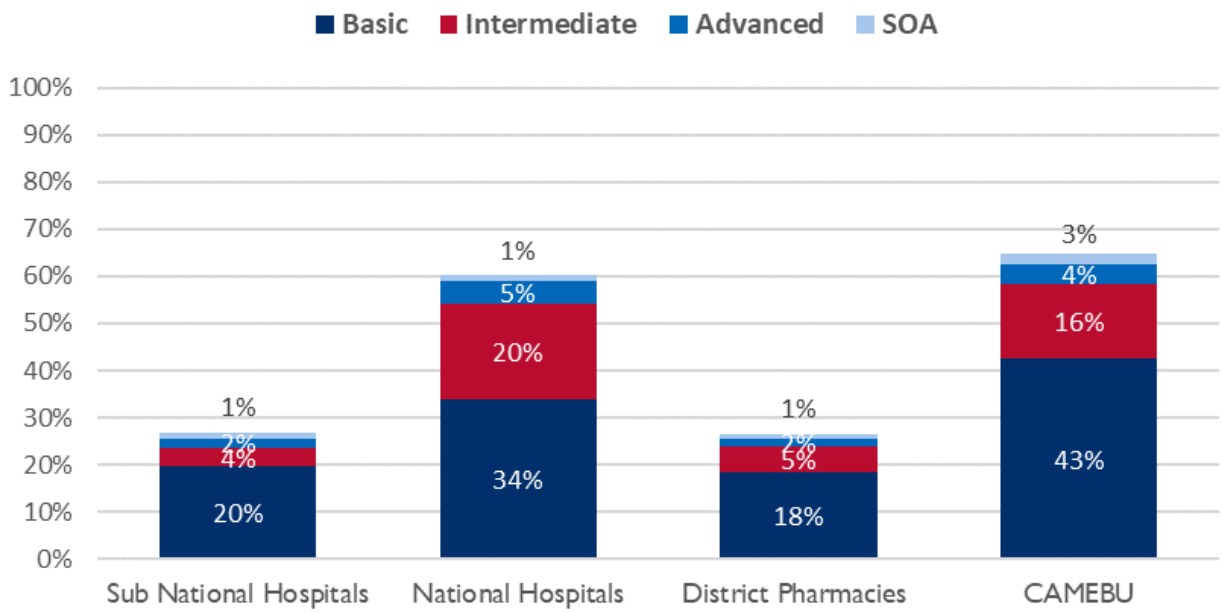
- Reduce delays in procuring pharmaceuticals through regulation and prequalification of vendors.
- Increase access to financing for procuring pharmaceuticals through price regulation and monitoring.
- Strengthen regulations that control the importation of products by predefining annual requirements.

2023 NSCA Findings and Analysis

Exhibits 51 and 52 display capability maturity scores for procurement and customs clearance. Procurement practices are currently distributed throughout the supply chain system. Normally, the NSCA does not assess procurement practices below the subnational level, but it was important to get an understanding of procurement practices across the public health landscape. Procurement capabilities were assessed at the sub-national hospitals, national hospitals, district pharmacies, and central purchasing agency (CAMEBU). However, this NSCA assessment did not reach aspects of procurement and customs clearance process that were handled within internal workings of the MSPLS. Also, procurement was not assessed at the public health programs because the procurement was either conducted through donors or directly by the MSPLS.

Overall, procurement maturity is sub-optimal across the public health supply chain although relatively strong performances were recorded at CAMEBU and the two national hospitals. None of the entities had sufficient capabilities in place to reach the NSCA benchmark score of 80 percent.

Exhibit 51. Procurement and Customs Capability Maturity Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent), and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.]

Exhibit 52. Procurement and Customs Clearance Maturity Score, and Basic Capabilities in Place

	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	28	2	48	1	1
Proportion of assessed facilities reporting that site procures some pharmaceuticals directly	83%	100%	98%	P	--
Overall maturity score (range)	27% (0–61%)	60% (60–60%)	26% (4–56%)	65%	--
Percent of basic items in place (range)	39% (0–85%)	68% (65–70%)	37% (5–65%)	85%	--

Procurement processes. Procurement capabilities were uneven across the supply chain with stronger performances at the national level in comparison to the peripheral levels. CAMEBU recorded the strongest capability maturity score of 65 percent due to the presence of basic and intermediate system capabilities, such as internal SOPs, contracts management procedures, a procurement oversight committee led by the MSPLS, and scheduled annual audits. Procurements at CAMEBU are based either on the NEML, a medical and supplies list, or user department specifications from an approved vendors list that is accessible for verification. Tender evaluations are based on price and quality with formal processes to protect vendor propriety information. Other capabilities observed at CAMEBU include price performance benchmarking, regular evaluation of vendor performance, and strong process documentation.

Yet procurement-related information is not managed in an integrated manner, as it is largely paper-based or sitting on individual computers. No procurement website is in place to provide information to vendors on current bid opportunities, bid results, awards, or solicitation schedules. Also difficult was verifying whether formal notifications were sent to successful and unsuccessful bidders and whether a formal process was in place for bidders to appeal procurement decisions. No ethics or anticorruption programs were in place for personnel who manage the procurement process, and risk management was not prioritized.

The two national hospitals assessed obtained a capability maturity score of 60 percent due to the presence of basic capabilities, such as the presence of procurement oversight committees and internal control systems. Procurements were based either on the NEML, a medical and supplier list, or user department specifications from an approved vendors list. Most procurements were conducted through a competitive process based on price, quality, and lead time although no metrics were in place for measuring procurement performance. Respondents confirmed a formal appeal process was in place for vendors but results of the appeal process were not publicized. Procurement-related information was mainly paper based with minimal automation, and no formal SOPs were sighted.

Procurement capability maturity performance was weakest at the district pharmacies and sub-national hospitals. These entities are expected to obtain their supplies from CAMEBU and not conduct procurement on their own except in cases of prolonged stockouts with authorization. Nonetheless, 83 percent of the sub-national hospitals and 98 percent of the district pharmacies actively procured drugs and medical supplies directly from private sources. The capability maturity scores obtained by the sub-national hospitals and district pharmacies ranged between 26 and 27 percent. These low capability maturity scores are attributable to the low availability or absence of policies, guidelines, and SOPs that direct procurement practice. Ethics or anticorruption programs are non-existent, and audits are infrequent. It is essential to recognize that the central level is not capable of satisfying all the needs of the district pharmacies and hospitals so, the preponderance of downstream procurements in the supply chain will remain into the

foreseeable future. So, system managers must prioritize the development of innovative procurement frameworks and structures to ensure process efficiency for practitioners at lower levels of the supply chain.

Exhibit 53. Key Procurement Capabilities (Resources, Practices, and Items) and Percentage of Facilities Reporting

	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
n =	28	2	48	1
Procurements approved by authorized personnel or stakeholders	70%	100%	72%	✓
Internal control systems**	Value thresholds; protocols; tender committee; contract mgt	Value thresholds; protocols; tender and contract committees; separation of roles; legal review	Value thresholds; protocols; tender committee; separation of roles	Contract committees and contract mgt
External audits of procurement system annually or more often	33%	50%	30%	✓
Procurement ethics or anticorruption program in place	29%	0%	0%	x
Procurement guidelines, manuals, or SOPs available (and onsite)	38%	0%	30%	✓
Documented process for identifying and qualifying vendors	0%	0%	23%	✓
Approved vendor list exists	59%	100%	43%	✓
Vendor information is maintained in a database	12%	100%	15%	✓
Most common system for maintaining procurements information	Electronic file (100%); software (50%); manual (84%)	Manual (94%); electronic (38%)	Manual (100%)	Electronic file (100%)

Prices paid. Exhibit 54 shows the prices paid for the selected products procured by CAMEBU. As medicine prices are always of interest, the assessment team used the underlisted tracer commodities to track pricing for procurements at this level of the system in comparison to international reference prices. Prices were in principle expected to be relatively less competitive, considering the need to use local currency, while international prices are referred to U.S. dollars, and the fact that supply to landlocked countries such as Burundi are more expensive that countries with access to a seaport. Still, 50 percent of the commodities selected were procured at lower prices when compared to the international average prices used.

Exhibit 54. Percentage international Reference Price Paid by CAMEBU for Select Commodities	
Commodity	Percentage of average international price paid
Atropine injection 1 mg	10%
Furosemide injection 10mg/2ml	38%
Albendazole tabs 400mg	57%
Azithromycin tablets 250mg	63%
Amoxicillin clavulanic acid 500/62.5mg	76%
Phenoxymethylpenicillin 250mg	78%
Benzathine benzylpenicillin 2.4 MUI	82%
Amoxicillin capsules 500mg	90%
Benzyl penicillin 1MUI	100%
Salbutamol tablets	102%
Paracetamol tablets 500mg	131%
Carbamazepine tablets 200mg	136%
Gentamicin eye drops 0.3 in 10ml	231%
Zinc sulphate tablets 20mg	400%
Aminophylline inj 250mg/10ml	534%
Cefotaxime injection g	558%

Source of funds for procurement. Exhibit 55 details the source of funds for procurements for Burundi's public health programs. It is encouraging to see how donors or implementing partners do not seem to be the main source of funding at any level, with most entities relying either on GOB budgets or facility revenue and cost recovery.

Exhibit 55. Source of Funds for Procurement				
Funding source	Sub -national hospitals	National hospitals	District pharmacies	CAMEBU
Government	78%	50%	62%	0%
Donor/implementing partners	3%	--	19%	0%
Facility revenue/cost recovery	73%	100%	34%	100%

Funding sources at central level. The NSCA documented the sources of funding for the procurement of health commodities at the central level. The entities assessed include CAMEBU and the public health programs (PNLS, PNILP, PNLIT, PRONIAUT, PNSR, and PEV). Among these entities the funding sources for the procurement varied based on the type of commodities; however, it is evident that donors accounts for most of the public health programs (non-commercial) products in comparison to government or facility cost recovery funds.

Exhibit 56. Funding Sources for Commodities Procured at the Central Level in 2022						
Methodology	CAMEBU	PNSR	PRONIANUT	PEV	PNLP	PNLS
Government		4%		25%		
Donors		UNFFA 57%, USAID 39%, UNICEF <1%)	UNICEF & USAID (100%)	75%	GFTAM 84%, USAID 14%, WHO 1% Others <1%)	World Bank 53%, Global Fund 31% USAID 15% Dutch Embassy 1%
Facility cost recovery revenue	100%					

Customs clearance. In Burundi, private-sector vendors are directly responsible for the custom clearance of commodities procured by the public sector. The custom clearance for donor-funded products is managed by an entity in the MSPLS that was not directly assessed during this NSCA.

Recommendations

The overall maturity score of the central-level entities active in procurement is below the NSCA maturity threshold of 80 percent. The following recommendations are proposed to address the gaps identified:

- Deploy an integrated procurement and contract management system at the central level to improve process transparency and access to data.
- Develop, disseminate, and train personnel on policies, guidelines, and SOPs to guide procurement practice with prioritization on the peripheral levels of the supply chain
- Introduce framework contracts and centrally negotiated pricing to further reduce price variation and cost effectiveness
- Prioritize the introduction of ethics and anti-corruption programs for persons involved in procurement and institutionalize annual audits for entities that conduct procurements

Supplemental Annex

Exhibit 57. Procurement and Customs Clearance: Distribution of Questions and Assignation of Weight Across Capability and Facility Levels								
MODULE	BASIC (50%)		INTERMED. (30%)		ADVANCED (15%)		SOA (5%)	
	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
Sub-national hospitals	20	2.5%	33	1.1%	16	1.0%	4	1.2%
National hospitals	20	2.5%	33	1.1%	16	1.0%	4	1.2%
District pharmacies	20	2.5%	33	1.1%	16	1.0%	4	1.2%
CAMEBU	20	2.5%	33	1.1%	16	1.0%	4	1.2%

Note that interpretations of the scoring, and discussions of "difference" in the scores, need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending on the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Warehousing and Storage

The Warehousing and Storage section seeks to ensure pharmaceuticals are stored using the most appropriate method to confirm their quality for patient use. Major areas factored into the scoring for this CMM module are existence of, and adherence to, SOPs for storage and inventory management, adequate physical infrastructure, safety equipment for storage of commodities, and appropriate security and accountability mechanisms in place (see Exhibit 58). Exhibits 59 and 60 show warehousing and storage results.

Exhibit 58. Examples of Warehousing and Storage Capabilities

Basic	Inbound shipments are checked for quantity, carton/pallet count, and documentation Stock cards are used to track and manage inventory A repair and maintenance plan is in place for all equipment and utilities
Intermediate	Facilities receive distribution schedule in advance from the issuing warehouse or supplier Different batches of quarantined product are segregated in the quarantine area
Advanced	Temperature is electronically monitored and linked to audible alarms when it is outside established range Warehousing and storage data and information are backed up off-site
SOA	Proof of deliveries are maintained through an automated system (such as barcodes scanned) Advanced warehouse management system is used to track and manage inventory

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

The PSNCA 2021–2025 identifies specific strengths and weakness for the warehousing and storage of health commodities within the Burundian public health supply chain and prescribes specific interventions to improve this area of the supply chain. Inadequacy of space for storing products, absence of a system of management of expired products, insufficient temperature monitoring of thermolabile products, and the lack of a product traceability system were highlighted as weaknesses in the warehousing and storage of pharmaceutical products at all levels of the supply chain. As a result, the MSPLS and stakeholders plan to enhance the country's capacity for the safe storage of pharmaceuticals by:

- Improving the conditions for the warehousing and storage of commodities
- Increasing capacity for cold storage
- Improving the knowledge of practitioners in the standards for the storage of commodities
- Promoting product safety and security of products in storage

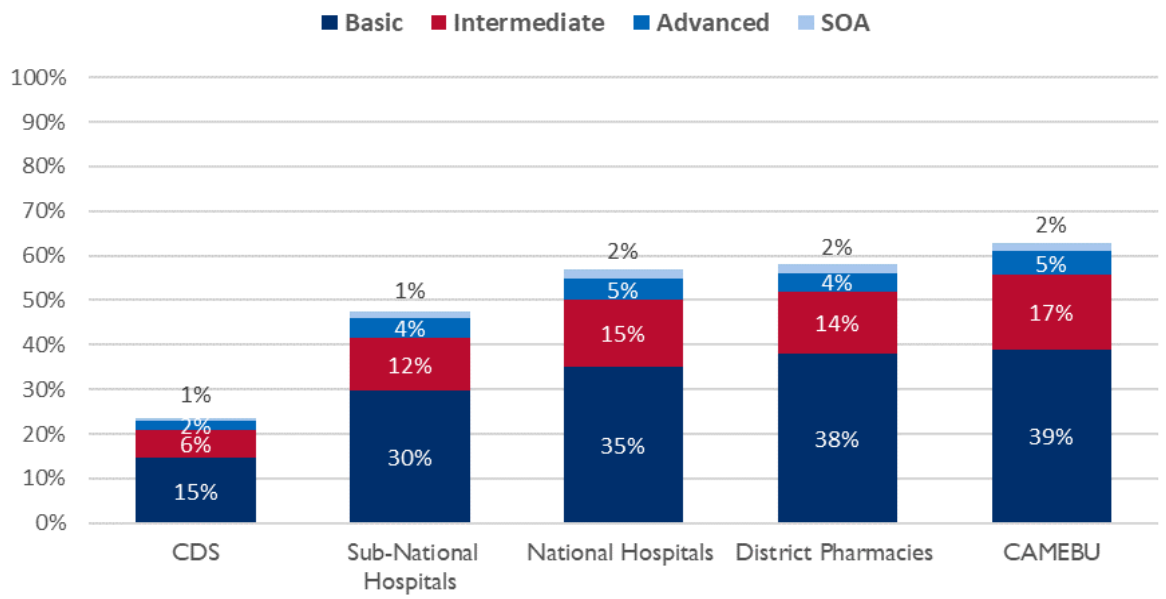
2023 NSCA Findings and Analysis

Typically, warehousing and storage capabilities improve further up in the supply chain from the last mile. In tandem with this expectation, CAMEBU obtained a capability maturity score of 70 percent, which is higher than the score obtained by any of the entities in the supply chain. The two national hospitals obtained a score of 54 percent while the score for the district pharmacies, sub-national hospitals, and the CDS ranged from 40 to 43 percent. However, these scores are all well below the NSCA's recommended benchmark of 80 percent, thus indicating the need to make specific improvements in this area at each level of the supply chain. Exhibits 60 and 61 display the capability maturity scores for warehousing and storage, by facility type. Results will be examined in several sections, including storage practices, inventory management, stock card use, storage conditions, and stock availability.

Exhibit 59. Warehousing and Storage Maturity Score, and Basic Capabilities in Place

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Overall maturity score (range)	40% (26–64%)	43% (29–46%)	54% (50–59%)	43% (30–57%)	70%	40%
Percent of basic items in place (range)	52% (35–85%)	56% (40–73%)	70% (66–74%)	55% (38–71%)	82%	44%

Exhibit 60. Warehousing and Storage Capability Maturity Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent), and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

Storage and Inventory Management Practices

The NSCA places a premium on the presence of manuals, job aids, and SOPs in facilities to guide the performance of storage and inventory management tasks. These tools are expected to be available in a ubiquitous manner in either manual or electronic formats across facilities and must be coupled with the adequate training of personnel to ensure they are used in the best ways possible. The current version of the SOPs manual for logistics management in Burundi was updated and finalized in November 2022, but its dissemination for use at all levels of the supply chain has lagged. Only 33 percent of CDS, 32 percent of hospitals, and 44 percent of district pharmacies produced copies of the SOPs for logistics management when quizzed during the NSCA. In some instances, facilities produced only the 2014 version of the SOPs

for logistics management instead of the current version developed in 2022. Also, just 33 percent to 56 percent of SDPs had capacity-building sessions in the previous year focused on storage and inventory management.

Even though the SOPs for logistics management 2022 prescribe the maximum and minimum stock levels that must be maintained at each level of the supply chain, their acknowledgment and application across the system vary greatly. When asked whether their inventory management system employs max/mins levels, most facilities responded positively; however, the max-min levels stated by each facility varied considerably from what is prescribed in the SOPs manual logistics management.

Exhibit 61. Methodology Used for Ordering as Reported by Facilities

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
Using min-max guidance	93%	94%	100%	88%	--
Economic quantity reordering (EQR)	2%	0%	0%	0%	✓
Past consumption	4%	3%	0%	10%	--

Despite the above, evidence of good inventory management practices is found throughout the system. For example, almost all facilities checked inbound shipments for quantity and remaining shelf life. Also, 94 to 100 percent of SDPs and district pharmacies will notify the issuing warehouse or the supplier of any discrepancy in commodities received, although only 2 to 12 percent of SDPs and district pharmacies reported altogether rejecting an entire shipment in case of a discrepancy. Equally commonplace was maintaining proof of delivery (POD) records for all products received. Maintenance of PODs ranged from 98 percent among CDS to 100 percent among hospitals and district pharmacies, but none were stored electronically, as the system is largely paper based.

Stock Card Use and Inventory Tracking

Exhibit 62 shows the percentage of facilities, by tracer commodity, that were found to have perfectly accurate stock cards on the day of the visit. The performance is good among the SDPs but not so much so for the district pharmacies, which registered an average score of 65 percent. The lower performance at the district pharmacies could be from the workload of filling orders from multiple facilities. Among the CDS, hospitals, and national hospitals, the percentage of facilities with perfectly accurate stock cards was 72 percent, 71 percent, and 92 percent, respectively.

Exhibit 62. Percentage of Facilities With 100 Percent Accurate Stock Card, by Tracer Commodity

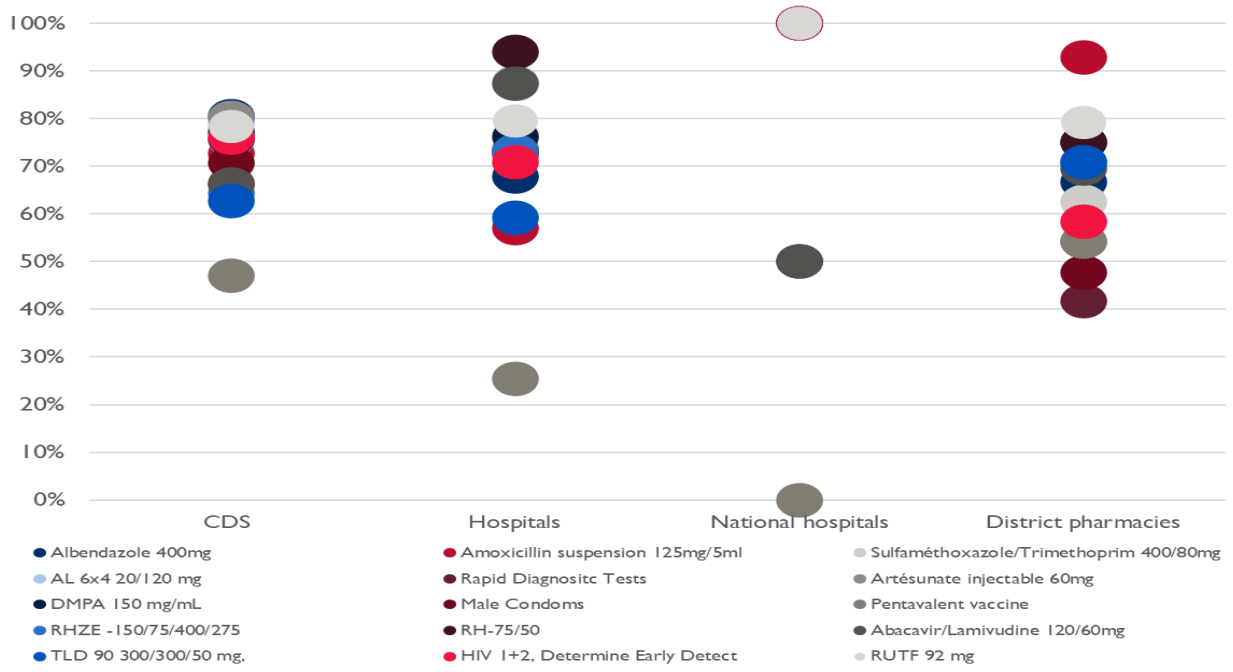


Exhibit 63. Percentage of Facilities with 100 Percent Accurate Stock Card, by Tracer Commodity

	CDS	Sub-national hospitals	National hospitals	District pharmacies
n =	83	29	2	49
Albendazole 400mg	81%	68%	100%	67%
Amoxicillin suspension 125mg/5ml	73%	57%	100%	93%
Sulfamethoxazole/trimethoprim 400/80mg	76%	88%		63%
AL 6x4 20/120 mg	79%	72%	100%	58%
Malaria rapid diagnostic tests	66%	73%	100%	42%
Artesunate injectable 60mg	80%	74%	100%	54%
DMPA 150 mg/mL	76%	76%	100%	75%
Male condoms	71%	73%	100%	48%
Pentavalent vaccine	47%	25%		54%
RHZE-150/75/400/275	64%	73%	100%	71%
RH-75/50	77%	94%	50%	75%
Abacavir/lamivudine 120/60mg	66%	87%	50%	70%
TLD 90 300/300/50 mg	63%	59%	100%	71%
HIV 1+2, Determine Early Detect (RTK)	76%	71%	100%	58%
RUTF 92 mg	78%	80%	100%	79%
AVERAGE	72%	71%	92%	65%

Storage conditions. For infrastructure, many of the basic components are in place across the supply chain. CAMEBU, the central warehouse, has permanent leak-free roofing facilities, adequate ventilation, and a hard, smooth floor that supports the movement of equipment and devices for commodity storage. Commodities are stored on pallets placed on racks that allow for easy identification of products by lots for dispatch to clients. There is a bulk storage area, separate locations for the receipt and dispatch of products, separate storage areas for storing hazardous and controlled substances, and a designated quarantine area although access is not restricted to specific individuals.

The quality of storage conditions declines as one moves further down the lower levels of the supply chain. In the district pharmacies, the presence of permanent leak-free roofing is ubiquitous; 88 percent of them are well-ventilated and 85 percent have smooth and non-porous floors that are suitable for handling and storing commodities. In 60 percent of the district pharmacies, commodities are stored on pallets away from the floor while 44 percent had distinct areas for the receipt and dispatch of commodities. A total 54 percent of the district pharmacies have a designated quarantine area but only 23 percent had a separate area for storing hazardous substances and just 17 percent created a separate space for storing controlled substances.

At the SDPs, permanent leak-free roofing and solid unbroken floors are provided for storing commodities in all facilities, and the proportion of facilities with adequate ventilation in the storage area ranged from 60 to 100 percent. Each national hospital assessed had a designated quarantine area, but the availability of designated quarantine areas was 35 percent of the CDS and 46 percent of the sub-national hospitals. Also, availability of separate spaces for storing hazardous and controlled substances is limited and accessibility to quarantine areas was not largely unrestricted.

Exhibit 64. Specialized Storage Capabilities at Service Delivery Points

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
Percentage of facilities that have cold chain storage	72%	56%	100%	83%	✓
Percentage with electricity access	82%	93%	100%	100%	✓
Percentage of facilities that have designated quarantine area	35%	46%	100%	54%	✓
Percentage of facilities that have designated storage for hazardous substances	7%	29%	50%	23%	✓
Percentage of facilities that have designated storage for controlled substances	7%	18%	100%	17%	✓
Availability of repair and maintenance plan for equipment and utilities	14%	37%	50%	46%	✓

Cold Storage

The availability of cold storage facilities was adequate at all levels of the supply chain; CAMEBU had four functional cold rooms for its cold chain. The availability of cold chain storage facilities at the district pharmacies and SDPs ranged from 56 to 100 percent. Temperature monitoring occurred at all the facilities that maintained a cold chain, and temperature excursions were reported in just 1 percent of the sampled sites in the last six months. Electricity coverage was reported in 82 to 100 percent of SDPs, and the district pharmacies and each of these facilities had a backup power system that was either a generator or solar-powered batteries to maintain electricity supply when power cuts occur.

Exhibit 65. Cold Storage Capabilities and Performance at Service Delivery Points and Warehouses					
	CDS	Hospitals	National hospitals	District pharmacies	CAMEBU
Percentage of facilities that have cold chain storage	72%	56%	100%	83%	✓
Types of cold chain infrastructure available	Free-standing refrigerators (100%), cold boxes (73%)	Free-standing refrigerators (96%), cold boxes (80%), cold room (8%)	Free-standing refrigerators (100%), cold boxes (100%),	Free-standing refrigerators (100%), cold boxes (92%)	Cold room (✓)
How temperature in monitored	Digital thermometer (80%),	Digital thermometer (52%),	Digital thermometer (52%),	Digital thermometer (52%),	Digital thermometer (✓)
Percentage of facilities that have temperature logs	97%	51%	50%	92%	✓
Percentage of time with temperature excursions	1%	1%	15	1%	--

✓ denotes yes, x denotes no, and -- indicates not applicable.

Security and Safety of Storage Areas

NSCA findings point to a need to prioritize investments for the safety and security of health commodities in storage. At CAMEBU the fire extinguishers were visible in all storage areas, but the last period of inspection was over a year, and there were no smoke detectors. Also, basic safety equipment, such as reflector vests, helmets, safety boots, and coats, was not widely used within the warehouses. Even though availability of fire extinguishers among the district pharmacies was 56 percent, most have not been serviced for periods exceeding one year and may not deploy effectively when required. The district pharmacies had no smoke detectors, and other basic safety devices were not widely accessible. On a positive note, the availability of hand gloves, laboratory coats, and safety was 83 percent, 70 percent, and 65 percent, respectively, for employees at district pharmacies.

Among the SDPs, fire extinguishers were available at both national hospitals, but availability rates were 40 percent at the sub-national hospitals and 10 percent among the CDS. None of these facilities had smoke detectors, reflective jackets, or helmets, but other protective wear, such as masks, gloves, and safety boots, was available.

For product security, most of the facilities have controlled access to the storage with security enhancements, such as locks and burglar-proof bars, in place. Advanced security systems, however, such as alarms, closed-circuit television (CCTV), and biometric access, were non-existent.

Exhibit 66. Security and Safety Capabilities Across the Supply Chains					
Percentage of facilities with:	CDS	Hospitals	National hospitals	District pharmacies	CAMEBU
Fire extinguishers	72%	56%	100%	83%	✓
Smoke detectors	0%	18%	0%	4%	X
Heavy-duty gloves	83%	90%	100%	56%	✓
Heavy lab coats	70%	80%	100%	40%	✓
Helmets	10%	9%	0%	4%	X
Safety boats	65%	67%	100%	33%	X
Reflectors	0%	0%	0%	46%	X
Controlled or limited access	90%	74%	100%	100%	✓
CCTV access control	0%	0%	50%	0%	✓

✓ denotes yes, x denotes no, and – indicates not applicable.

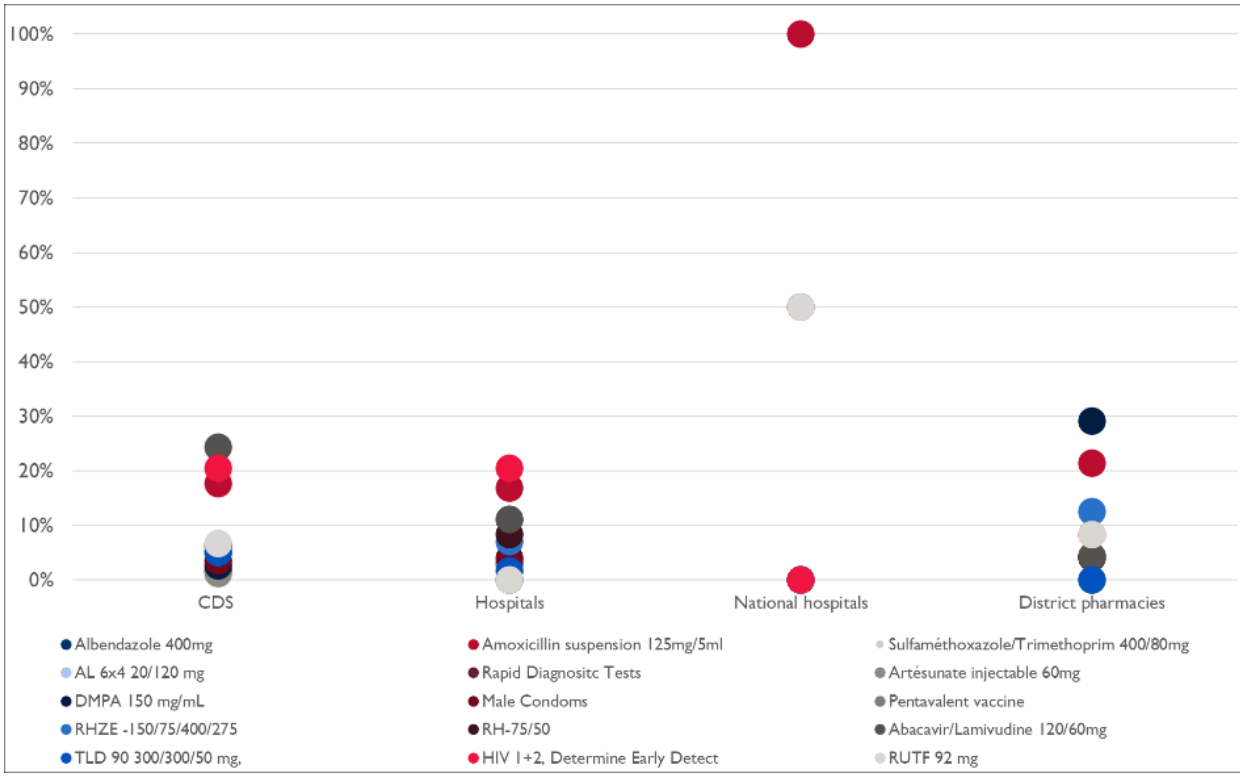
Stock Availability

The availability of commodities at SDPs is the top priority of any well-functioning pharmaceutical supply chain. The NSCA found that stock was mostly available throughout the system, with no specific commodity or facility type being singled out. The relative higher stockout rates recorded for amoxicillin suspension 125mg/ml ranging from 17 to 100 percent is attributable to prolonged shortages at CAMEBU in the immediate periods before the assessment. Another factor that may influence product availability is the implementation of PBF schemes that reward reduced stockouts at SDPs. The PBFs are thought to be a great motivation for SDPs to maintain a minimal level of stock on the shelf to satisfy the benchmark of no stockouts. This assertion may be given credence when the high product availability rate on the day of assessment is juxtaposed with a low stocked-according-to-plan performance as per the prescribed max-min levels.

Exhibit 67. Percentage of Facilities With Stockout on Day of Assessment					
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
Number of observations:	71	72	17	4	1
Albendazole 400mg	4%	0%	0%	4%	✓
Amoxicillin suspension 125mg/5ml	18%	17%	100%	21%	✓
Sulfaméthoxazole/trimethoprim 400/80mg	4%	3%		0%	✓
AL 6x4 20/120 mg	5%	0%	0%	4%	✓
Rapid diagnostic tests	2%	3%	0%	4%	✓
Artésunate injectable 60mg	1%	3%	0%	0%	✓
DMPA 150 mg/mL	3%	0%		29%	✓
Male condoms	4%	4%	50%	4%	✓
Pentavalent vaccine	5%	11%		0%	--
RHZE-150/75/400/275	6%	7%	0%	13%	✓
RH-75/50	6%	8%	0%	4%	✓
Abacavir/lamivudine 120/60mg	24%	11%	0%	4%	✓
TLD 90 300/300/50mg	5%	2%	0%	0%	✓
HIV 1+2, Determine Early Detect	20%	20%	0%	8%	✓
RUTF 92mg	7%	0%	50%	8%	✓
Range	1%–24%	0%–20%	0%–100%	0%–29%	✓

✓ denotes yes, x denotes no, and -- indicates not applicable,

Exhibit 68. Stock Rates on the Day of Visit for Tracer Products, by Level in the Supply Chain



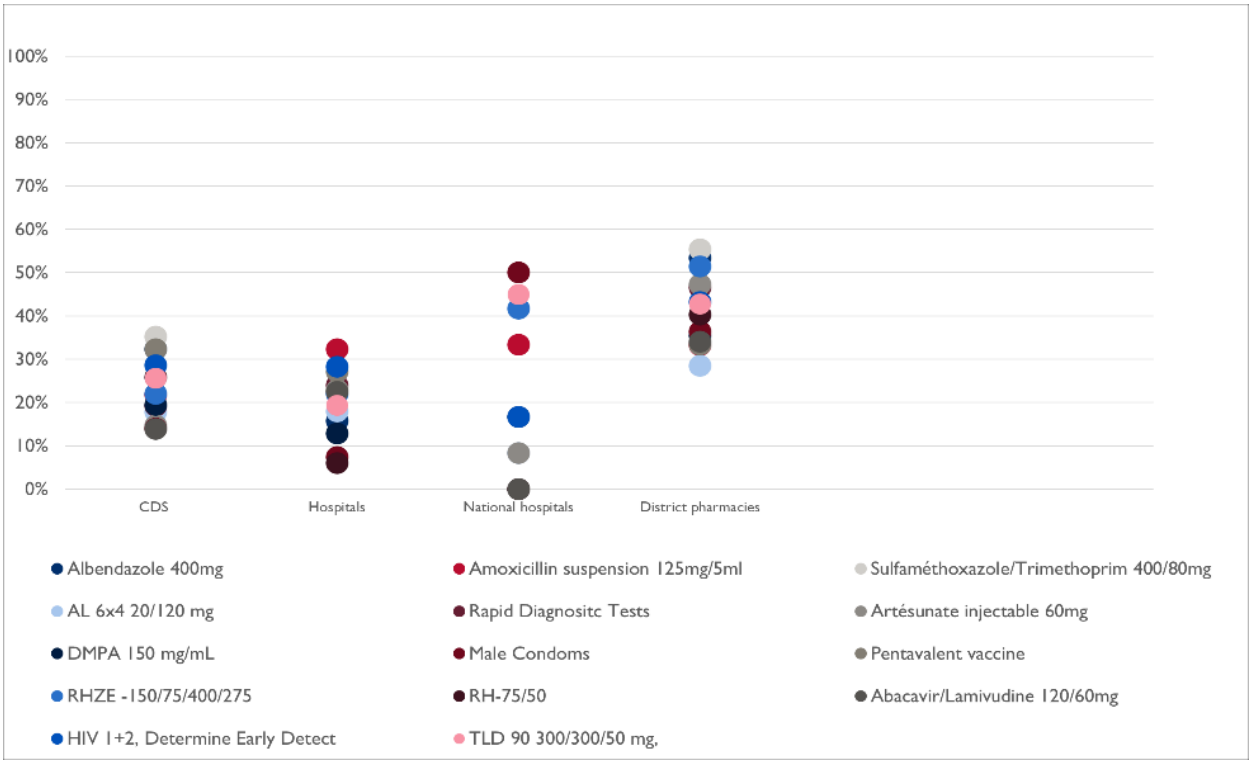
Stock According to Plan

The NSCA examined stock levels over the previous six months before the assessment by reviewing historical stock records. Exhibit 68 displays the stocked according to plan (SATP) rates, defined as the number of observations of stock levels that were within the prescribed min/max levels, over the defined period. While the levels were below ideal, it was particularly concerning how low the SATP rates were at the central warehouse and district pharmacies. Per the national SOPs for logistics management, CAMEBU is expected to maintain a minimum inventory level of six months and maximum level of 12 months; however, none of the 14 tracer's products assessed meet this criterion. Two out of the 14 tracer products assessed at CAMEBU were overstocked while the remaining 12 were understocked. At the district pharmacies the portion of tracer products in storage meeting the set max-min levels ranged from 0 percent to 29 percent. Throughout, the supply chain adherence to the prescribed max-min levels of inventory was arbitrary and did not follow a consistent pattern, although there are explicit criteria in the SOPs for logistics management. Clarity is needed in how max-min levels are applied at each level of the supply chain and when variations are made for specific reasons, the same must be documented for easy reference and validation. While this is concerning, it was not surprising to see such low SATP rates in the context of the ordering and distribution challenges between the district pharmacies and the SDPs.

Exhibit 69. SATP Rates for All Tracer Products, by Level in the Supply Chain

Number of observations	CDS	Hospitals	National hospitals	District pharmacies
	83	29	2	49
Albendazole 400mg	32%	16%	0%	53%
Amoxicillin suspension 125mg/5ml	22%	32%	33%	33%
Sulfamethoxazole/trimethoprim 400/80mg	35%	23%		55%
AL 6x4 20/120 mg	18%	18%	8%	28%
Rapid diagnostic tests	19%	24%	0%	47%
Artesunate injectable 60mg	15%	23%	8%	47%
DMPA 150 mg/mL	19%	13%	17%	36%
Male condoms	14%	7%	50%	36%
Pentavalent vaccine	32%	27%		33%
RHZ-150/75/400/275	22%	22%	42%	51%
RH-75/50	26%	6%	0%	40%
Abacavir/lamivudine 120/60mg	14%	22%	0%	34%
TLD 90 300/300/50 mg,	26%	19%	45%	43%
HIV 1+2, Determine Early Detect	29%	28%	17%	43%
RUTF 92 mg	17%	12%	42%	27%
Range:	17%–35%	7%–28%	0%–42%	27%–55%

Exhibit 70. Stocked According to Plan Rates for All Tracer Products by Level in the Supply Chain



Performance Indicators

The use of performance indicators to regularly measure and track inventory in storage at the warehouses and SDPs was assessed. This was to determine whether performance indicators in the facilities, such as stockouts, stocked according to plan, order fill rate, wastage rate, and stock turn per annum, were regularly measured and tracked warehouses and district pharmacies on their own. As evident in Exhibit 71, the performance tracking was more pronounced at the central warehouse (CAMEBU) as compared to the lower levels of the supply chain. Indeed, evidence is minimal that district pharmacies and SDPs tracked and reported performance indicators for the supply chain.

The SOPs manual for logistics management 2022 defines and provides a list of indicators that must be regularly tracked and measured at the SDPs; however, many of the SDP and district pharmacies do not track indicators on their own, as they are not required to track and document performance improvement trends.

Exhibit 71. Measuring and Tracking of Performance Indicators at SDPs and Warehouses					
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
Stocking according to plan	13%	17%	0%	8%	✓
Stockout rates	9%	12%	0%	17%	✓
Stock accuracy	24%	11%	0%	23%	✓
Order fill rate	20%	9%	0%	25%	✓
Order turnaround time	10%	4%	0%	10%	✓
Wastage from expires	10%	7%	0%	15%	✓
Number or duration of temperature excursions	9%	0%	0%	2%	✓

✓ denotes yes, x denotes no, and – indicates not applicable.

District pharmacies. The district pharmacy facilities play a crucial role in the warehousing and storage of health commodities to last-mile facilities and ultimately to patients. Yet despite this being a crucial node in warehousing and distribution, the central level and district pharmacies have a wide gap in performance. With sub-optimal stock card accuracy rates, low SATP rates, and a high degree of variance of capability across the 49 different branches, these entities need to be strengthened so they can fully execute their roles. PSNCA 2021–2025 also has a proposal to create regional hubs for warehousing and distribution; however, this is yet to be realized and must be implemented with a long-term view of the role of the district pharmacies.

Recommendations

The warehousing and storage module identified important warehousing capabilities across the country, as well as opportunities for investing in additional resources and improving stock management performance. NSCA findings suggest the following warehousing and storage recommendations:

- As a complement to the NSCA, conduct a warehouse capacity and operational assessment in Burundi to understand the state of storage infrastructure and determine options for improving commodity warehousing and storage. NSCA assessed the capabilities and maturity around the warehousing, storage, and inventory management practices in the supply chain but did not assess the state of infrastructure or its operational capacity. So, the authors of this report recommended a separate warehousing assessment that will evaluate the state of storage infrastructure, operational capacity, and handling equipment to complement NSCA findings.
- Invest in strengthening the logistics management of capabilities at the sub-national level (district pharmacies, hospitals, and CDS). It is not enough to have in place the SOPs manual for logistics management; a clear plan is needed for dissemination, training, and use by supply chain actors at the last mile. We recommended that the MSPLS develop a learning agenda and a dissemination plan to ensure the SOPs for logistics management are available, accessible, and used to inform decision making across the supply chain.

- Conduct an immediate audit of safety and security systems, particularly fire safety equipment, to ensure they remain functional and fit for purpose.
- Resolve discrepancies in the application and use of max-min inventory levels at each level of the supply chain. This will ensure that practitioners have a common understanding of applying inventory management principles for each class of commodity they manage.
- Leverage the ongoing process for developing an eLMIS to automate the process for tracking logistics management indicators. If the new eLMIS is expected to collect and report data at each level of the supply chain, then it should be an opportunity to improve the process of data collection and tracking performance indicators.

Supplemental Exhibit

Exhibit 72. Warehousing and Storage: Distribution of Questions and Assignation of Weight Across Capability and Facility Levels

	BASIC (50%)		INTERMED. (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
CDS (n=83)	48	1.0%	29	1.0%	13	1.1%	7	0.7%
Hospitals (29)	53.3	0.9%	30	1.0%	13	1.2%	6	0.8%
National hospitals (2)	53.3	0.9%	30	1.0%	13	1.2%	6	0.8%
District pharmacies (48)	74.7	0.7%	37	0.8%	14	1.1%	5	1.0%
CAMEBU (1)	74.7	0.7%	37	0.8%	14	1.1%	5	1.0%

Note that interpretations of the scoring, and discussions of "differences" in the scores, need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending on the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Distribution

The safe and efficient distribution of pharmaceuticals and medical products is a fundamental function of public health supply chains. In this technical area, the NSCA seeks to ensure that distribution plans are structured, implemented, and monitored so that they regularly achieve on-time distribution of commodities to SDPs. Major areas that were factored into the scoring for this module included the existence of a distribution plan, consideration of appropriate factors for optimizing distributions, best practice policies and procedures, active recording and monitoring of cost and transit data, and appropriate mechanisms to ensure safety and quality of products during transit (see Exhibit 73).

Exhibit 73. Examples of Scored Distribution Capabilities

Basic	Existence of an approved distribution plan that defines when products will be delivered to clients Existence of a data management system that captures distribution plans and operations Existence of manual systems for capturing and maintaining transportation data Temperature monitoring devices used to track temperature excursions during transportation Security management measures: unannounced inspections/security guards Process for recording loss incidents Manual tracking of ownership of commodities throughout the system POD records maintained manually
Intermediate	Distribution routes are preplanned/included in the communication to health facilities/reviewed annually Existence of policies that cover the distribution and transportation of commodities/aspects of fleet management (list of policies areas/key aspects) Documented SOPs for managing transportation assets available at site Existence of electronic systems for capturing and maintaining transportation data Collection of distribution cost data/using Excel
Advanced	Products from different programs and partners distributed in an integrated manner wherever product characteristics allow (most products = an intermediate capability) Daily or real-time capture of transportation data Temperatures recorded in transit Security management measures: video surveillance/two-way radio/barcode scanning
SOA	Government budget or facility revenue covers 100 percent of recurring distribution costs Security management measures: radio frequency identification tags

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

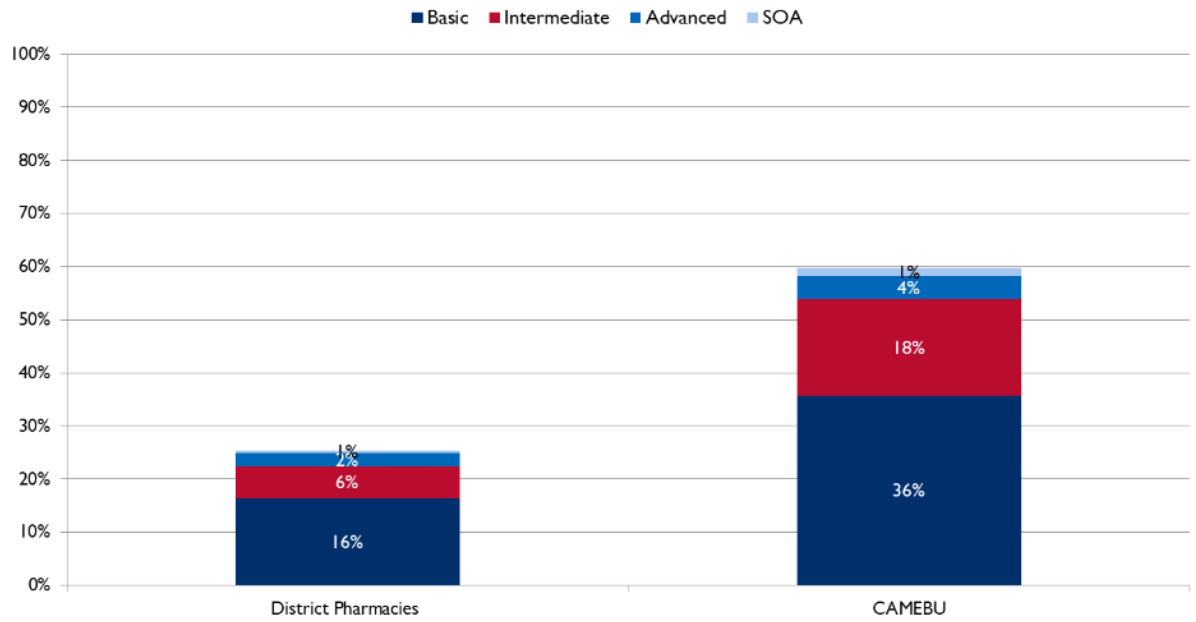
In the 2014 NSCA, significant weaknesses were reported in transporting and distributing health commodities in Burundi. Since then, Burundi has taken steps to strengthen its capacity in distributing health supplies by developing route plans and improving the scheduled distribution of commodities between CAMEBU and the district pharmacies. While these interventions have improved the regular supply of health products to end-users, the distribution system remains fragile and cannot always deliver the volumes required to meet the needs of its clients and the health programs. The country has been moving toward an integrated distribution of commodities using the fleet at the disposal of CAMEBU to transport health products to the district pharmacies, but distribution between the district pharmacies and the SDPs is still in its nascent stages. Strengthening the distribution system and its infrastructure is a core priority in the national supply chain strategic plan (PNSCA 2021–2025).

2023 NSCA Findings and Analysis

The NSCA assessed the distribution of health commodities through the public health supply chain system. A capability maturity assessment was conducted at CAMEBU, which is responsible for distributions from the central level to the district pharmacies and at district pharmacies, which supply the peripheral levels. Scheduled distribution is currently being conducted from the central level to the district pharmacies. By design, the district pharmacies are expected to conduct direct deliveries to the hospitals and CDS but most facilities pick up their supplies due to resource limitations.

Results of this NSCA reveal the presence of some foundational capabilities that can become essential elements for an effective distribution system and challenges that can impede expected performance if not addressed Exhibits 74 and 75 detail the distribution maturity scores for all five entity types assessed as well as the proportion of basic elements in place.

Exhibit 74. Distribution Maturity Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent,) and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

Exhibit 75. Distribution Maturity Score, and Basic Capabilities in Place

	District pharmacies	CAMEBU
n =	48	1
Overall maturity score (range)	25% (3%–54%)	60%
Percent of basic items in place (range)	33% (5%–67%)	71%

CAMEBU

CAMEBU attained an overall capability maturity score of 60 percent with 71 percent of basic capabilities in place. Although this score is below the desirable NSCA benchmark score of 80 percent, this assessment identified the presence of some strong capabilities that can be leveraged as building blocks to enhance supply chain performance. These include the presence of approved distribution plans that are updated at least each year to meet client demands and communicated to end-users. The entity depends largely on its cost recovery funds to conduct an integrated distribution for most of the commodities it supplies using its own fleet or outsourced vehicles.

CAMEBU also has the infrastructure for storing and distributing cold chain commodities, although there is a deficit in temperature monitoring for goods in transit. Data on distributions are not regularly captured, the processes are largely manual with minimal automation, and data for measuring KPIs are not regularly collected or monitored.

In making decisions around strengthening the distribution system within CAMEBU and the entire supply chain, stakeholders need to prioritize development of policies, guidelines, and SOPs that provide a framework for prescribing standards, delineating roles, and responsibilities, and planning for resource allocation. They must also consider issues around collecting and reporting distribution-related data within the configuration of the new eLMIS.

District Pharmacies

The district pharmacies obtained an overall capability maturity score of 25 percent with a range of 3 to 54 percent and a score of 33 percent for the basic element present with a range of 5 to 67 percent. These scores reinforce findings from previous NSCA in 2014 and the SWOT analysis in the PSNCA 2021–2025 that the distribution between district pharmacies to the SDPs is the weakest link within the network in Burundi. No clear policies cover the process for the districts, as the availability of SOPs was sparse. A total 35 percent of the districts submitted distribution plans, 17 percent had routed plans for distribution, and 46 percent shared their plans with their clients. When the district pharmacies conduct distributions, they use their own fleet and mostly fund the expeditions through cost recovery funds. Indeed, most SDPs collected their products directly as opposed to having a direct supply from the district pharmacies.

On average, each of the 49 district pharmacies will be expected to supply products to no more than 40 facilities (hospitals and CDS) if the total number of health facilities in-country is assumed to be no more than 2,000 facilities. This means each district pharmacy needs to acquire and maintain a fleet to service only a few numbers of facilities within its geographical coverage. Whereas it is entirely possible to acquire and equip the district pharmacies, to be involved in the last-mile delivery albeit to a few facilities, it is important to recognize that this will be at a huge cost and not necessarily the most optimal use of scarce resources. If last-mile delivery between the district pharmacies and the last mile is to be optimized, then the country needs to decide on an optimal distribution model that makes the best use of the current resources among district pharmacies, such as co-ownership of fleet or outsourcing to the private sector.

Exhibit 76. Assessing Features of Distribution Capabilities in Place		
	District pharmacies	CAMEBU
Mechanisms used for distribution	Own fleet, rented vehicles, outsourced service	Own fleet, rented vehicles
Existence of an approved distribution plan	35%	✓
Responsibility for funding the distribution budget	Government budget, facility cost recovery, donor and implementing partners	Facility cost recovery
Presence of policies that cover distribution and transportation of commodities	4%	X
Proof of delivery maintained	Yes (manually) 77%, Yes (electronic with manual entry)	Yes (electronic with manual entry)
Transport-related KPIs monitored	2%	X
Distribution cost data collected	17%	✓
Security requirements documented for truck and personnel	13%	✓

✓ denotes yes, x denotes no, and -- indicates not applicable.

Distribution KPIs

Exhibit 77. Downstream Order Key Performance Indicators		
	District pharmacies	CAMEBU
Total number of orders (randomly selected over a six-month period)	182	226
Order turnaround time (days)	--	12.05 days
Percentage of orders adjusted	82%	0%
Average deviance from 100 percent fill rate	51%	11%
Percentage of orders delivered in-full	33%	38%

Recommendations

- Use the results of the planned network optimization study to decide on the most efficient options for last-mile delivery to replace the existing situation where facilities need to travel to the resupply points. The results from the NSCA, a network optimization study, and warehouse assessment should influence the decision on the siting of additional warehousing as proposed in the PNSCA 2021–2025.
- Codify existing practices and procedures for transportation and distribution. Use this opportunity to review operational practices across the board to ensure consistency and appropriateness.
- Institute formal tracking of transportation- and distribution-related KPIs and establish a formal structure to monitor them. Empower managers to use this information to further drive distribution efficiency and effectiveness.
- Strongly consider leveraging private-sector participation in distributing commodities to the last mile. Whereas using a government fleet remains a viable option, involving the private sector will help reduce the burden on government to make initial capital investments.

Supplemental Exhibit

Exhibit 78. Distribution Module, Distribution of Questions and Assignation of Weight Across Capability and Facility Levels

	BASIC (50%)	INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
District pharmacies (48)	21	2.4%	43	0.7%	17	0.9%	7	0.7%
CAMEBU (1)	21	2.4%	43	0.7%	17	0.9%	7	0.7%

Note that interpretations of the scoring, and discussions of "difference" in the scores, need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending on the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Logistics Management Information Systems

Accurate and timely data are critical for effective decision making throughout the public health system. The logistics management information system is a system of records and reports—paper-based or electronic—that is used to aggregate, analyze, validate, and display data to inform logistics decisions and manage the supply chain. Major areas factored into the assessment of LMIS capabilities and performance in the NSCA included evidence that standardized LMIS tools and practices are used consistently throughout the system, harmonized reporting practices, regular reporting intervals, performance monitoring on quality of reporting, and ultimately, performance in data accuracy, completeness, and timeliness (see Exhibit 79).

Exhibit 79. Examples of Scored Logistic Management Information System Capabilities

Basic	Standard operating procedures Paper-based LMIS tools Quarterly reporting frequency Internal data quality assessments (DQAs)
Intermediate	Standardized tools across the supply chain—geographic regions, health programs, and system levels Electronic LMIS tools Monthly reporting frequency Standard process to review LMIS data Reliable Internet
Advanced	Weekly reporting frequency Virus protection for eLMIS computers
SOA	Real time/daily LMIS reporting frequency

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

Previous studies of the health commodity supply chain in Burundi, including the 2014 NSCA, have revealed challenges with LMIS performance. These challenges have impacted the availability of accurate and reliable data for the performance of key supply chain activities, such as forecasting, supply planning, storage, and distribution of health commodities.

In 2015, the MSPLS, with the support of financial and technical partners, deployed the district health information management (DHIS2) software as the health information management system to collect and report health statistics from all SDPs. Although the DHIS2 was designed to primarily collect and report service delivery statistics, the MSPLS leveraged it to collect and report logistics data. So, logistics reports from district hospitals and health centers are entered on paper and then transcribed into the DHIS2 software to provide data on health commodities. But this tool does not support end-to-end logistics management functions, and its deployment for reporting is limited to 120 tracer products only.

Per the aspirations of the PNSCA 2021–2025, Burundi seeks to ensure a 100 percent availability of real-time logistics data by 2025. The strategy seeks to ensure the availability and use of standardized logistics management tools for reporting, implement a computerized integrated national system at all levels of the health system, ensure the interoperability of the eLMIS tools with other existing tools (SAGE, SARI, and DHIS2 software), and strengthen the collection and reporting system for quality data.

Since 2019, the MSPLS begun designing and implementing a project for an electronic logistics information management Burundi. This system aims to improve the visibility of logistics data and information at all levels of the supply chain to ensure the continuous availability of health supplies at SDPs.

2023 NSCA Findings and Analysis

LMIS capability and performance results from this NSCA are presented in Exhibits 80 through 82. Overall, capability scores were consistently 50 percent above the SDPs assessed; however, lower scores were found at the district pharmacies and CAMEBU. The NSCA revealed a baseline of important basic capabilities at SDPs, such as the presence of paper-based tools at SDPs; the use of LMIS data to inform order, reporting, and inventory management; the use and availability of the SOPs; and government funding for the LMIS. Yet challenges, such as the intermittent stockout of reporting tools and weak data quality, persist. The wide spreadsheet availability of paper-based LMIS tools is one of the key successes achieved in the supply chain post-implementation of the 2014 NSCA.

Exhibit 80. LMIS Maturity Scores Across All Surveyed Facility Types

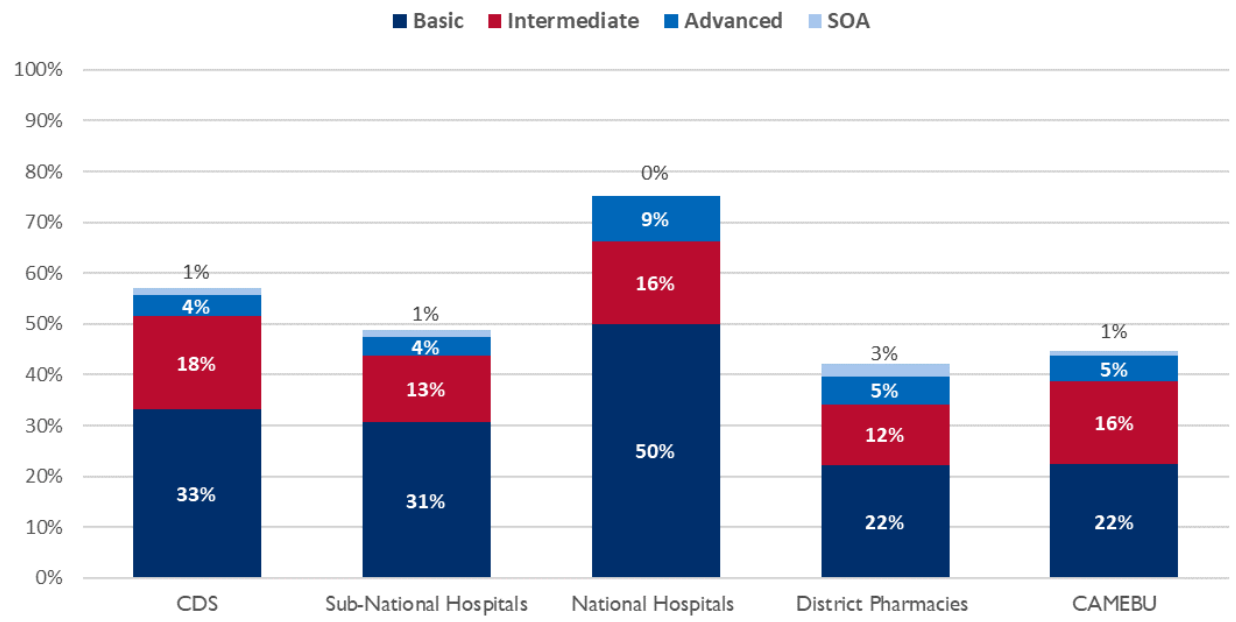


Exhibit 81. LMIS Maturity Score, and Basic Capabilities in Place for Entities Assessed

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Overall maturity score (range)	57% (4–81%)	58% (3–84%)	75% (74–77%)	49% (4–76%)	42%	N/A
Percent of basic items in place (rang	66% (8–92%)	75% (0–98%)	100% (100–100%)	61% (9–100%)	44%	N/A

Typically, the strongest capabilities within supply chain functions are found at the central level, and those capabilities decrease progressively going through the health system to last-mile facilities. In Burundi, this trend is reversed, as the CMM scores at the central warehouse (CAMEBU) were the lowest when compared to the other levels of the supply chain. The overall CMM score for LMIS was 42 percent at CAMEBU, 49 percent at the district pharmacies, 58 percent at the CDS, 59 percent at the sub-national hospitals, and 75 percent at the national hospitals. At the national hospitals,100 percent of basic capabilities were deemed to be present, while basic capability scores among other entities, including CAMEBU, ranged from 44 to 75 percent.

Looking at the CMM scores, we are encouraged by the presence of nascent system capabilities that will constitute the building blocks for an advanced or state-of-the art LMIS in the future. These include the ubiquitous availability of paper-based LMIS tools at all levels of the supply chain, harmonized reporting cycles among vertical programs, and SOPs to guide tasks and processes. Still, each vertical program has individualized reporting requirements, and no standardized processes are in place to review and improve data quality. Throughout the supply chain, LMIS performance indicators, such as timelessness, completeness, and accuracy, are sparingly calculated even though they are explicit in the SOPs.

Paper LMIS

Paper-based LMIS is the predominant system in Burundi, although the country has initiated processes to transition to an electronic system. Presently, health facilities collect logistics data using manual forms, which are then transcribed into the DIHS2 system at the district level for a limited number of tracer products.

Exhibit 82 shows key LMIS capabilities, resources, and best practices are inconsistently found in the paper-based system. The SOPs for the logistics system and the LMIS were updated and published in 2022 but their dissemination and uptake by end-users has lagged. The presence of SOPs on LMIS was 40 percent at the CDS, 32 percent at hospitals, 100 percent at the two national hospitals, and 48 percent at the district pharmacies. The percentage of facilities reporting the existence of a standard process to review LMIS data and reports ranged from 47 percent to 100 percent while internal DQAs were conducted in not more than 26 percent of facilities. Other challenges associated with use of the paper-based system include data loss, difficulties in filling out forms, inadequate numbers of trained personnel to deal with the workload, and challenges in data storage, retrieval, and sharing with stakeholders. Despite these challenges, the availability of the paper-based tools for data collection and reporting was adequate with minimal stockouts reported. Stock card accuracy at the SDPs and district pharmacies ranged from 65 to 92 percent while the proportion of stock cards updated ranged from 78 to 100 percent. It is therefore important to recognize and define actions to address the gaps in paper system capabilities and harness the strengths of the system as the country transitions to an electronic LMIS.

Exhibit 82. Key Performance Indicators and Key Capabilities in Place, Paper LMIS				
	CDS	Sub-national hospitals	National hospitals	District pharmacies
n =	83	29	2	49
Percentage of facilities that use paper LMIS (exclusively or with eLMIS*)	100%	97%	100%	58%
Percentage of facilities reporting the presence of SOPs on LMIS	40%	32%	100%	38%
Percentage of facilities reporting the existence of a standard process to review LMIS data and reports	62%	47%	100%	65%
Percentage of facilities reporting the site conducts internal DQA	26%	19%	0%	19%
Percentage of facilities reporting stockout of stock cards in the last year	10%	0%	0%	6%
Stock card accuracy: percentage of facilities with 100 percent accurate stock card, average across tracers	72%	71%	92%	65%
Stock card accuracy: percentage points deviation from 100 percent accuracy (range across tracer commodity)	47%–2,152%	17%–2,216%	50%–700%	60%–1,339%
Stock card up to date: Average of average—facilities reporting up-to-date x tracer commodities	84%	86%	100%	78%

Electronic LMIS. Burundi is in the process of digitizing the LMIS to improve the collection, analysis, dissemination, and use of data for distributing and managing health products at all levels of the country's health system. Exhibit 83 highlights the scope and utilization of eLMIS within the public health supply chain in Burundi. The mention of eLMIS during this NSCA refers mostly to the use of the DHIS2 software for reporting stock data. The DHIS2 collects logistics data for 120 tracers' commodities, but these data are neither used to inform order and resupply of health products at any level and are not relied upon by stakeholders at the central level to perform key supply chain tasks, such as forecasting, supply planning, or distribution of health commodities. The district pharmacies use the CHANEL software for inventory management, but the software is not connected to a network or linked to other levels of the supply chain for data access and visibility beyond each district pharmacy. CAMEBU uses the SAGE warehouse and inventory management software, but this is also not connected to any other level of the supply chain so operates as a standalone system. The data accuracy rate in the current eLMIS system ranges from 42 to 54 percent, and deviations from 100 percent accuracy goes over a wide range (refer to Exhibit 83).

The future-state eLMIS is expected to achieve end-to-end data visibility and accessibility for real-time decision-making by ensuring interconnectivity at all levels of the supply chain and interoperability between the various software that hold inventory data. However, results of the NSCA reveal that Internet connectivity is limited particularly at the lower levels and could be a potential challenge to supply chain digitization. SOP uptake and use remains low as is the case with the practice of audits and reviews to inform

quality improvements. Insufficient training or human resource capability was also a frequently cited challenge, indicating that room for improvement continues in this area. Still, most facilities have access to computers and the government remains committed to improving the system.

Exhibit 83. Key Performance Indicators and Capabilities in Place—eLMIS

	CDS	Hospitals	National hospitals	District pharmacies
n =	83	29	2	49
Percentage of facilities that use eLMIS (exclusively or with paper LMIS system)	9%	27%	--	10%
Percentage of facilities reporting the presence of manuals or SOPs on eLMIS	2%	0%	--	20%
Percentage of facilities reporting existence of reliable internet connectivity at facility ("always or almost always works")	39%	88%	--	20%
Percentages of facilities reporting LMIS (electronic or paper) capacity-building sessions within the last year	39%	13%	50%	56%
eLMIS record accuracy: percentage of facilities with 100 percent accurate stock card, average across tracers	52%	42%	--	54%
eLMIS record accuracy: percentage points deviation from 100 percent accuracy (range across tracer commodity)	10%–432%	24%–8,686%	--	29%–1,644%

*This metric is calculated only for commodities for which the facility had an eLMIS record available on the day of the visit. If it was not available:

✓ denotes yes, x denotes no. and – indicates not applicable.

Exhibit 84. Percentage of Facilities With 100 percent Accurate eLMIS Record, by Tracer Commodity

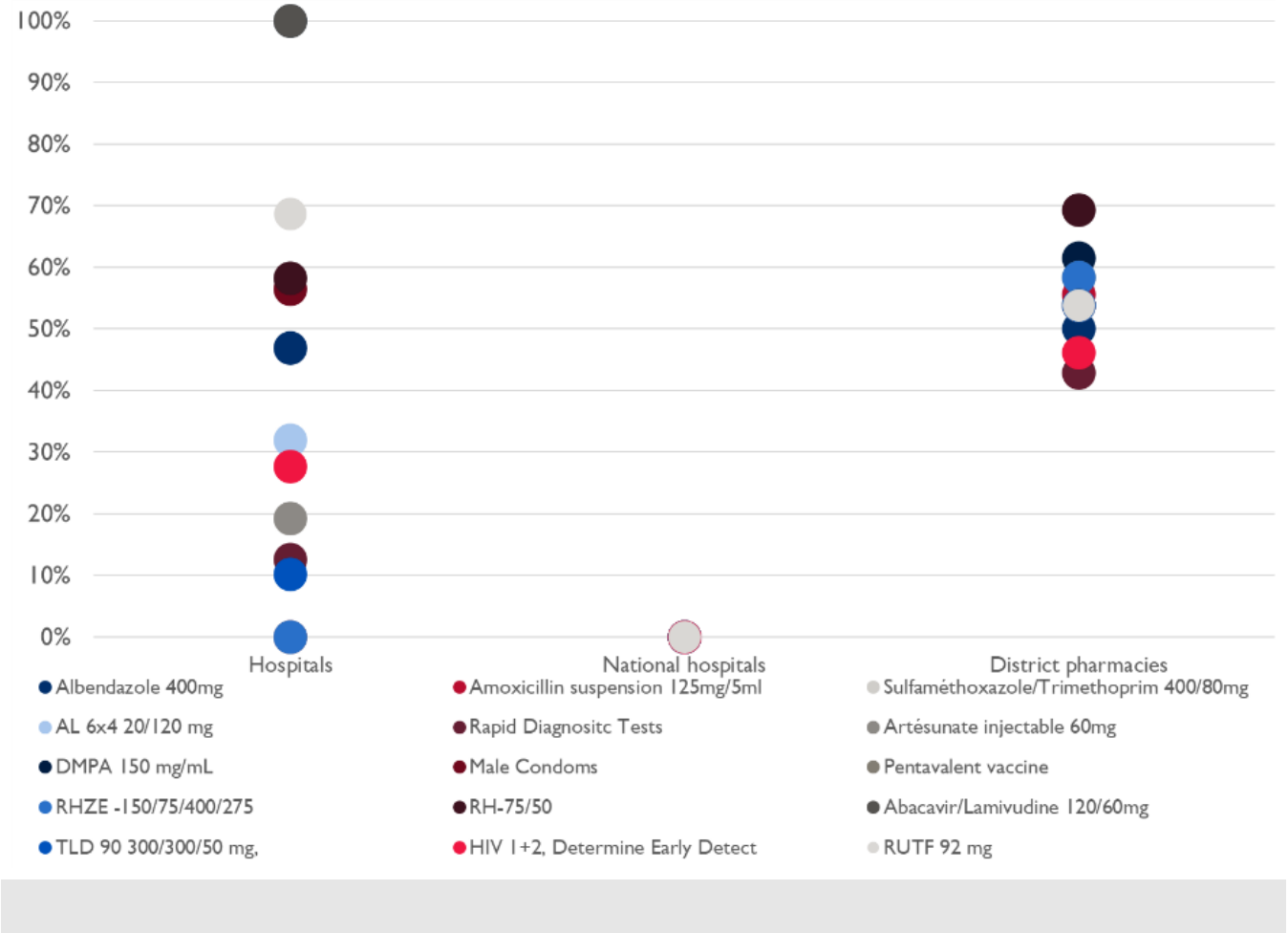
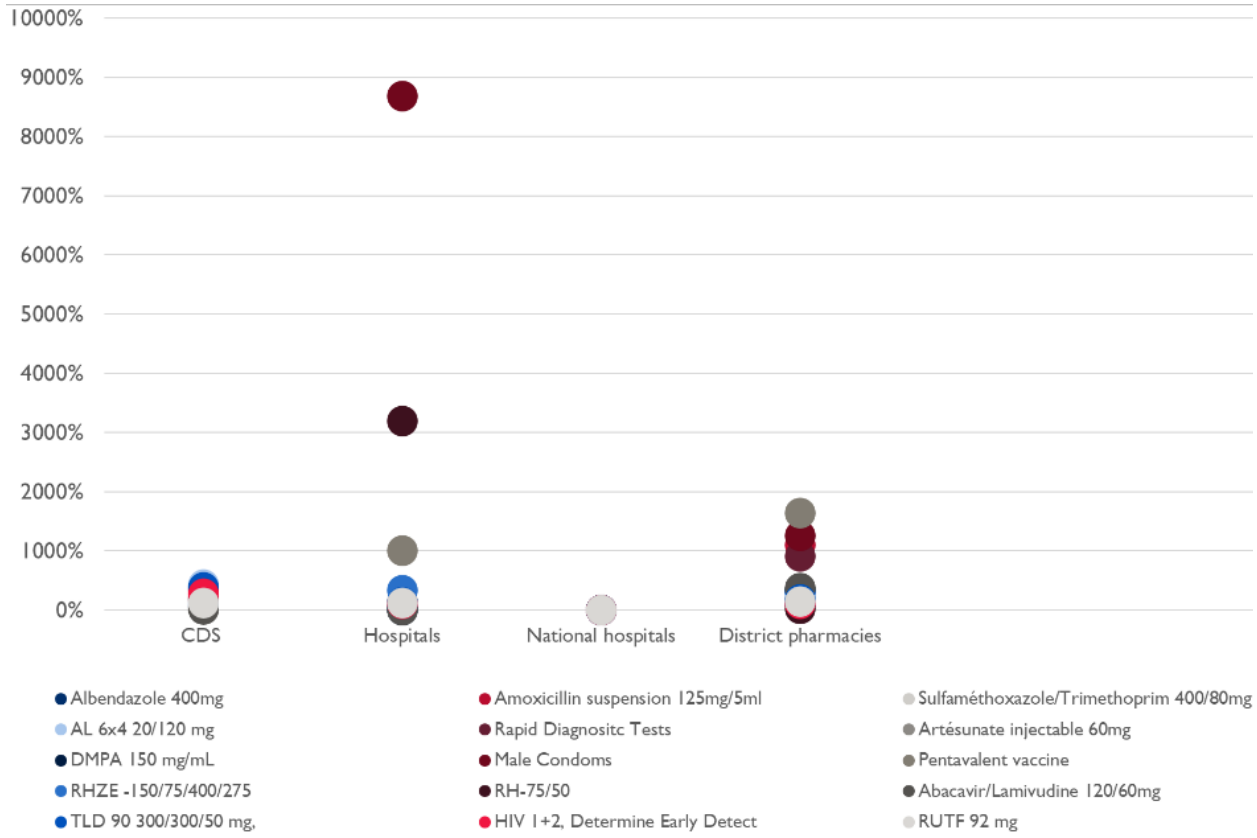


Exhibit 85. Average eLMIS Record Deviation From 100 Percent Accuracy, by Tracer Commodity



HR for LMIS. While the Human Resource module has its own section of the report, the authors felt it important to highlight some of the HR dynamics related to LMIS, as the system's success or failure is driven largely by the people who input, analyze, and use the information from the system. Two of the most important considerations for supportive capabilities for the workforce are the staff's understanding of their job responsibilities and the opportunities for them to grow and refresh their skills as they relate to their job duties. Exhibit 86 details the prevalence of LMIS as a formal component of job descriptions and the proportion of staff receiving capacity-building opportunities in LMIS across various SDPs.

Exhibit 86. LMIS Prevalence in Job Descriptions and Capacity Training Opportunities

	Percentage of facilities reporting				
	CDS	Hospitals	National hospitals	District pharmacies	CAMEBU
n =	83	29	2	48	1
LMIS in formal job descriptions of at least one staff member	39%	57%	100%	71%	✓
Capacity training on LMIS in past year	39%	13%	50%	56%	✓

✓ denotes yes, x denotes no, and -- indicates not applicable.

It is encouraging to see that the national hospitals, district pharmacies, and CAMEBU have LMIS responsibilities included in available job descriptions and capacity-building opportunities for staff. This indicates ample commitment by the government to ensure that staff are aware of their LMIS responsibilities and have the skills needed to complete the work. However, the prevalence of both items in sub-national hospitals and CDS decreases sharply. Less than half of the CDS and hospitals reported having LMIS as a formal component of at least one staff member's job description (see Exhibit 86). Capacity building at the last mile on this topic was also limited. The quality of the training and capacity building around LMIS for these health facilities needs to be reviewed and updated.

Exhibit 87. Most Frequently Cited Challenges with eLMIS

District hospitals (eLMIS)	Percent facilities	Health centers (eLMIS)	Percent facilities
Internet connectivity	81%	Internet connectivity	61%
Lack of time due to other tasks	50%	Lack of time due to other tasks	83%
Insufficient training or human resources capability	73%	Challenges in analysis of data	35%
Down time centrally (system failure)	13%	Availability of computers	26%
Challenges in analysis of data	19%	Data quality or data entry errors	26%
Data loss	16%	Insufficient training or human resources capability	57%

Data Quality Assessments. Any well-functioning LMIS requires the regular use and review of DQAs to ensure the validity of the information stored in the system. A closer look at the CMM scores in this area lends evidence that knowledge of this concept is limited with the Burundian health supply chain and is often confused with routine data checks provided by supervisors. Only 26 percent of health centers, 19 percent of hospitals, and 19 percent of district pharmacies report conducting DQAs. DQAs are conducted from multiple levels, including the MSPLS, regional health bureaus, and district health offices or by staff at their own facilities. A closer look at the data indicates only half of the facilities that conduct DQAs receive feedback on performance and less than half of the facilities adjust their data collection or reporting process based on DQAs conducted. It is important that this activity is formalized to guarantee the quality and reliability of data for decision making in either the present or the future electronic system.

Recommendations

Burundi has a huge opportunity to leverage its robust, nationwide eLMIS system as the cornerstone of its supply chain. To do so, a countrywide commitment to systems and data quality is needed. Specifically, the GOB should consider the following steps:

- Ensure the MSPLS clarifies the governance issues around the functioning and operations of the current and future eLMIS. A technical entity, such as a logistics management unit or analogous entity at the central level, is needed to host, manage, and lead decision making emanating from logistics data.
- In considering the transition to the eLMIS, ensure the MSPLS recognizes the challenges with the availability and quality of Internet connection at the lower levels of service delivery. The new system must maintain an offline capability to cater to the expected interruptions in Internet connectivity.

- Conduct a systematic review of capacity-building methods employed for LMIS within SDPs. Ensure a standardized approach is being used to bring all health facility staff to the same minimum level of competency.
- Have the MSPLS review job descriptions across the value chain to ensure the responsibility of the LMIS is assigned to specific individuals at each level. Staff cannot be expected to work on tasks they are not responsible for. Simultaneously, ensure that infrastructure and adequate staffing are present within facilities nationwide to allow for satisfactory completion of LMIS duties.
- Reinvigorate the processes for internal and external data quality assessments. A renewed focus on data accuracy, reliability, and validity is needed as the country transitions to an automated LMIS platform.

Supplemental exhibits

Exhibit 88. LMIS: Distribution of Questions and Assignation of Weight Across Capability and Facility Levels

MODULE	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
CDS (83)	12	4.1%	11	2.7%	5	3%	2	2.5%
Sub-national hospitals (29)	12	4.1%	11	2.7%	5	3%	2	2.5%
National hospitals (2)	12	4.1%	11	2.7%	5	3%	2	2.5%
District pharmacies (48)	20	2.5%	21	1.4%	11	1.4%	2	2.5%
CAMEBU (1)	20	2.5%	21	1.4%	11	1.4%	2	2.5%

Quality Assurance and Pharmacovigilance

Ensuring that the healthy commodities consumed by patients are safe, effective, and remain in good quality as they travel throughout the health system is a critical function of effective supply chains. This section of the NSCA seeks to make sure that a well-resourced system is in place for ensuring medicine quality and that facilities at all levels understand and can act on their role in pharmacovigilance for medicines. Exhibit 89 outlines key capabilities of an effective quality assurance and pharmacovigilance strategy, including the existence of formal guidelines and SOPs, regular quality testing, and the availability of data collection tools and processes for pharmacovigilance.

Exhibit 89. Examples of Scored Quality Assurance and Pharmacovigilance Capabilities	
Basic	Formally approved national-level product quality assurance strategy or policy Formally approved guidelines or manual/SOPs
Intermediate	Samples of received pharmaceutical products taken for quality control testing (intermediate capability at MSPLS, CAMEBU and National Hospital levels, advanced for SDPs) Quarterly (or more frequent) quality control samples Data collection tools available for pharmacovigilance
Advanced	Dedicated department responsible for implementing pharmacovigilance strategy All laboratories conducting quality control testing accredited by a competent body (e.g., WHO) SOPs to quarantine and/or recall product determined to be compromised Certificates of analysis and conformance recorded for **all** medicines received from international sources
SOA	Action protocols, based on pharmacovigilance results

Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

An evaluation of pharmaceutical quality assurance in Burundi in 2014–2015 found that the existing legislative and regulatory framework was "inadequate to enable it to effectively implement the essential elements of a quality assurance system for medicines and other health products used in the country."[13] These shortcomings were also cited in CAMEBU's Strategic Plan (2019–2024) as a "threat" in its supply chain SWOT analysis, which noted the limited capacity of the country's quality control laboratory.

These findings prompted a series of actions to rectify the situation, beginning with developing the National Quality Assurance Guidelines for Medicines and Medical Products in 2016. The guidelines aim to "establish, harmonize and implement a quality assurance system applied to the supply of medicines and healthcare inputs, to prevent as far as possible procurement organizations from buying substandard, counterfeit or contaminated products, leading to waste and serious health risks for patients."[14] In 2017, at the recommendation of the Inspector General of the State and the African Association of Central Essential Medicines Stores, or ACAME, the CAMEBU added three new departments, among which was the Department of Quality Assurance. In May 2020, a law was established to regulate the "production, importation, exportation, storage, distribution, quality analysis, sale of medicines for human usage (including

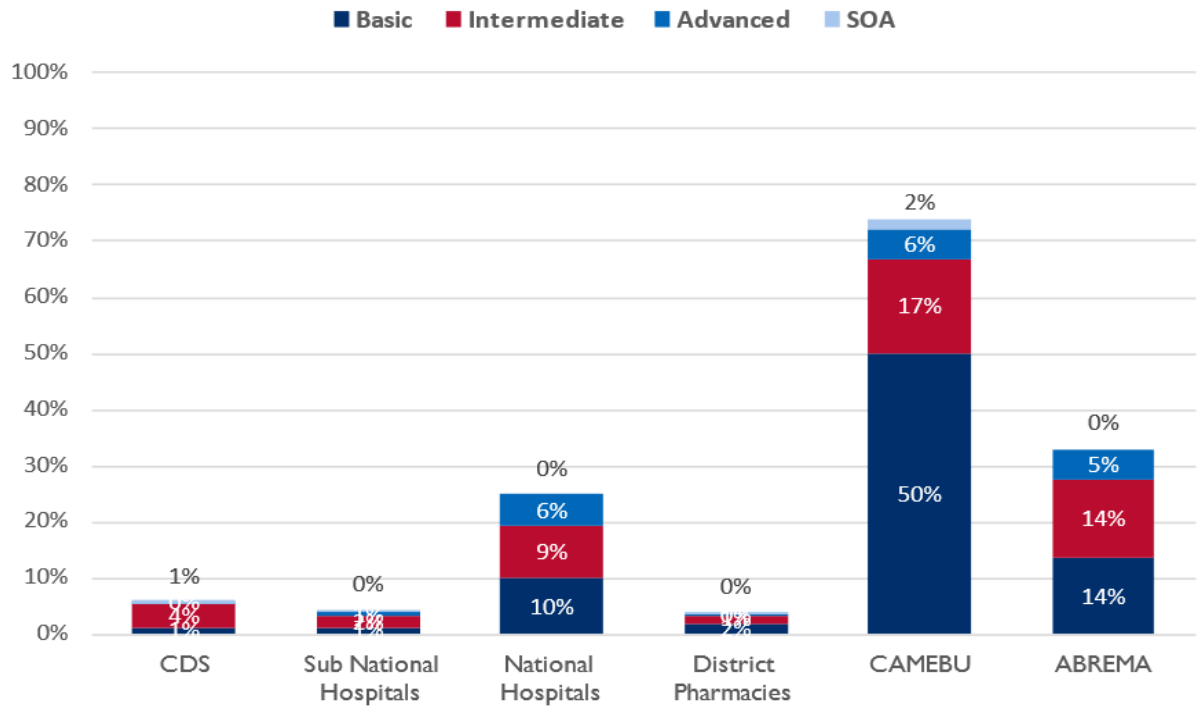
[13] Directives Nationales d'Assurance Qualité des Médicaments et Intrants Médicaux, Septembre 2016, p. 12
[14] Ibid, p. 7

traditional medicines), and all other health and pharmaceutical products."[15] This was followed in February 2021 by the creation of ABREMA, which sits under the MSLPS and is the primary body in charge of regulating the quality of pharmaceutical products and medical devices. Currently, the National Drug Quality Control Laboratory (NDQL) within the National Institute of Public Health (INSP) can conduct a limited quantity of initial quality control testing, discussed further below.

2023 NSCA Findings and Analysis

Exhibits 90 and 91 display the capability scores, by facility type, for quality assurance and pharmacovigilance. Results show that the central levels of the supply chain have the strongest pharmacovigilance capabilities while pharmacovigilance capabilities appear to be limited at the sub-national level levels of the supply chain.

Exhibit 90. Quality Assurance and Pharmacovigilance Capability Maturity Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent) and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

[15] Burundi Law No. 11 of May 8, 2020 *Portant Règlementation de l'Exercice de la Pharmacie et du Médicament à Usage Humain*

Exhibit 91. QA and Pharmacovigilance Maturity Score and Basic Capabilities in Place						
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU	ABREMA
n =	83	28	2	48	1	1
Overall maturity score (range)	6% (0–70%)	4% (0–38%)	25% (21–29%)	4% (0–54%)	74% (74–74%)	33% (33–33%)
Percent of basic items in place	2% (0–75%)	2% (0–20%)	20% (20–0%)	4% (0–57%)	100% (100–100%)	27% (27–27%)
Availability of SOPs for pharmacovigilance	4%	0%	0%	--	--	0%
Availability of reporting forms for pharmacovigilance	26%	20%	100%	--	--	
Availability of SOPs for product quality control/quality assurance	1%	0%	0%	4%	100%	0%

Central-level entities. The central-level entities involved in health commodity quality assurance and pharmacovigilance include the Ministry of Health, ABREMA, the National Drug Quality Control Laboratory (NDQL) within the INSP, and CAMEBU. The central level is responsible for policy and strategy development, planning, resource mobilization, management, performance monitoring and evaluation, regulation, and coordination of the health sector.

ABREMA's objective is to "protect public health by promoting the quality and safety of products such as . medicines for human use, herbal medicines, traditional medicines, medical devices or materials or substances used in the manufacture of products whose consumption or use may be harmful to human health."[16] The decree establishing ABREMA specifies ABREMA's role in, among other areas, detecting, analyzing, and acting upon adverse [drug] reactions; ensuring that post-marketing surveillance is conducted in accordance with the standards; and prescribing quality standards for products manufactured, intended to be manufactured, or imported into or exported from Burundi.

The NDQL, housed within the INSP, was established to implement drug quality control. As it is still in the development phase, it analyzes only a limited number of products with the following three objectives: establish the identity of a drug, determine the quantity of active ingredient present in the pharmaceutical form, and check for major damage or contamination.[17] Another overarching goal at this nascent stage is to act as a deterrent to the introduction of low-quality or counterfeit medicines.[18] It serves as a first line of quality assurance for the products it analyzes: when a product fails a test, it must be recalled or quarantined until samples can be tested by a WHO-prequalified laboratory in another country, most commonly to the National Quality Control Laboratory in Nairobi, Kenya. Global Fund commodities are required to be tested at a WHO-prequalified laboratory, so those commodities bypass the NDQL altogether.[19]

[16] Burundi Decree number 100/039 of February 26, 2021 *Portant Creation, Organisation, et Fonctionnement de l'Autorité Burundaise de Régulation des Médicaments à l'Usage Humain et des Aliments (ABREMA)*
[17] Directives Nationales d'Assurance Qualité des Médicaments et Intrants Médicaux, September 2016, p. 85
[18] Ibid, p. 85
[19] Ibid, p. 86

CAMEBU: CAMEBU, whose role is to supply medicines, medical devices, and laboratory products to the country, includes quality in its vision statement, which notes the provision of sufficient, safe, and effective medicines.[20] Its 2019–2024 strategic plan includes an objective to improve the quality assurance system, outlining expected results at each point in the supply chain, from prequalification of the products and manufacturers to product selection, to product storage and distribution.

The CAMEBU's maturity score for Quality and Pharmacovigilance is 74 percent, second only to its score for financial stability (77 percent), and far above the maturity scores of the other entities assessed in Burundi. CAMEBU has all the basic maturity capabilities in place, and more than half of the intermediate capabilities. It also has more than a third of advanced capabilities and nearly half of the state-of-the-art capabilities. The CAMEBU records certificates of analysis and conformance for most medicines received from international and domestic sources and sends products for quality control testing to a non-WHO-prequalified in-house lab and a WHO-prequalified international lab. SOPs are available to guide the quarantining and/or recall of products with compromised quality, as well as SOPs for quality assurance and control at the site, updated at least every three years.

The CAMEBU sends product samples for testing to the Burundi NDQL and international laboratories. The NSCA conducted in 2014 reported that 98 percent (48 out of 49) of samples tested conformed to quality standards (erythromycin 250mg supplied by Anm life science of India). Of the 49 samples, 80 percent were tested at the Burundi INSP. In this assessment, 77 out of 82 (93.9 percent) of the samples tested met quality standards, a slight decrease in quality since 2013.

The CAMEBU is committed to following the WHO's Good Storage Practices, many of which serve to maintain the quality of medicines during storage. Its maturity score in warehousing and inventory management was 70, which is below the benchmark of 80 percent.

ABREMA: ABREMA was established to regulate the quality of medicines and medical devices, along with foods and cosmetics. In its Capability Maturity Model score for Quality Assurance and Pharmacovigilance, ABREMA meets fewer than a third (28 percent) of basic capabilities, and about half (47 percent) of intermediate capabilities. It also meets a third of advanced capabilities.

Having been established only recently, in 2021, the agency acknowledges in its 2022–2023 Action Plan that its pharmaceutical quality assurance system is weak in a number of areas. Some of the steps the agency planned to take to address these weaknesses were: 1) Drafting and revising regulatory texts to implement the pharmaceutical law of May 8, 2020; 2) setting up an inspection system for pharmaceutical and other health product establishments, and 3) strengthening the capacity of personnel in pharmaceutical quality control and drug registration, as well as recruitment of additional personnel to bolster these functions.

Among the assessment's findings was that no formally approved product quality assurance strategy is in place, and product quality assurance guidelines that were developed in 2016 have not since been updated. Certificates of analysis and conformance are rarely recorded (for only 1–25 percent of medicines) for medicines received from international sources. While product samples are sent to an international laboratory for quality control testing, no SOPs are in place for quarantining and/or recalling products with compromised quality. However, a pharmacovigilance strategy is in place with dedicated staff responsible

[20] CAMEBU Strategic Plan, 2019–2024, p. 34

for implementing it, and data collection tools are shared with lower levels of the health system. Action protocols are in place to address any adverse drug reactions. However, the lower levels of the health system are not actively collecting and reporting these data.

Exhibit 92. Key QA and Pharmacovigilance Capabilities in Place at Service Delivery Points

	CDS	Sub-national hospitals	National hospitals
n =	83	28	2
Facilities reporting samples of products taken for testing	1%	1%	0%
Facilities reporting SOPs for quarantine/recall of suspected products	0%	0%	0%
Facilities reporting presence of action protocols based on PV results	12%	5%	50%
Data collection tools for pharmacovigilance (e.g., reporting forms) are available at the facility	26%	20%	100%
Collected data are shared with central- or higher-level authorities	16%	15%	50%
SOPs are available at the facility to quarantine and/or recall products found to have comprised quality	0%	0%	0%
There are action protocols based on pharmacovigilance results	12%	5%	50%

Service delivery points: Pharmacovigilance and quality assurance capability scores are low for most of the SDPs. The overall capability maturity was 6 percent for CDSs, 4 percent for sub-national hospitals, and 25 percent for national hospitals. Only about a quarter of CDSs (26 percent) and a fifth (20 percent) of national hospitals reported the existence of reporting forms for pharmacovigilance. None of the sites was aware of or had access to the National Quality Assurance Guidelines for Medicines and Medical Products (developed in 2016). Little to no testing of samples is done, and fewer than a fifth of CDSs and hospitals share the collected data with central-level authorities.

Recommendations

- Develop and support an enabling environment for private-sector participation in quality assurance testing. This could attract International Organization for Standardization (ISO)-certified laboratories to establish local branches for pharmaceutical quality testing in Burundi.
- Make incremental investments in the INSP's national laboratory toward attaining ISO certification or WHO-prequalification.
- Update the National Quality Assurance Guidelines for Medicines and Medical Products (2016) and disseminate to all health facilities.
- Provide training to health providers on the national quality assurance guidelines and reporting procedures.
- Make pharmacovigilance reporting forms available to health providers at all levels.

Supplemental Exhibit

Exhibit 93. QPV: Distribution of Questions and Assignation of Weight Across Capability and Facility Levels

	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
CDSs (n= 83)	4	12.5%	3	10.0%	4	3.8%	1	5.0%
Sub-national hospitals (n=29)	4	12.5%	3	10.0%	4	3.8%	1	5.0%
National hospitals (n=2)	5	10.0%	8	3.8%	4	3.8%	1	5.0%
CAMEBU (1)								
ABREMA (1)								

Note that interpretations of the scoring, and discussions of "differences" in the scores, need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending on the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Waste Management

Medical waste management is a core operation of effective public health supply chains, ensuring that used, unsafe, or unusable pharmaceutical products are efficiently removed from the supply chain and properly disposed. Major areas that were factored into scoring of capabilities and performance of waste management included the existence of an approved national waste management plan, existence of SOPs and guidelines for waste management in all facilities, active monitoring of waste management and removal, and complete records of waste management events (see Exhibit 94).

Exhibit 94. Examples of Scored Waste Management Capabilities

Basic	SOPs for waste management and disposal National regulatory agency or department for enforcing regulations Unusable pharmaceutical products stored separately Minimal government or facility budget contribution toward waste management
Intermediate	Disposal methods: on-site incineration, inertization or solidification Waste disposal events authorized and documented Internal audits of waste management
Advanced	Disposal supervised and certified by a regulatory authority Unusable pharma waste products sorted by method of disposal
SOA	Waste management system integrated with LMIS

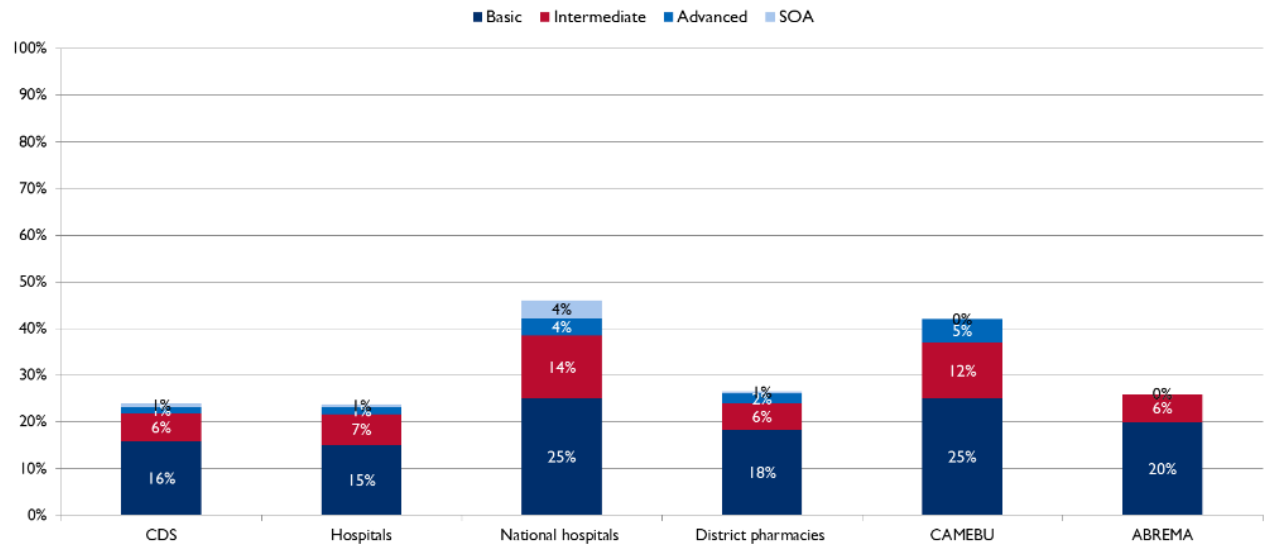
Note: These are illustrative examples of the types of capabilities scored in this module, not *an exhaustive list. Each module contains many dozens of questions and capabilities. For a full list, please refer to the NSCA toolbox, available at www.ghsupplychain.org.*

The PNSCA 2021–2025 does not make many mention of waste management as a priority area for the supply chain although waste management is not one of the strongest competency areas for the public health supply chain in Burundi. The 2014 NSCA recommended an evaluation and design of a waste management system for pharmaceutical and consumable waste, which includes identifying, managing, transporting, treating, and disposing of this waste based on best-practice requirements. However, management and disposal of pharmaceutical waste remained largely unregulated until 2018, when the MSPLS, through the DPLMT, developed the Guideline for the Management of Unusable Pharmaceutical products. The purpose of the guidelines is to protect the public and the environment from the adverse effects that can result from poor management of pharmaceutical waste. The guidelines outline procedures for pharmaceutical waste management at all levels of the supply chain and give directions on how usable products should be treated.

2023 NSCA Findings and Analysis

Exhibit 96 presents the NSCA capability maturity results for waste management in the Burundian supply chain system. None of the overall CMM scores recorded approaches the 80 percent benchmark, indicating significant gaps that require attention in this technical area of the supply chain. Basic capabilities scores ranged from 30 to 50. `

Exhibit 95. Waste Management Capability Maturity Model Scores



Note on interpreting results: Recall that CMM scores are a composite of assessed basic (max 50 percent), intermediate (30 percent), advanced (15 percent), and SOA (5 percent) capabilities. Reported percentages are the scored results averaged across all assessed sites, for each capability level and facility type. For more information, please refer to the Understanding the CMM Results section above.

ABREMA: Exhibit 96 demonstrates that many key waste management capabilities—including waste management policies, regulations, SOPs, and procedures on reverse logistics—do not exist at the national level (ABREMA). Waste management is mentioned neither in the country's supply chain strategy (PNSCA 2021–2025) nor the SOPs for logistics management. Although the guidelines for the management of pharmaceutical waste were developed in 2014, the document mentions the absence of a policy and regulatory framework for waste management. Clarity is lacking on when the guidelines would be updated and how they would be disseminated to ensure end-user compliance.

Exhibit 96. Waste Management Maturity Score, and Select Capabilities and Performance Indicators ABREMA	
	ABREMA
n =	1
Overall maturity score (range)	26%
Percent of basic items in place (range)	40%
Formally approved waste management regulations exist	X
National regulator agency or department for managing and enforcing waste management regulations exits	✓
Policies and procedures that cover distribution include aspects about reverse logistics (from "distribution" module)	X
Environmental regulations that affect waste treatment exist	X
Approved guidelines for waste management and disposal exist	✓
Approved SOPs for waste management exist	X
Approved SOPs for waste management are updated	--

Note: MOH not assessed in this functional area as central-level waste management responsibilities are housed within GHS HQ. ✓ denotes yes, x denotes no, and -- indicates not applicable.

CAMEBU: Overall waste management capability maturity score at CAMEBU was 44 percent with 50 percent of basic elements in place. Key capabilities documented during the NSCA include the presence of an internal SOP for waste disposal, the separation of waste or unusable products from usable products, and the regulation, authorization, and documentation of waste disposal events. However, no structured processes or timelines were in place for reviewing and updating the waste disposal SOPs, and little evidence was found that waste was separated or stored according to the prescribed disposal methods. The institution did not have an internal infrastructure for handling or treating waste, so it transported all its waste to the government-owned disposal site and monitored the disposal process only on-site with no specific KPIs. It is therefore important to consider repositioning the process of waste disposal within CAMEBU by updating and standardizing the SOPs, improving the infrastructure for quarantine and storage and disposal of waste, and information management around waste disposal.

District pharmacies: The district pharmacies recorded a low waste management capability maturity score of 27 percent with 36 percent basic capabilities in place. These results are largely influenced by the low availability of SOPs that outline a step-by-step process for managing and disposing of waste. Most district pharmacies (79 percent) stored and separated unusable pharmaceutical products from usable ones but only 15 percent of them stored waste according to their method of disposal. No clear procedures for reverse logistics and waste management were in place and they were not integrated into the LMIS or actively monitored with KPIs. Most of the district transports waste to the central level for disposal due to limited internal capacity to handle and dispose of it safely.

Exhibit 97. Waste Management Maturity Scores and Select Capabilities and Performance Indicators

	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
n =	**83**	**28**	**2**	**48**	**1**
Overall maturity score (range)	24% (0–58%)	24% (3–45%)	44% (42–46%)	27% (0–60%)	42%
Percent of basic items in place (range)	32% (0–75%)	30% (0–50%)	50% (50–50%)	36% (0–75%)	40%
Percentage of facilities demonstrating presence of SOPs for waste management and disposal at site	9%	3%	0%	4%	✓
Percentage of facilities reporting that waste disposal events are authorized and documented	17%	14%	100%	19%	✓
Percentage of facilities demonstrating that unusable pharmaceutical products are stored separately	60%	71%	100%	79%	✓
Percentage of facilities reporting disposal supervised or certified by a regulatory authority	20%	35%	100%	50%	✓

✓ denotes yes, x denotes no,-- indicates not applicable.

Service delivery points: Exhibit 98 details the prevalence of SOPs and adherence to waste management practices at the SDPs. The capability maturity score was 24 percent at the CDS and hospitals and 44 percent at the national hospitals. The relatively improved performance at the national hospitals in the CMM score is due to much stronger regulation and documentation of the waste disposal process at this level. Generally, the availability of SOPs on waste at the SDPs was non-existent and the main method of waste disposal is transport to the next higher level. Between 60 to 100 percent of the SDPs stored unusable pharmaceutical products separately but less than 16 percent of them sorted waste according to disposal methods before storage. Waste disposal events are rarely documented and are not part of activities that are monitored with specific reporting systems or KPIs. This level of the supply chain would be the key beneficiary of process standardization, including providing SOPs, training personnel, and reporting waste disposal events.

Exhibit 98. Methods of Pharmaceutical Waste Disposal

What means or methods are used for treating and/or disposing of pharmaceutical waste generated or in storage at the site or facility?	*Percent of facilities reporting:*				
	CDS	Sub-national hospitals	National hospitals	District pharmacies	CAMEBU
n =	83	28	2	48	1
Transport to higher-level government facility or warehouse	72%	88%	100%	60%	✓
Municipal landfill disposal	25%	25%	0%	8%	X
Incineration (onsite) followed by landfill disposal of ash residues	33%	31%	50%	23%	X
Contract (third-party) pick-up, transport and disposal by certified waste management company	0%	0%	0%	0%	X
Steam autoclaving followed by landfill disposal of treated waste residues	5%	3%	8%	30%	0%

✓ denotes yes, x denotes no, and - indicates not applicable.

Recommendations

The findings on the current state of pharmaceutical waste management in the Burundian supply chain system point to gaps in the key technical area and the need to expand and deepen capabilities to standardize and improve process efficiency.

Recommendations include:

- Adopt a strategic approach to waste management within the health commodity supply chain by developing policies, regulations, and strategies to prioritize resources for improvement in this technical area.
- Improve standardization for waste management by updating the existing guidelines and providing SOPs to clarify and outline the procedures for end-users.
- Consider improving infrastructure at the provincial and district sites to minimize the transport of waste to the central level for disposal.
- Reinforce the dissemination of policies and procedures with training and oversight. Facility staff will need supportive supervision to ensure that they are conducting waste management activities correctly.
- Standardize the process for documenting and communicating waste disposal events to central-level authorities for all facilities and ensure facilities understand how to adhere to them. The future LMIS for the country will need to prioritize the capture and reporting of data for reverse logistics and waste management with specific KPIs.

Supplemental Exhibit

Exhibit 99. Waste Management, Distribution of Questions, and Assignation of Weight Capability and Facility Levels

	BASIC (50%)		INTERMED. (30%)		ADVANCED (15%)		SOA (5%)	
MODULE	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
Health centers (83)	4	12.5%	7	4.3%	5	3.0%	1	5.0%
Hospitals (29)								
National hospitals (2)	4	12.5%	10	3.0%	6	2.5%	2	2.5%
District pharmacies (48)	4	12.5%	10	3.0%	6	2.5%	2	2.5%
CAMEB (1)	4	12.5%	10	3.0%	6	2.5%	2	2.5%

Note that interpretations of the scoring and discussions of "differences" in the scores need to recognize that the number of assessed capabilities differs by facility type and module. Thus, positive responses to individual questions (i.e., reports of present capabilities) carry different weights, depending on the technical area and facility type.
Note also that the number of questions and the question weighting for these modules vary because some conditionally scored questions are included. Figures presented here assume all conditions are met and all questions are included.

Cross-cutting Analysis

This report looks at the pharmaceutical supply chain across the various technical/functional areas that inform and shape the way the supply chain operates. Major takeaways from a cross-cutting perspective are:

- **Procurement rationalization:** Except for the CDS (for which data on procurement were not collected), there is a multiplicity of procurement at all levels of the supply chain. Though can be advantageous in a system where full supply has not yet been achieved, the MSPLS needs to guide and regulate the practice so that it is not detrimental to the supply chain. Burundi can take advantage of the vibrant private pharmaceutical sector to institute innovations, such as framework contracts and other mechanisms, to regulate procurements conducted by the sub-national levels of the supply chain.
- **Strengthening of central-level coordination:** Among its many regulatory functions, ABREMA is also responsible for coordinating the public health supply chain. In reviewing the CMM scores for the capability areas assessed, we find more investment is needed for ABREMA to fully assume its leadership role. However, given the multiple functions it performs in food and drug regulation, creating a standalone procurement and supply chain management entity of the MSPLS should be considered to provide administrative and technical leadership for the sector in Burundi.
- **Supply chain management versus pharmaceutical management:** When personnel involved in pharmaceutical service delivery play significant roles in supply chain management of public health commodities, the system benefits greatly. Yet lines of distinction between the two (pharmaceutical management and supply chain management) should not be blurred or subsumed, since these functions are distinct but critical to achieving universal health coverage. The health sector must take steps to professionalize the supply chain management functions to include actors beyond pharmaceutical service providers.
- **Data use and performance monitoring**: For system managers to make evidence-based decisions, performance monitoring is needed. The CMM scores obtained across the technical areas assessed indicate that no systems are in place to proactively collect and track performance indicators, particularly at the peripheral levels of the supply chain. If entities in the supply chain are expected to track performance, they should be provided with tools to facilitate the task. It is not enough to define indicators and request that they be monitored. Indicator reference sheets, SOPs, and report templates should be available to enable them to perform this task. Also, as the country transitions to an eLMIS system, integrating data collection for performance monitoring as an integral part of the system is needed so that the burden of work and manual procedures is reduced as much as possible.
- **Dissemination of policies, guidelines, and procedures:** The MSPLS has policies, guidelines, and procedures that support the supply chain and are intended to guide practitioners in performing various supply chain functions. Whereas some of these procedures need to be updated and new ones developed, measures are needed that ensure the existing ones reach intended users. Intentionally developing a learning and continuous improvement program, such as a professional development program focused on a learning agenda, would be helpful.

  Human resources for supply chain management: The NSCA assessed HR capabilities at all levels of the supply chain, but it did not directly access the staff turnover ratios and attrition in Burundi's public health supply chain due to contextual factors expressed by the oversight committee. Since none

of the entities assessed obtained a capability maturity score of more than 60 percent, the MSPLS should focus on human resources for the supply chain. This may include professionalizing supply chain management roles, defining staff norms, and clarifying job roles and responsibilities for the supply chain at all levels.

The role of district pharmacies: The district pharmacies can be envisioned as playing the role of the central medical stores (CAMEBU) at the peripheral levels of the supply chain. If this assertion is correct, then it will be advantageous that a stronger relationship be built between them and CAMEBU, so that CAMEBU's relatively stronger technical capabilities can benefit them. Also, it is reasonable to assume equipping all 49 districts to function as intermediate warehouses and transporter for last-mile delivery will be resource intensive. Strengthening collaboration and resource sharing among the district pharmacies to ensure efficiency and reduce costs must be strongly encouraged.

Exhibit 100. ABREMA CMM Scores for All Relevant Technical Areas

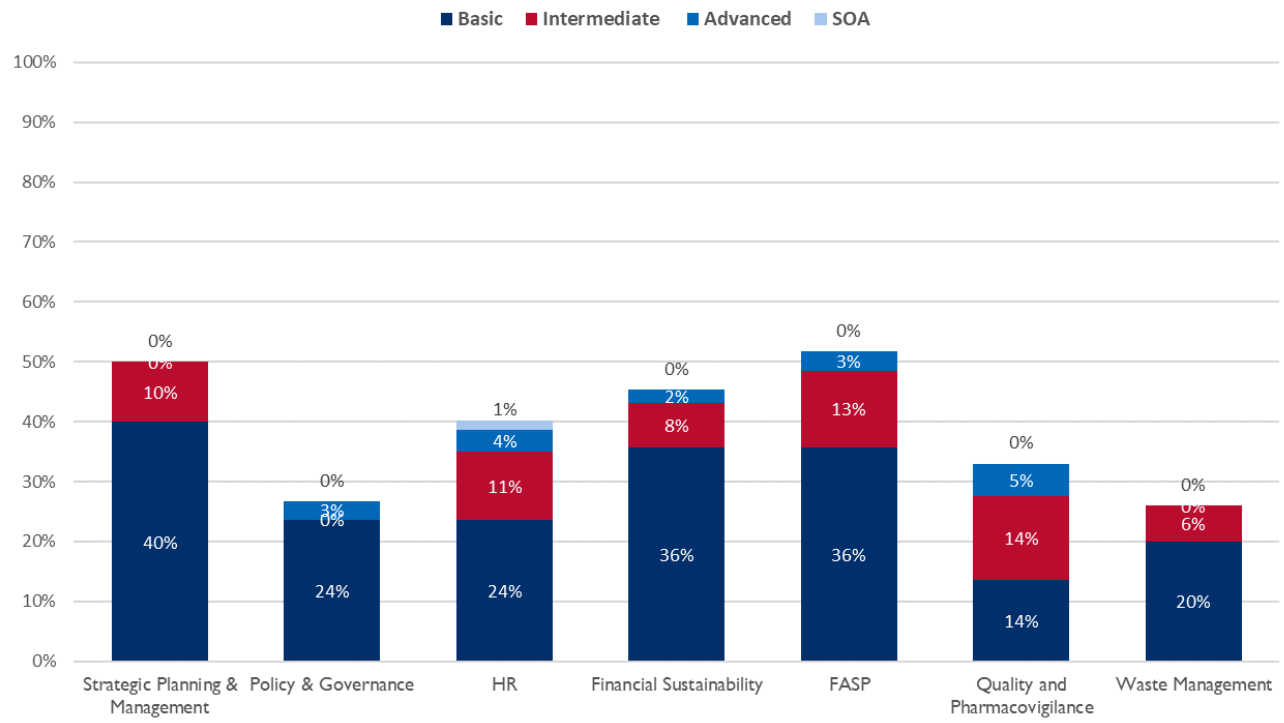


Exhibit 101. CAMEBU Scores for All Relevant Technical Areas

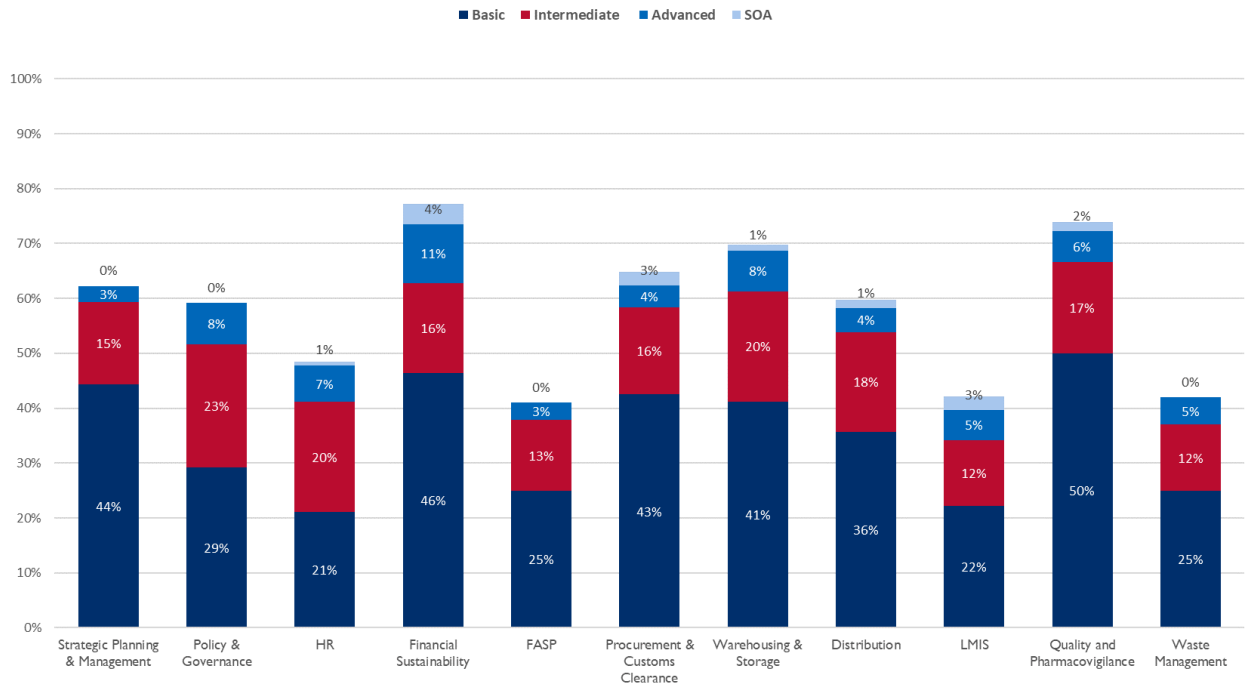


Exhibit 102. District Pharmacies, CMM Scores for All Relevant Technical Areas

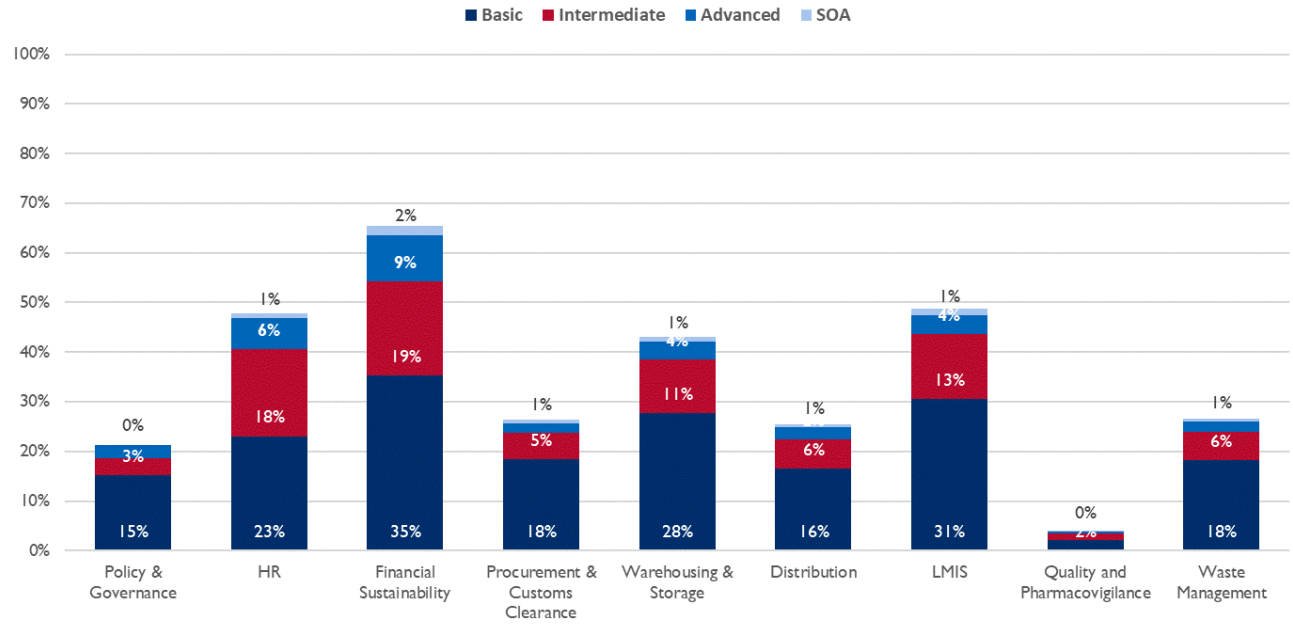


Exhibit 103. National Hospitals, CMM Scores for All Relevant Technical Areas

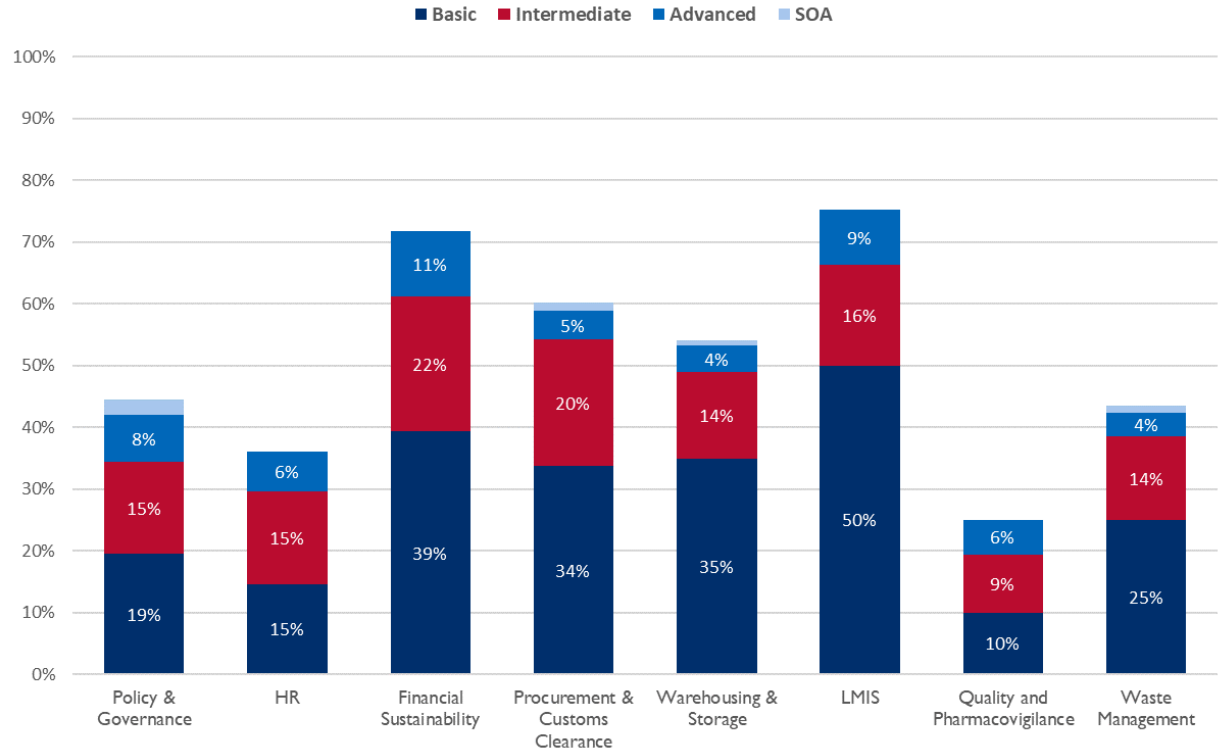


Exhibit 104. Sub-National Hospitals, CMM Scores for All Relevant Technical Areas

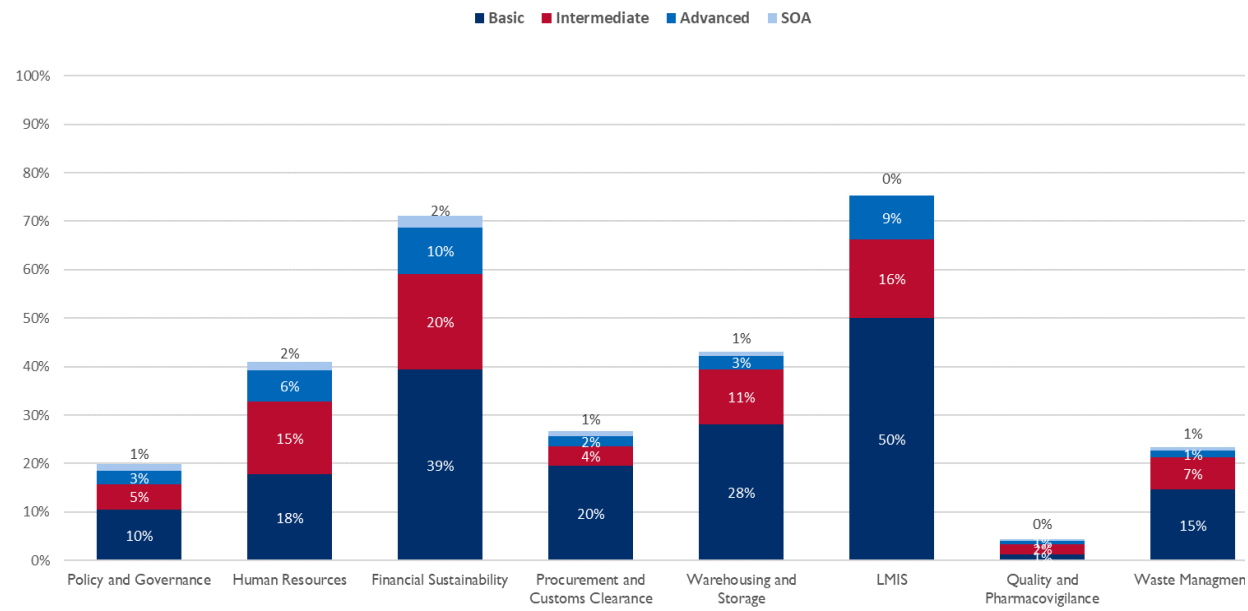
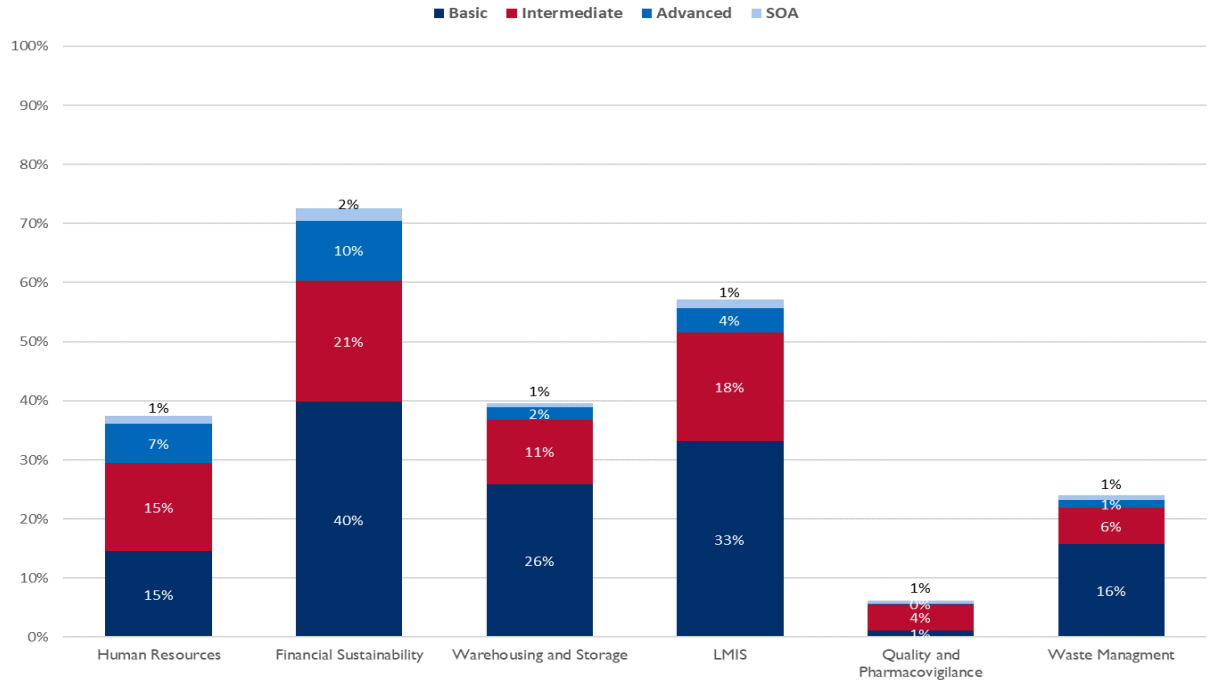


Exhibit 105. CDS, CMM Scores for All Relevant Technical Areas****



2014 NSCA versus 2023 NSCA

In 2014, the MSPLS received technical assistance from USAID's SCMS and SIAPS to conduct the first NSCA in Burundi. This assessment was conducted using the NSCA 1.0 methodology, which has substantial technical differences from the NSCA 2.0 methodology deployed for the 2023 NSCA. So, a direct comparison of the scores from the 2014 and 2023 assessments is not strictly appropriate, as the methodologies (number of questions, nature of questions, etc.) vary.

Still, some parallels can be drawn between the findings and recommendations of the previous and current assessments to understand the evolution of the country supply chain between this period. In Exhibit 106, key findings and recommendations in the 2014 assessment are compared to those from the 2023 assessment to understand the progress made and address persistent gaps.

Exhibit 106. Comparison of 2014 to 2023 NSCA

Technical area	NSCA 2014 findings/ recommendations	NSCA 2023 findings	Way forward
Product Selection	Develop comprehensive standard treatment guidelines for primary medicine and priority diseases in Burundi. These guidelines will provide practitioners at health facilities with the information required to make sure patients are receiving the correct medicines.	The country has an NEML, but a standard treatment guideline for all primary medicine and priority diseases is absent. However, guidelines and protocols are in place for individual public health programs.	The MSPLS should prioritize the development of STGs for primary medicine and priority diseases within the next two years.
LMIS	Work toward implementing the new paper based LMIS system. Strong supply chains rely on access to data. The MSPLS 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.	The wide spreadsheet availability of paper-based LMIS tools is one of the key successes achieved in the supply chain post-implementation of the 2014 NSCA. The 2023 NSCA established use of LMIS data to inform ordering, reporting, and inventory management. SOPs for the LMIS in the country are also in place. However, challenges such as the intermittent stockout of reporting tools and gaps in data quality exist. Also, the application of established maximum and minimum inventory levels is not consistent across the supply chain.	The MSPLS needs to clarify the governance issues around the functioning and operations of the current and future eLMIS. A technical entity, such as a logistics management unit or analogous entity at the central level, is needed that would host, manage, and lead decision making emanating from logistics data. The MSPLS also needs to resolve the discrepancies in the application and use of max-min inventory levels at each level of the supply chain.

Forecasting and Supply Planning	Use LMIS consumption data instead of transactional data in the forecasting process, as this will provide a more accurate representation of the quantity of products being consumed at the health facility level.	Although a paper-based LMIS is in place, downstream data visibility is limited. FASP activities are still based on transactional data rather than real consumption reported from SDPs.	The future eLMIS should be structured to improve the flow of logistics data from SDPs to the central level for decision making. In addition, the MSPLS should finalize development of the national quantification guidelines and strengthen central- level coordination for FASP.
Procurement	Explore the option of vendor prequalification with relevant in-country stakeholders, including the public market, and consider implementing a vendor management program, routinely monitoring performance, and communicating successes and challenges with vendors.	Key capabilities such as internal SOPs, contracts management procedures, a procurement oversight committee led by the MSPLS, and scheduled annual audits were present at CAMEBU. Yet procurement-related information is not managed in an integrated manner, as it is largely paper-based or sitting on individual computers.	Deploy an integrated procurement and contract management system at the central level to improve process transparency and access to data.
Warehousing and Inventory Management	Ensure 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.	The current version of the SOPs manual for logistics management was finalized in November 2022, but its dissemination for use at all levels of the supply chain has lagged. Only 33 percent of CDS, 32 percent of hospitals, and 44 percent of district pharmacies could produce copies. Also, just 33–56 percent of SDPs had capacity-building sessions in the previous year for focused on storage and inventory management.	Invest in strengthening logistics management capacity at the sub-national level (district pharmacies, hospitals, and CDS). It is not enough to have in place the SOPs manual for logistics management. A clear plan is needed for dissemination, training, and use by supply chain actors at the last mile.
Distribution	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	Burundi has taken steps to strengthen its capacity in distributing health supplies, by developing route plans and improving the scheduled distribution of commodities between CAMEBU and the	Use the results of the planned network optimization study in 2023 to decide on the most efficient options for last-mile delivery to replace the existing

	establish a transportation system with CAMEBU managing the contract.	district pharmacies. While these interventions have improved the regular supply of health products to end-users, the distribution system remains fragile and cannot always meet the volumes required to meet the needs of its clients and the health programs	situation where facilities need to travel to the resupply points (district pharmacies). In addition, the GOB should strongly consider expanding private sector participation in distributing commodities to the last mile.
Waste Management	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.	The MSPLS through its pharmacy department (DPLMT) developed a waste management guideline for pharmaceutical products guidelines in 2014, however, these were not sighted at any level expect at CAMEBU where in-house waste management SOP was produced.	Adopt a strategic approach to waste management within the health commodity supply chain by developing policies, regulations, and strategies to prioritize resources for improvement in this technical area. It is also important to consider improving infrastructure at the provincial and district sites to minimize the transport of waste to the central level for disposal.

Exhibit 106 indicates the country has made significant progress in executing recommendations in the 2014 NSCA although some areas still need improvement. The widespread availability of paper-based LMIS tools, strengthening of procurement systems at the central level, development of waste management guidelines in 2018, and roll-out of last-mile delivery are significant milestones that have been achieved since the previous assessment. However, several areas have stagnated, such as using consumption data for FASP activities, developing STGs, disseminating SOPs to the last mile, developing human resource capacity for supply chain management, and implementing waste management reforms. Consequently, the recommendations of the 2023 NSCA have been formulated to address these gaps and resolve the challenges identified through this assessment.

Consolidated Recommendations

NSCA methodology produces targeted, actionable recommendations across the entire supply chain. To facilitate coordinated planning and action, select recommendations from across the report are consolidated here, by technical area. To help facilitate prioritization, the authors of this report have created a classification system for report recommendations. Actions to improve the supply chain can be prioritized in three ways:

1. **Low-cost/high-yield priorities:** relatively small interventions that can be achieved with minimal investment in financial or human resources.
2. **Time-order priorities:** actions that need to be prioritized because of sequencing effects, i.e., other future improvements depend upon them.
3. **Prevailing priorities:** actions that are deemed important to implement for pressing ethical or efficiency reasons, independent of time or ease of intervention.

To model how Burundi might consider prioritizing supply chain interventions and reforms, we select below a maximum of three recommendations per technical area that the NSCA assessment team further emphasizes as crucial for improving the country's supply chain. The reason for our selection is provided in brackets after the recommendation, according to the categorizations above. Rather than being a finalized list, these examples are meant to serve as a guide—and a stimulus for a critical and inclusive exercise in prioritization by the MSPLS and GOB. Additional targeted recommendations are found at the end of each technical section in this report. To ensure that workstreams remain on track for implementing supply chain priorities, the MSPLS and GOB should consider prioritizing the following recommendations:

Strategic Management and Planning

- Strongly consider creating a specialized entity within the MSPLS to provide leadership and operational oversight for the public health supply chain. Such an entity should be strategically positioned so that it can provide technical and operational support from the central to the peripheral level. This is because neither the law nor regulation that sets up ABREMA as an entity mentions supply chain management as one of its functions; hence it performs the supply chain management role as an auxiliary function. [Time-order priority]
- Ensure the MSPLS strategically positions supply chain management as a core function in the health sector so that it is not an appendage to pharmaceutical management or services. This will ensure that specific provisions are made for its prioritization and professionalization in the health sector. [Prevailing priority]
- Provide guidance and tools to encourage supply chain operational planning at sub-national levels, particularly the district pharmacies. This will ensure that these levels of the supply chain develop specific operational plans that align with the country's supply chain strategy and provide clarity for financial and human resource planning. [Low-cost/high yield]

Policy and Governance

- Consider developing a national supply chain policy that would provide the framework of supply chain governance and clarity around its technical scopes, such as human resources for supply chain, financing, and accountability. This would help distinguish supply chain management from

pharmaceutical management so that these functions are not usurped by each other. [Time-order priority]

- Make a census of existing policies and guidelines and develop a comprehensive plan to review and update them within defined timelines. [Prevailing priority]
- Revamp the existing national-level supply chain coordination committees to improve governance for the supply chain. This should involve updating the terms of references and calendars of events so that stakeholders can fully participate in planned activities. [Low-cost/high yield]

Human Resources

- Develop a supply chain capacity-building plan and supply chain recruitment policies for ABREMA or the future supply chain management entity. As the institution mandated to oversee the supply chain, it must lead by example in this area. [Prevailing priority]
- As the timeframe of "Strategic Plan for the Development of Human Resources for Health 2019–2023" ends, ensure the inclusion of health supply chain staff in the next iteration of the plan so their needs for staffing, capacity building, and staff motivation can be included in work and funding streams. [Time-order priority]

Financial Sustainability

- Institutionalize the practice of regular financial audits in health institutions, particularly the peripheral levels of the supply chain, since they are actively involved in financial management. [Prevailing priority]
- Ensure that facilities across the supply chain and in all geographical locations receive guidance and support to implement basic financial management best practices in the supply chain particularly at the peripheral levels. [Low-cost/high yield]

Forecasting and Supply Planning

- Complete the development of the national quantification guidelines and SOPs to standardize FASP activities and clarify roles and responsibilities among the entities. [Prevailing priority]
- Institutionalize the monitoring and reporting of forecast accuracy and properly define the data sources for measuring FASP KPIs [Low-cost/high yield]
- Develop a structured approach to strengthening in-country capacity for FASP activities within the framework of supply chain HR capacity development [Low-cost/high-yield]

Procurement and Customs Clearance

- Deploy an integrated procurement and contract management system at the central level to improve process transparency and access to data. [Prevailing priority]
- Develop, disseminate, and train personnel on policies, guidelines, and SOPs to guide procurement practice with prioritization on the peripheral levels of the supply chain. [Prevailing priority]
- In addition to an approved vendors list, procurement inefficiency and price variations at different levels of the supply chain can be reduced through the introduction of framework contracts and centrally negotiated prices. [Time-order priority]

Warehousing and Storage

- Conduct a warehouse capacity and operational assessment in Burundi, as a complement to the NSCA, to understand the state of storage infrastructure and determine options for improving the commodity warehousing and storage. NSCA assessed the capabilities and maturity around the warehousing, storage, and inventory management practices in the supply chain but did not assess the state of infrastructure or its operational capacity. So, the authors of this report recommended a separate warehousing assessment that will assess the state of storage infrastructure, operational capacity, and handling equipment to complement the findings from the NSCA. [Time-order priority]
- Invest in strengthening the logistics management of capabilities at the sub-national level (district pharmacies, hospitals and CDS). It is not enough to have in place the SOPs manual for logistics management; a clear plan is needed for dissemination, training, and use by supply chain actors at the last mile. We recommended that the MSPLS develops a learning agenda and dissemination plan to ensure the SOPs for logistics management are available, accessible, and used to inform decision making across the supply chain. [Prevailing priority]
- Conduct an immediate audit of safety and security systems particularly fire safety equipment to ensure they remain functional and fit for purpose. [Prevailing priority]

Distribution

- Use the results of the planned network optimization study to decide on the most efficient options for last mile delivery to replace the existing situation where facilities need to travel to the resupply points. The results from the NSCA, a network optimization study and warehouse assessment should influence the decision on the siting of additional warehousing. [Low-cost/high-yield]
- Codify existing practices and procedures for transportation and distribution of health commodities. Use this opportunity to review operational practices across the board to ensure consistency and appropriateness particularly among the district pharmacies. [Low-cost/high-yield]
- Strongly consider leveraging private sector participation in the distribution of commodities to the last mile. Whereas using a government fleet remains a viable option involving the private sector will help the burden on government to make initial capital investments. [Prevailing priority]

Logistics Management Information System

- Ensure that the MSPLS clarifies the governance issues around the functioning and operations of the current and future eLMIS. A technical entity, such as a logistics management unit or an analogous entity, is needed at the central level to host, manage, and lead decision making emanating from logistics data. [Time-order priority]
- In considering the transition to the eLMIS, ensure that the MSPLS recognizes the challenges with the availability and quality of internet connection at the lower levels of service delivery. The new system must maintain an offline capability to cater for the expected interruptions in internet connectivity. [Prevailing priority]

- Reinvigorate the processes for internal and external data quality assessments. A renewed focus on data accuracy and validity is needed as the country transitions to an automated LMIS platform. [Low-cost/high-yield]

Quality and Pharmacovigilance

- Develop and support the enabling environment for private sector participation in quality assurance testing. This could attract ISO-certified laboratories to establish local branches for pharmaceutical quality testing in Burundi. [Time-order priority]
- Make incremental investments in the INSP's national laboratory toward attaining ISO certification or WHO-prequalification. [Prevailing priority]
- Update the National Quality Assurance Guidelines for Medicines and Medical Products (2016) and disseminate to all health facilities. [Prevailing priority]

Waste Management

- Adopt a strategic approach to waste management within the health commodity supply chain by developing policies, regulations, and strategies to prioritize resources for improvement in this technical area. [Time-order priority]
- Improve standardization for waste management by updating the existing guidelines and providing SOPs to clarify and outline the procedures for end-users. [Prevailing priority]
- Reinforce the dissemination policies and procedures with training and oversight. Facility staff will need supportive supervision to ensure that they are conducting waste management activities correctly. [Low-cost/high-yield]

Conclusions

The PSNCA 2021–2025 outlined key priorities for the MSPLS in Burundi's supply chain, identified the underlying challenges that shaped those priorities, and delineated specific actions to address them. The NSCA assessed the presence of existing capabilities and levels of performance across 11 technical areas of the supply chain to determine progress, challenges, and viable options to achieve the objectives of the PNSCA of improved product availability and accessibility at all health system levels. Overall, the NSCA documented the presence of existing capabilities and levels of performance across all technical areas covered and at each level of the supply chain (central, intermediate, and peripheral). The presence or absence of expected capabilities and performance gaps identified sets out the priorities for the MSPLS and GOB as they enter the final two years of the PNSCA 2021–2025. Overall, some of the challenges or priorities delineated in the PNSCA 2021–2025 have remained unchanged from when the plan was elaborated although strong progress has been made in other areas.

ABREMA, the central coordinating body, must be technically and financially resourced to exercise its strategic mandate for the public health supply chain. Throughout the assessment, ABREMA obtained a relatively lower capability maturity score in the areas assessed primarily due to the absence of some specific policies, guidelines, and SOPs for the supply chain. In cases where policies, guidelines, and SOPs were present, no timelines were specified for making updates, and dissemination to the intended users has been slow. Given that ABREMA is the Foods and Drugs Authority of Burundi, the government needs to re-examine its function as the coordination and supervisory entity for the public health supply chain. In most jurisdictions the intersection of the Foods and Drugs Authority and the public health supply chain reaches only to the extent of product quality assurance and pharmacovigilance but not to the core supply chain functions, such as quantification, supply planning, procurement, LMIS, and the other technical areas of the supply chain. Public health, supply chain management, and pharmaceutical management have a natural relationship; however, it is important to recognize the diversity of these roles and account for their resources separately even if overlaps are inevitable.

The central medical stores (CAMEBU) represent a strong nexus in the supply chain and obtained many favorable CMM and KPI scores in the NSCA in relation to the other entities assessed. CAMEBU through its strategic plan 2019–2024 has worked to improve the availability of quality, affordable medicines for its clients. However, no direct supervisory relationship exists between the entity and other entities in the supply chain, particularly the district pharmacies, which could benefit from the enormous capacity and capabilities possessed by the entity. The PNSCA 2021–2025 proposes to construct three regional storage hubs to address the long-standing concerns of inadequate storage space and decentralize CAMEBU's operations beyond the capital city of Bujumbura. Whereas augmentation of storage capacity is welcomed, the authors are favorable to a warehouse capacity and operational assessment in addition to the NSCA to enable Burundi to understand the state of storage infrastructure and determine options for improving commodity warehousing and storage. These assessments, together with the network optimization study approved by the MSPLS, will provide a comprehensive perspective on the options for improving warehousing and network infrastructure for the supply chain.

The peripheral levels (district pharmacies, hospitals, and CDS) require considerable capacity enhancements so that policies, guidelines, and SOPs developed at the national level inform practice at this level. For the district pharmacies, their role is crucial in ensuring product availability at SDPs and must be equipped to perform this function. However, given that this may require an enormous investment, it may be prudent

to configure some of the district pharmacies as hubs to support others and outsource some services such as transportation so that the government is not burdened with initial capital investments. Except for financial sustainability, low CMM scores were obtained by the district pharmacies in the other technical areas of the NSCA, such as human resources, waste management, procurement, storage, and inventory management as well as distribution. These results affirm the need for considerable investments to optimize performance at this level of the supply chain.

The two national hospitals showed relatively stronger supply chain performance when compared with the sub-national hospitals (district hospitals, communal hospitals, and other hospitals) and the CDS. This is understandable, since these two hospitals operate almost as autonomous entities at the national level and have the benefit of diverse professionals and procedures that guide their supply chain operations. However, they would require further strengthening and regular supervision to ensure their procedures align with national expectations. For instance, the max-min inventory levels of one to two months of stock for SDPs should not necessarily apply to the national hospitals since they have capacity to hold higher levels of inventory especially when they conduct external procurements. For the sub-national hospitals and CDS, it is imperative that they become the focus of training, mentoring, and supervision to ensure improvements are made. One thing that was noticeable was the positive impact of PBF schemes on product availability in these facilities. Such incentive schemes can be extended to address other performance gaps and promote learning among personnel at this level.

In addition, ongoing initiatives hold significant promise for the future supply chain system as the decision to transition to an eLMIS that provides end-to-end data visibility for decision making, upscaling of scheduled delivery to the last mile, and development of the national quantification guidelines. Yet if gaps in human resources, financial management, procurement procedures, and other standard processes are not addressed, these initiatives may not achieve their intended objectives. An active process is needed of developing capacity and resourcing the responsible entities to perform at optimum levels, while progressively establishing a culture of data use for decision making, performance monitoring, and knowledge management for supply chain data.

The authors of this report are confident that with empowered leadership, strategic targeting of supply chain weaknesses, and an ongoing commitment to equity within the health system, Burundi can implement appropriate reforms to further strengthen the supply chain and help realize the country's vision of universal access to high-quality health care.