

USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM  
Procurement and Supply Management



# Guinea National Supply Chain Assessment

## Capability and Performance

September 2019



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# Acknowledgements

This National Supply Chain Assessment (NSCA) was conducted in close collaboration with the Guinea Ministry of Health (MOH) and the United States Agency for International Development (USAID). The assessment team extends its gratitude to the Guinea MOH, National Directorate of Pharmacy and Medicines (DNPM), Central Pharmacy of Guinea, and USAID for their leadership, provision of resources, guidance, and support throughout planning and implementing the assessment.

Special thanks to the Government of Guinea leadership, especially at MOH, for allowing us access to personnel at all health system levels before, during, and after data collection. We thank Pr. Falaye Traore from the DNPM and his team for their commitment and dedication throughout the assessment, coordination of various interviews, and participation as key informants in the assessment. Sincere thanks is extended to all the enumerators for their dedication and hard work collecting high-quality data and to the health facility respondents for their insights into the Guinean supply chain system. (For the complete list of enumerators, see the Annex).

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## Recommended Citation

GHSC-PSM (2019). Guinea National Supply Chain Assessment Report: Capability and Performance. Submitted to the United States Agency for International Development by The Global Health Supply Chain-Procurement and Supply Management (GHSC-PSM) Project, under USAID Contract Number: AID-OAA-I-15-00004.

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This report was contracted under USAID Contract Number: AID-OAA-I-15-00004.

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# Acronyms

ART	antiretroviral therapy
ARV	antiretroviral
ASAQ	artesunate + amodiaquine
BND	National Development Budget (French acronym)
CMM	Capability Maturity Model
CMC	communal medical center (French acronym)
CSU	urban health center (French acronym)
DNPM	National Directorate of Pharmacies and Medicines
eLMIS	electronic logistics management information system
FASP	Forecasting and Supply Planning
GOG	Government of Guinea
HIV	human immunodeficiency virus
HR	human resources
IGS	General Inspectorate of Health (French acronym)
KPI	key performance indicator
LMIS	logistics management information system
M&E	monitoring and evaluation
MOH	Ministry of Health
mRDT	rapid diagnostic test for malaria
NEML	National Essential Medicines List
NPP	National Pharmaceutical Policy
NSCA	National Supply Chain Assessment
PCG	Central Pharmacy of Guinea (French acronym)
PNDS	National Health Development Strategy (French acronym)
PNLAT	National Tuberculosis Program (French acronym)
PNLP	National Malaria Control Program (French acronym)
PNLSH	National HIV/AIDS Program (French acronym)
PNSR	National Family Planning/Reproductive Health Program (French acronym)
POD	proof of delivery
RFID	radio-frequency identification
RH	reproductive health
RMS	regional medical store
RTK	rapid test kit
SDP	service delivery point
SOA	state of the art
SOP	standard operating procedure
STG	Standard Treatment Guideline
SWOT	strengths, weaknesses, opportunities, and threats
WHO	World Health Organization
WMS	warehouse management system

# Executive Summary

The Ministry of Health (MOH), the United States Agency for International Development (USAID), and the USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project conducted fieldwork in Guinea for the National Supply Chain Assessment (NSCA 2.0) from June 10 to June 28, 2019. 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 below.

## NSCA 2.0 CMM functional areas

Forecasting and Supply Management

Procurement

Pharmacy and Stores Management

Distribution

Policy and Governance

Strategic Planning and Management

Quality and Pharmacovigilance

Logistics Management Information Systems

Human Resources

Financial Sustainability

Waste Management

Guinea's 2019 national supply chain assessment had four objectives, to:

- Analyze and measure the performance, operational capacity, and capability of the national public sector–financed health commodity supply chain
- Identify performance gaps to inform the development of plans for guiding system strengthening investments
- Assess progress to date from the Government of Guinea (GOG) in implementing reforms laid out in the National Supply Chain Strategic Plan 2017–2024 (the Strategic Plan) and provide recommendations for addressing deficient areas
- Provide overall assessment on progress to date on the Strategic Plan

This assessment focused exclusively on the public-sector supply chain, or that which is directly financed by the GOG or public-sector funding. The NSCA included in its sample public facilities that are supplied by the Central Pharmacy of Guinea (PCG) warehouse network.

This is the second national supply chain assessment conducted in the country in recent years. The first NSCA was conducted in 2016, using the NSCA 1.0 methodology, and helped inform development of the Strategic Plan. This second NSCA 2.0 assesses progress made since the 2016 baseline and, equally, the level of implementation of the priority activities subsequently outlined in the Strategic Plan.

The assessment team examined each technical area individually. The following outlines the status of the technical area in the 2016 NSCA, the relevant priority actions outlined for implementation in the 2017 Strategic Plan, and the current state of capability and performance as assessed in 2019. Broadly assessing Guinea's supply chain in the context of the 2016 NSCA and 2017 Strategic Plan focuses the analysis on known challenges and established priorities and thus highlights continued gaps or opportunities that require immediate prioritization to ensure progress toward these goals.

Overall, this assessment found that Guinea's public health supply chain benefits from a plethora of strategic-level plans for the overall health system, pharmaceutical sector, and supply chain management specifically. This is an important and valuable starting point for improving system capabilities and performance. Many of the priority actions laid out in the strategic plans, however, have yet to be implemented, or are only partially implemented. In the assessment, this is captured by generally poor scores across the CMM and KPIs.

A renewed commitment by leadership, coupled with effective governance of key public health supply chain functions, would greatly benefit the overall system. The Logistics Management Unit (LMU) of the National Directorate of Pharmacies and Medicines (DNPM) was envisioned to oversee and consolidate the forecasting and supply planning process for all national programs. The LMU has yet to step into this role, which explains why we see disparate forecasting processes and variable forecast accuracy performance across the supply chain. Procurement is another principal functional area that could strongly benefit from enhanced coordination. Although a procurement services agreement is in place between the parastatal organization PCG and the GOG, this relationship has not been leveraged fully to facilitate efficient, adequate, and timely procurement of commodities for the public health supply chain. This assessment found that the PCG scored strongly on its own procurement functions but was curtailed by limited strategic support. National leadership that further empowers the PCG to execute its assigned role could translate into stronger procurement results and could help strengthen the overall system.

We find clear examples of where strong leadership has produced tangible development of supply chain capabilities, for example, in logistics management information systems (LMIS). The 2017 Strategic Plan identified improving the logistics data information system to support more effective decision making as a key strategic priority. In recent years, the country saw the creation of a single integrated LMIS coupled with the rollout of the electronic LMIS (eLMIS) system, both of which required significant investment of financial and human resources. Building LMIS capabilities represents an immense opportunity for the GOG to gain visibility into stock levels of health commodities throughout the country, a fundamental part of any successful supply chain.

That said, performance lags behind capabilities in the LMIS, and in all technical areas assessed by the NSCA. In the LMIS case, health centers averaged 71 percent of basic capabilities and reported near-universal (97 percent) use of a paper-based LMIS system. Yet LMIS accuracy was poor. Only 46 percent of health centers and 33 percent of hospitals were assessed to have perfectly accurate LMIS/eLMIS records. Poor data visibility has downstream impacts. Of the 14 tracer commodities included in the assessments, health centers and hospitals reported an average stock-out rate on the day of the visit of 34 percent and 23 percent, respectively. Looking at the previous six months (December 2018–May 2019), health centers were stocked out on average 18 percent of the time for the 14 tracer commodities used in this assessment. Hospitals had an average stock-out rate of 11 percent of the time for the same time period and tracer commodities.

We found similar cases of increasing capabilities but inconsistent implementation and lagged performance in other technical areas, including warehousing and storage, distribution, and procurement. Stepping back, a lag between performance and capabilities is not unexpected, given that many of the capabilities in Guinea's health supply chain system are newly installed. Continued investment in capacity training is vital to fully leveraging latent potential and achieving high performance



in areas of recent investment. Equally, elevating awareness and supervision of supply chain functions—i.e., by formally including supply chain roles and responsibilities in public health job descriptions—will be important to institutionalizing performance across the system.

The assessment found that quality assurance and pharmacovigilance (PV) were the poorest-performing technical areas in Guinea's public health supply chain. With health centers scoring a capability maturity score in the single digits, virtually no PV activities are being conducted at last-mile facilities. Only 31 percent of health centers and 59 percent of hospitals reported that tools were available for reporting adverse drug reactions, and 0 percent of health centers and 5 percent of hospitals reported that PV is included in a staff member job description. These findings should be leveraged as an opportunity to fill this apparent gap and kick-start the reporting of PV surveillance throughout the country.

In sum, the 2019 NSCA provides an updated assessment of the current state of the capabilities and performance of Guinea's health supply chain system. It presents an excellent opportunity to recommit, at all levels, to leveraging existing capabilities, addressing gaps, and reprioritizing strategic action. With strong leadership, a fully empowered LMU, and a thoughtful prioritization of key activities identified below, Guinea can realize its goals and vision laid out in the Strategic Plan. This report provides, with careful analytic considerations, key recommendations to inform the focused implementation of activities that will ultimately lead to a strengthened and optimally performing supply chain.

# Background

## Guinea's Public Health Context

The estimated population in Guinea exceeds 12 million people (2016 estimate) with an annual population growth rate of 2.6 percent.<sup>1</sup> The country's human development index for 2017 was 0.457, which places the country in the low human development category at position 175 out of 189 countries and territories.<sup>2</sup> Infrastructure is weak with only about 8,000 km of the country's 44,000 km road network paved.<sup>3</sup> Health workforce density (physicians, nurses, midwives, dentists, pharmacists, and psychiatrists) is less than 1.5 per 10,000 population, far below the World Health Organization (WHO) recommended minimum threshold of 23,<sup>4</sup> and Guinea has a total of three hospital beds per 10,000 population.<sup>5</sup>

Progress has been made to improve health outcomes in the country over the last three decades; however, metrics remain poor. Between 1990 and 2017, Guinea's life expectancy at birth increased by 10.7 years (49.9 to 60.6), expected years of schooling increased by 6.2 years (2.9 to 9.1),<sup>6</sup> and GNI per capital increased by about 70.8 percent (\$1,210 to \$2,067). Over the same period, under-5 child mortality decreased from 145.9 deaths per 1,000 live births in 1990 to 89 in 2016.<sup>7</sup> Health allocation represented 2.8 percent of the total national budget on average over the period 2010–2016; this increased to 7.3 percent beginning in 2019.<sup>12</sup> In that same timeframe, out-of-pocket health expenditure in Guinea fell from 65 percent to 50 percent, but remains above the sub-Saharan average of 37 percent in 2016 and above the least-developed countries average of 52 percent.<sup>8</sup> In 2017, the top causes of death in the country included lower-respiratory infections, malaria, neonatal disorders, tuberculosis, diarrheal diseases, and HIV/AIDs.<sup>9</sup>

From 2013 to 2016, Guinea fought the largest and most complex outbreak of Ebola in history, which severely undermined health progress to date.<sup>10</sup> The epidemic started in Guinea and spread to other

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<sup>1</sup> "Guinea" World Health Organization, 2019, retrieved from <https://www.who.int/countries/gin/en/>.

<sup>2</sup> "Guinea," UNDP, Human Development Indices and Indicators: 2018 Statistical Update, 2018, retrieved from [http://hdr.undp.org/sites/all/themes/hdr\\_theme/country-notes/GIN.pdf](http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/GIN.pdf). This is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge, and a decent standard of living.

<sup>3</sup> "Guinea Road Network," 2018, WFP: Logistics Cluster, available at <https://dlca.logcluster.org/display/public/DLCA/2.3+Guinea+Road+Network>.

<sup>4</sup> WHO. Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies. World Health Organization Library Cataloguing-in-Publication Data. 2010.

<sup>5</sup> Haitham Shoman, Emilie Karafillakis, and Salman Rawaf, 2017, "The link between the West African Ebola outbreak and health systems in Guinea, Liberia and Sierra Leone: a systematic review," *Globalization and Health* (13:1), available at <https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-016-0224-2>.

<sup>6</sup> Although the mean years of schooling remains low, increasing from 1.2 years in 1990 to just 2.6 in 2019.

<sup>7</sup> "Monitoring Health for the SDGs," World Health Statistics, 2018, retrieved from <https://apps.who.int/iris/bitstream/handle/10665/272596/9789241565585-eng.pdf?ua=1>.

<sup>8</sup> World Health Organization Global Health Expenditure database, available at <http://apps.who.int/nha/database>.

<sup>9</sup> "Guinea, Cause, Deaths," GBD Compare: Viz Hub, 2019, retrieved from <https://vizhub.healthdata.org/gbd-compare/>.

<sup>11</sup> Guinea had 3,811 cases of the disease and, worldwide, the outbreak resulted in more than 28,000 cases and 11,000 deaths.

<sup>12</sup> "Guinea 2019 Budget of the State" 2018, Guinea Morning, available at <https://guineematin.com/2018/12/27/guinee-voici-le-budget-2019-de-letat-en-chiffres-et-en-rubriques/>

countries, including the heavily impacted neighboring countries of Sierra Leone and Liberia. The outbreak decimated Guinea's already overburdened health infrastructure and contributed to the decline in the availability of human and physical resources for health. The epidemic interrupted other health interventions—e.g., vaccination campaigns—which led to outbreaks of other infectious diseases and high numbers of comorbidities and fatalities from malaria, diarrhea, and pneumonia.<sup>12</sup> Health-care workers faced a particularly high risk of infection and death,<sup>13</sup> with additional indirect costs in stress and fear, social rejection, exhaustion, rapid turnover, and poor management. International engagement in the Ebola response and post-Ebola recovery of impacted countries may eventually help to ameliorate the shocks to the health systems caused by the epidemic. but the net effects to date remain ambiguous.<sup>14</sup>

## Guinea's Public Health Supply Chain

The Government of Guinea, through the Ministry of Health, has made progress toward ensuring access to affordable quality medicines for Guineans. The public health system is organized hierarchically. At the top is the Ministry of Health (MOH), which is responsible for regulating the sector, directing actions, and coordinating and allocating resources. Within the MOH sits the National Directorate of Pharmacies and Medicines (DNPM), whose responsibilities include ensuring the availability and accessibility of quality drugs and health care throughout the country. In 2017, a subdivision was created, the Logistics Management Unit (LMU,) to specifically support supply chain functions.

The MOH has outsourced procurement, storage, and distribution operations to a parastatal institution, the Central Pharmacy of Guinea. Created in 1992, the PCG has the mission of procuring and distributing medicines and other health products in Guinea. Under the supervision of the MOH, it enjoys management autonomy in its operations. A formal memorandum of understanding (MOU) with the government states that the PCG is intended to be the sole purchaser of publicly financed health commodities (excluding donor procurements); however, this agreement has not been fully implemented. Under the same MOU, the MOH is meant to provide consistent and sufficient funds to the PCG for procurements. This has also not been fully implemented. The last government grant to the PCG was in 2015, a sum of approximately 2 billion Guinean francs (about \$220,000 USD). The most recent installment of funds to the PCG was instead from the European Union-funded Project to Support Health in 2017, approximately €2,400,000 million.

The PCG network extends beyond the central medical stores in Conakry to include six additional regional warehouses in Boké, Conakry, Faranah, Kankan, Labé, and Nzérékoré. Each depot serves health facilities in the surrounding geographical area. Regional depots receive products for all priority health programs through quarterly distributions from the central PCG. Health centers further supply products to lower-level facilities, including health posts and community health workers. This final level in the Guinean supply chain is outside the scope of this NSCA assessment.

Parallel to the public supply system is a private pharmaceutical sector that supplies essential health-care commodities (commercialized products) directly to patients and also to health facilities, when products ordered from the PCG are insufficient. A 2019 exercise to map all private pharmacies in

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<sup>13</sup> 109 health-care workers in Guinea were killed in the outbreak. Savini et al., 2017, "Occupational Exposures to Ebola Virus in Ebola Treatment Center, Conakry, Guinea," *Emerging infectious diseases*, vol. 23 (8), 1380–1383.

<sup>14</sup> Marston, Barbara J et al, 2017, "Ebola Response Impact on Public Health Programs, West Africa, 2014–2017." *Emerging infectious diseases* vol. 23,13: S25–S32.

Conakry inventoried a total of 811 pharmaceutical establishments across the eight regions of Guinea among which 53 pharmaceutical wholesalers and 518 private pharmacies were identified. Results from this mapping suggest that the private pharmaceutical sector in Guinea remains exposed to significant regulatory challenges.

This challenge is not unique to Guinea. Public health research argues that rapid globalization of the pharmaceutical production and distribution has not been supported by harmonization of regulatory systems worldwide.<sup>11</sup> Thus, the supply systems in low-income and middle-income countries remain exposed to the risk of poor-quality medicines.

Several strategic plans, policies, and regulations outline and structure Guinea's approach to improving health care broadly and supply chain management specifically. The overarching National Health Development Strategy, 2015–2024 (PNDS) outlines three objectives:

1. Strengthen prevention and management of diseases and emergency situations
2. Promote the health of mothers, children, adolescents, and the elderly
3. Strengthen the national health system

Within these, the PNDS recognizes the centrality of a reliable supply of medicines and other health products in disease control for attaining broader health goals.

In parallel, in 2014, the country updated its National Pharmaceutical Policy (NPP), originally developed in 1994, with the aim of improving the availability, accessibility, quality assurance, and rational use of pharmaceutical commodities. Informed by these revisions, in 2018, the president signed into law an update to the country's 24-year-old pharmaceutical regulatory law, which is intended to help ensure that the manufacture, trade, and use of medicines in Guinea are regulated appropriately and that the public has access to accurate information on medicines and other health products. The revised law gives authority to the DNPM for quality assurance and surveillance of medicines in circulation. Also, the MOH reviewed and updated the National Essential Medicines List (NEML) in 2016 to reflect the latest WHO guidelines on the most efficacious, safe, and cost-effective medicines for priority health problems.

Finally, and of most direct relevance, Guinea adopted a National Supply Chain Strategic Plan (Strategic Plan) in 2017 to supplement the overarching National Health Development Strategy. The PNDS and NPP emphasized the importance of a secure, reliable, and sustainable supply chain in ensuring the availability and accessibility of medicines and other health products at all levels of the health system. In 2017, the need for a strategic plan for the national supply chain was identified to enable the different actors to coordinate in a common vision, and the technical and financial partners to support the realization of this vision.

The process for creating the National Supply Chain Strategic Plan began in 2016 with a National Supply Chain Assessment (NSCA 1.0 methodology<sup>15</sup>) to evaluate the state of the country's supply chain, identify gaps and opportunities, and inform priority setting. This was coupled with interviews of stakeholders and partners as well as a wide review of previous evaluations of supply chain components. Throughout 2016 and 2017, workshops were organized to develop, vet, and validate the plan, with

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<sup>11</sup> For example, Van Assche, K., Nebot. Giralt A., Caudron, J. M., et al., 2018, "Pharmaceutical quality assurance of local private distributors: a secondary analysis in 13 low-income and middle-income countries," *BMJ Global Health* (3).

<sup>15</sup> The National Supply Chain Assessment's first iteration was developed under the USAID program Supply Chain Management System project in 2012.

participation from the ministry, vertical health programs, international NGOs, supply chain actors, and technical and financial partners. The final plan defined supply chain management as the active management of all activities, including purchasing, warehousing, distribution, information management, and coordination, to provide the right-quality product, in good quantity, in good condition, at the right place, at the right time and at the right cost. It included an analysis of the strengths, weaknesses, opportunities, and threats (SWOT) of six key operational functions and five cross-cutting functions of Guinea's supply chain, each complete with a list of prioritized corrective actions. Prioritized action items were further organized into three main time blocks and across four strategic axes. This NSCA 2.0 is in part intended to assess progress made on the Strategic Plan priority actions since the original 2016 NSCA 1.0.

# Overview of the Supply Chain Assessment Activity

Under MOH leadership, USAID, GHSC-PSM, and the DNPM provided support for the requisite fieldwork for the National Supply Chain Assessment in Guinea from June 10 to 28, 2019. The primary objectives of this assessment were as follows:

- Assess Guinea's public health supply chain—its capability and performance—to identify strengths, gaps, and opportunities for improvement
- Monitor the impact of recent supply chain improvement activities and investments, specifically assessing progress since the 2016 NSCA (version 1.0) and implementation of priority actions outlined in the 2017 National Supply Chain Strategic Plan, 2017–2024
- Identify focus areas of opportunity for MOH planning and stakeholder coordination to refine strategic plans and guide future system strengthening investments

The NSCA 2.0 includes three distinct elements: the *supply chain mapping workshop* results in a visual representation of the country's supply chain; the *capability maturity model survey* measures the overall capability, resources, processes, and functionality of the country supply chain; and site-level data on *key performance indicators* are collected to measure supply chain performance. Based on the findings, the GOG, 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 Guinean health supply chain directly financed or directed by the GOG. The assessment team collected capability and performance metrics on the Ministry of Health, the central and regional medical stores, hospitals, and health centers. Donors play an important role in Guinea's public health system, especially in procuring key commodities, and their actions certainly impact the public system. However, to the extent that donors feature in the NSCA, it is to assess how Guinea'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 Guinea's health, but one which remained mostly outside of the scope of this assessment. Future assessments on donor effectiveness and the private health market would certainly be welcomed 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 system strengthening.

The following discussion is focused on providing interpretations of the capability and performance results and translating them into recommendations for future supply chain interventions. The Summary of Findings and Conclusions sections highlight key takeaways and suggestions for future areas of analysis. The report annexes, contained in a second volume, provide the complete assessment tools and other detailed information.

# Methodology

Over five months, from February to June 2019, 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 MOH, USAID, and other key supply chain stakeholders. This section describes in detail the assessment's methodology.

The team used the NSCA 2.0 toolkit to guide planning, data collection, and analysis.

## 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. The toolkit includes three primary assessment elements: supply chain mapping, the Capability Maturity Model (CMM) tool, and the key performance indicator (KPI) assessment tool (see Exhibit 1). The toolkit is freely available for download at [www.ghsupplychain.org](http://www.ghsupplychain.org)

Exhibit 1. Overview of the Three Elements of NSCA 2.0	
ACTIVITY	DESCRIPTION
Supply chain mapping	The objective of mapping the supply chain 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	The CMM diagnostic tool assesses capability and processes across functional areas and cross-cutting enablers (e.g., HR, financial sustainability) using interviews and direct observation.
Supply chain KPIs	The KPIs include a set of indicators that measure supply chain performance in selected functional areas.

The toolkit also includes resources for planning and implementing the assessment activity, and for data analysis and dissemination.

## Scope of Work

The SOW required that the assessment team conduct a comprehensive assessment of the Guinea public health system at the following levels: central, regional, and service delivery, which included the MOH; central and regional medical stores; referral hospitals, hospitals, communal medical centers (CMCs); and health centers and urban health centers (CSUs). Exhibit 2 lists all sites where data were collected in June 2019. The complete SOW is attached to this report in the Annex.

## Sampling

The NSCA 2.0 was designed with the intent of assessing country-level supply chain infrastructure, with disaggregation at the level of facility type. In Guinea, the sample frame consisted of all public health facilities across the country that are supplied by the PCG facilities, receive public funding, and for which the national government has a census of sites. The sampling frame thus consisted of 410 health centers, 44 hospitals, and six regional medical stores. The Ministry of Health, through its various directorates and programs, and the Central Medical Store (PCG) were also included. The sample frame excluded

health posts, the lowest level of service delivery, as a full and accurate population list of existing posts is not currently available.

The assessment team determined the minimum sample size using the hypergeometric sample size formula, assuming a margin of error of  $\pm 10$  percent, and a 90 percent level of confidence as the NSCA 2.0 guidance suggests. The team used a randomized two-stage sampling 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. Within each selected district, four health centers were selected at random. In 2016, the first NSCA assessed all hospitals, CMCs, and regional medical stores. In 2019, we decided also to census all facilities of these types, to allow for most direct comparability.

The final sample included 98 health centers, 41 hospitals and CMCs, three referral hospitals, six regional medical stores, the central medical store, four national health program offices, and the Ministry of Health (see Exhibit 2). We assessed a total of 154 sites. The full list of selected sites is provided in the Annex.

<b>Exhibit 2. Sampling Frame and Selected Sample</b>		
<b>Facility Type</b>	<b>Population</b>	<b>Sample</b>
Health centers and CSUs	410	98
Hospitals and CMCs	41	41
National hospitals	3	3
Regional medical stores	6	6
Central medical store (PCG)	1	1
Ministry of Health	1	1
National health programs	8	4
<b>Total</b>	<b>470</b>	<b>154</b>

At each selected facility, data collectors completed a capability maturity model survey and collected data on key performance indicators. In all cases, they sought to speak 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 Ministry of Health, 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 supply chain multiple 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 Ministry of Health and PCG officials were led by senior GHSC-PSM staff, including the technical director, two technical advisors, three DC-based assessment and operations experts, and a Guinea-based senior assessment consultant.



At the subcentral sites, 20 two-person teams (40 members total) traveled to 148 sites over 12 days to collect data. These teams included a mixture of final-year pharmacist students and Ministry of Health officials. Many had recently supported a separate data collection exercise to census the capital's private pharmacies and were selected to participate in this exercise based on professional excellence and past assessment performance. 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 six health facilities in Conakry. 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 Guinean context.

## Procedures

Six weeks before the start of data collection, MOH-endorsed letters were sent to district health offices to inform them that facilities in their districts had been randomly selected to participate in the NSCA. Where possible, letters were also sent directly to selected sites. District health offices were responsible for communicating the exercise to the main points of contact at each health center under their oversight. Data collectors carried with them a copy of the notification signed by the MOH, 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 June 16 to 30. On average, teams spent one full day assessing health centers, 1.5 days at hospitals, and two days at warehouses, with travel days in between. One team member would lead the CMM survey interviews, while the other collected KPI data. If one finished earlier (usually the CMM lead), data collectors would support the team member.

The central-level team collected data from multiple department officials within the MOH, including vertical program leads, and several senior individuals at the PCG. Access was facilitated by relationships developed throughout the planning process with key stakeholders and gatekeepers in the Ministry. Central-level interviews were conducted over a three-week period, from June 17 to July 5. A total 63 interviews were conducted with senior central officials across central-level institutions and departments.

## Capability Maturity Model questionnaire

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 Guinean counterparts to understand what supply chain functions were expected at different facility types throughout the system.

The survey primarily consists 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 the collection of data in a standardized way, reduces the impact of subjectivity in the assessment (compared to NSCA 1.0), and improves 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 important respondent answers were 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, and safety equipment. Depending on the number of modules completed, availability of key informants, and speed of retrieving verification documents, the CMM questionnaire might take multiple hours to a full day to complete. Data were collected electronically using the SurveyCTO platform on individual tablets.

Exhibit 3 provides an overview of the functional areas that were addressed in the capability questionnaire by type of facility. The Annexes include a complete list of the facilities assessed, and the geographic coverage in a map.

Exhibit 3. CMM Functional Area by Level in the Guinea Supply Chain System							
#	FUNCTIONAL MODULES ASSESSED	MOH	PCG	Regional PCG	Referral Hospitals	Hospitals and CMCs	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	✓	✓	✓	✓		
7	Procurement and Customs Clearance		✓	✓			
8	Warehousing and Storage		✓	✓	✓	✓	✓
9	Distribution		✓	✓			
10	Logistics Management Information Systems	✓			✓	✓	✓
11	Waste Management	✓	✓	✓	✓	✓	✓

## Key Performance Indicators

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 that are aligned with international standards for health supply chain management. KPIs included stocked according to plan percentages (by tracer), stock card accuracy, stock-out rates (by tracer), temperature excursions, and staff turnover rates. The full list of KPIs and the facility level at which they were collected is presented in Exhibit 4.

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 multiple hours reviewing reports and counting stock to up to two full days. Data were collected on tablets using SurveyCTO.

#### Exhibit 4. KPIs by the Level in the Guinea Supply Chain System

#	Key Performance Indicators	MOH	PCG	Regional PCG	National Hospitals	Hospitals	Health Centers
1	Stock data		✓	✓	✓	✓	✓
2	Downstream delivery			✓			
3	Human resource	✓	✓	✓	✓	✓	✓
4	Stock turn data	✓	✓	✓	✓	✓	✓
5	Facility reporting rates				✓	✓	✓
6	Temperature excursions		✓	✓	✓	✓	✓
7	Forecast accuracy	✓	✓				
8	Supply plan accuracy	✓	✓				
9	Source of funds data	✓					
10	Prices paid		✓				
11	Quality control testing		✓				

In collaboration with the MOH, the tracer commodities shown in Exhibit 5 were selected for the NSCA. Collectively, they provide a fair representation of the commodity types that can be found in the Guinean 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.

#### Exhibit 5. Tracer Commodities

#	PRODUCT NAME	DOSAGE	PRODUCT CATEGORY
1	Determine HIV 1/2, test kit	NA	HIV/AIDS
2	Zidovudine/lamivudine/nevirapine	60/30/50 mg	HIV/AIDS
3	Artemether/lumefantrine 6x1	20/120 mg comp	Malaria
4	Rapid diagnostic test for malaria	NA	Malaria
5	Combined oral contraceptives	150/30 mcg 28 tablets/cycle	FP/RH
6	One-rod Implant	One-rod	FP/RH
7	Oxytocin injectable	10 UI/ml	MNCH
8	Magnesium sulfate	50 mEq/ml	MNCH
9	Vitamin K1	10 mg/ml	MNCH
10	RH (150 +75) mg tablet	150/75 mg	TB
11	RHZE (150 + 75 +400 +275) mg tablet	150 + 75 +400 +275 mg	TB
12	Amoxicillin	500 mg	Essential medicines
13	Pentavalent vaccine	0.5 mg	Vaccines
14	Bleach solution	5% concentration	Legacy Ebola commodities

During the visit to the PCG, a second, complementary tracer listed was employed to more effectively capture the PCG's performance on procurement and forecasting and supply planning. Since the PCG does not procure on behalf of the government, a small subset of the commodities that the PCG procures on its own was used to examine these areas.

#### Exhibit 6. Tracer Commodities for Review of the PCG

#	PRODUCT NAME	DOSAGE	PRODUCT CATEGORY
1	Paracetamol	500 mg tablet	Essential medicines
2	Ketamine	10 ml vial	Essential medicines
3	Ringer's lactate	Infusion bottle 500 ml	Essential medicines
4	Sodium chloride solution (0.9%)	500 ml bottle	Essential medicines
5	Ceftriaxone	1g vial powder	Essential medicines

## Data Management

We provided each enumerator 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 the NSCA technical team conducted daily quality checks. Original copies of the collected data were held on SurveyCTO's server. While both enumerators on a field team used tablets to collect data, each enumerator collected data on different modules, ensuring that only one completed collective survey was uploaded per site. A monitoring and evaluation (M&E) specialist from GHSC-PSM reviewed, verified, and uploaded data daily. This served to verify that all answers were correctly coded and nonresponse data points were removed, facilitating more efficient analysis. Further, the frequency of this data review (sometimes referred to as "cleaning") enabled us to identify unexpected issues, which were systematically addressed. After the daily review, data collection teams were immediately contacted (often through WhatsApp by a central-level point of contact) to clarify discrepancies in, or questions related to, the uploaded data.

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 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, the CMM interviews, and the KPI data collected.

# Limitations

## Excluded Facilities: Health Posts and Prefectural Directorates of Health

In an ideal assessment, two additional facility types would have been included. Health posts are an important “last-mile” service delivery point in the Guinean system. Unfortunately, the government does not have a comprehensive—or even near-comprehensive—list of health posts currently active in the country and thus the assessment team did not have a sample frame from which to draw assessment sites. Alternative assessment strategies to “find and assess” health posts were briefly considered, but ultimately dismissed because, without a full census of the country’s health post, it would be impossible to claim that collected data was nationally representative or that it met the same level of rigor required in the assessment of other facility levels. Without a direct assessment, we can likely assume that health posts have less resources and capabilities available than other service delivery points (SDPs) assessed in this NSCA seems reasonable, but this assumption needs to be verified. We strongly recommend that the country conduct a baseline census of its health posts to support rigorous last-mile assessments and data-informed decision making in the future.

Also, directorates of health (DPSs) were not included in the assessment. In retrospect, it may have been useful to complete the LMIS CMM module at these facilities, given their role in the upstream paper LMIS/information process. That said, the extra costs and time required to direct teams to dozens of additional sites for a single survey module may not have warranted the amount of data gained. Health posts and DPSs thus remain “black boxes” in this assessment but warrant consideration in future supply chain evaluations.

## Data Quality and Incomplete Data

The challenge of collecting complete, accurate, and timely data was apparent throughout the 2017 Strategic Plan and proved to be a challenge for the NSCA as well. The assessment team worked to preempt and redress data quality issues where possible. The team recruited and trained highly skilled data collectors for five full days before the 10-day assessment. Also, each submitted survey was cleaned nightly and the assessment team provided data collectors with immediate feedback on quality issues. Still, given the challenging context, data issues persisted. These can be broadly grouped into three main dynamics.

- *Missing, inaccurate, or incomplete records at facility types.* Many of the KPIs assume that facility sites maintain complete and accurate records, from which data collectors could extract data points. This was often not the case in Guinea. In many instances, data collectors were confronted with records that were out of date, wildly inaccurate, only partially complete, or completely missing. While the absence of record keeping is itself an important finding, it also significantly limits this assessment’s ability to provide trustworthy performance metrics against which to compare capability results.
- *Lack of familiarity with or misunderstandings of supply chain concepts.* The NSCA includes highly technical and precise supply chain terminology. On the one hand, this allows for detailed differentiation of levels of capabilities. On the other hand, in situations where facilities do not employ staff specialized in supply chain management (where a pharmacist is also the store manager, waste management lead, and LMIS point person), then the nuances in supply chain terminology may be lost or misunderstood. Data collectors were trained in key supply chain concepts, and the NSCA includes documentation verification questions where possible, which ameliorate this challenge somewhat. That said, some reported capabilities were surprising and difficult to rationalize given the context. Most likely, they reflect a misperception or a misunderstanding, rather than reality itself.

- *Opacity at the central level.* Finally, collecting data at the central level was challenging. The NSCA benefited greatly from gatekeepers within the ministry who were extremely generous with their time, at times spending many hours over several interviews with the assessment team. That said, the distribution of supply chain roles and responsibilities is not always clearly specified within the ministry, which resulted in many interviews where the person formally responsible for a given supply chain function could not fully, confidently, or accurately answer assessment questions. In these cases, the central-level assessment team worked hard to follow up on additional leads to amend poor interview responses and ultimately conducted several dozen interviews toward a single CMM survey. In the end, the absence of transparent, readily available, and easily triangulable information about supply chain capabilities, policies, and processes is in and of itself an important finding about the state of supply chain capabilities and performance at the central level. In a few cases, interviewees appeared to mislead the NSCA team. Here again the NSCA's structured requirement for documentation and verification for specific capability questions proved useful in more accurately establishing the state of capabilities. Finally, in some cases, no one in the ministry appeared willing to answer questions, which highlights a lack of transparency in some parts of the supply chain system. Central-level results should be understood with these challenges in mind.

## Comparing CMM Scores and KPIs

The NSCA 2.0 uses a two-stage cluster-sampling approach designed to yield a maximum error of  $\pm 10$  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  $\leq \pm 10$  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  $\pm 10$  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.

This does not imply that scores or KPIs are unimportant or the underlying data are not useful, but it is simply a function of sampling 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. Note that the underlying questions asked in the CMM are still insightful and will help drive analysis and recommendations.

## Comparing 2016 and 2019 NSCA Scores

Care is needed when comparing the results of the 2016 and 2019 NSCAs in Guinea, as the questionnaire and methods were significantly revised in creating NSCA 2.0. This is especially true for the CMM questionnaire. In the 2.0 revisions, the content of all CMM modules was updated and expanded based on experience with prior NSCA 1.0 assessments. The number of questions per module was expanded and the type was significantly revised to be more objective and less reliant on individual data collectors' subjective judgements. Impressionistic questions were replaced with series of building-block "yes/no" framings supplemented by physical verification. As a result, the topline capability maturity scores are not directly comparable across NSCA 1.0 and 2.0 versions, or between the 2016 and 2019 assessments in Guinea.

That said, the underlying reported percentages of facilities reporting specific capabilities in the case of complementary questions are informative and broadly comparable. For example, the 2016 NSCA 1.0 in Guinea found that only 24 percent of health centers had incinerators. In 2019, the NSCA 2.0 similarly found that 28 percent of health centers used incineration (onsite) as a mode of pharmaceutical waste disposal. While the specific questions varied, they collectively suggest that little progress has been made in expanding the use of incinerators for waste management in health centers in the past three years. This example works to highlight points of similarly informative capability comparisons between the two assessments. Finally, it is notable that the 2.0 version of the NSCA added additional CMM modules—governance, financial sustainability, human resources—not considered as complete modules in the NSCA 1.0 version.

In contrast, the KPI portion of the NSCA 2.0 retained the core indicators established under NSCA 1.0. The sampling approach in the 2019 NSCA was also conducted in a manner to mirror confidence levels and confidence intervals of the 2016 assessment. Thus, these indicators are directly comparable from the 2016 Guinea NSCA 1.0 to this 2019 NSCA 2.0.

## Summary Results

Overall, we collected data from 154 sites visits, including six at the central level (MOH [including DNPM], the PCG, and four vertical programs), six at the regional levels (regional PCGs), and 142 at service delivery levels (national hospitals, hospitals, CMCs, health centers and CSUs. The service delivery level includes national referral hospitals (n = 3), hospitals and CMCs (n = 41) and health centers and CSUs (n = 98).

This section provides a snapshot overview of collected data. The supply chain map is presented first to establish the flow of products and information through the Guinean public health supply chain system. Next, an overall table of CMM results, followed by select KPIs provides, synthesizes the 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, relevant KPIs are presented first, then CMM scores. Discussion and recommendations specific to that module or service level follow the presentation of findings.

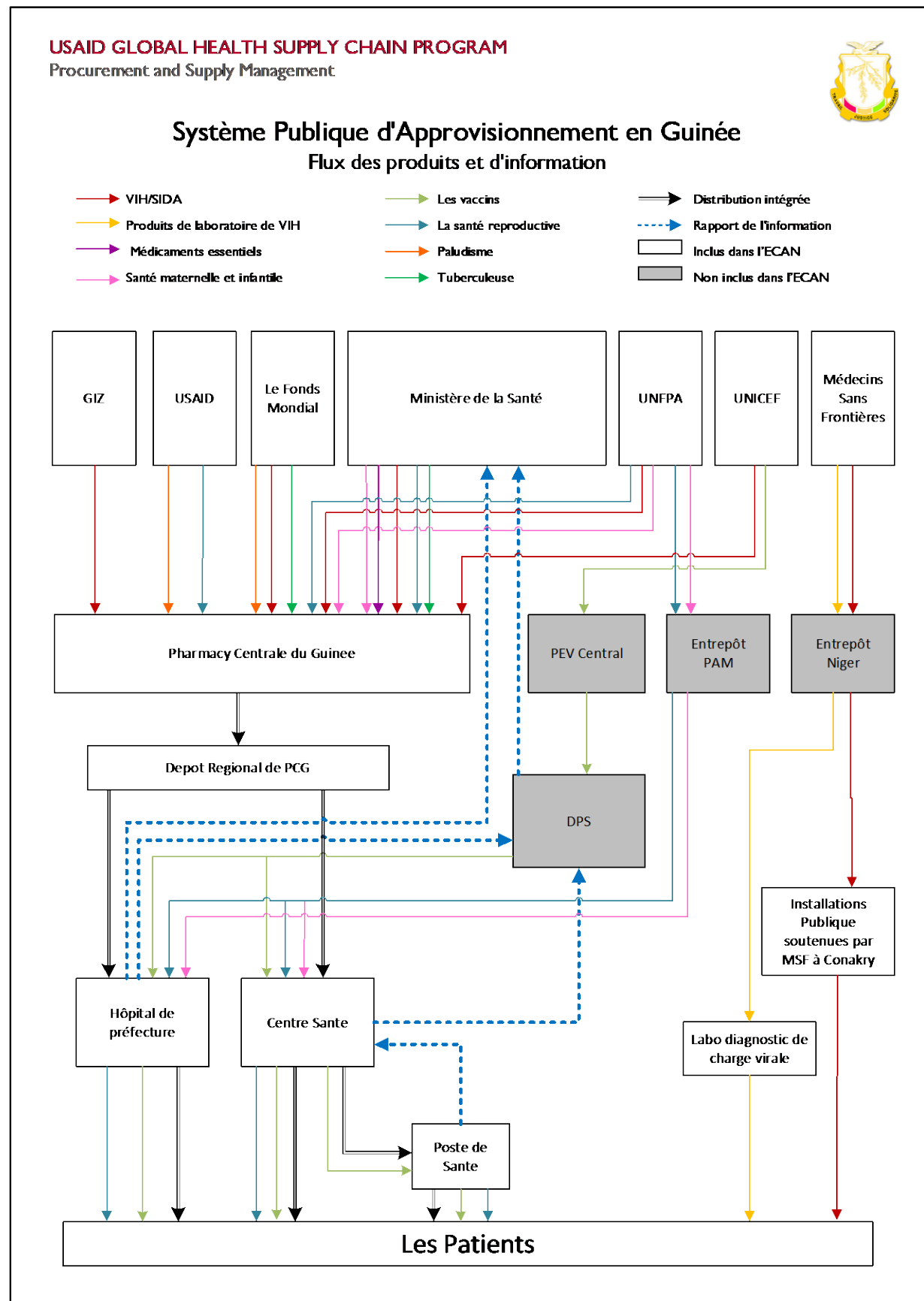
### Supply Chain Mapping

All NSCA 2.0 implementations include, as a first step, a participatory exercise to comprehensively map 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 June 10, 45 participants convened for the one-day supply chain mapping workshop in Conakry, Guinea. Participants included representatives from the MOH and other government representatives, the PCG, the vertical programs, supply chain partners, and international development actors (see report annex for the workshop slides, agenda, and final participant list). Participants were organized by their expertise into six working groups based on salient vertical programs, and each team was asked to produce (1) a comprehensive map of commodity and information flows from procurement to service delivery and (2) a program-specific SWOT analysis. After the workshop, the assessment team integrated these maps into a single illustration of the Guinean public health supply chain with the goal of illuminating bottlenecks, inefficiencies, and opportunities for improvement. Exhibit 7 illustrates the organization and elements within the Guinean supply chain as well as the flow of commodities and information through the system. The final version presented here has been reviewed and endorsed by the MOH.



## Exhibit 7. The Guinean Supply Chain



Three notable characteristics of the Guinean public health supply chain are highlighted when mapped:

1. **Partial integration of the distribution system.** The most efficient portion of the distribution system appears to be the integrated quarterly transport of most health commodities from PCG central to regional warehouses. Vaccines from UNICEF (stored at PEV Central) and reproductive, maternal and infant health products from UNFPA (stored at Entrepot PAM) fall outside of this distribution cycle.
2. Conversely, **procurement and transfer of commodities** from the donors to the PCG involved a large number of different actors procuring different products on their own timelines.
3. **Information flow upstream** is relatively integrated, with monthly LMIS data collected via paper forms flowing through DPSs to the MOH and electronic LMIS data flowing directly from hospitals to the MOH. A notable caveat is the exclusion of the country's warehouses from the LMIS system. The PCG's warehouse management system (WMS) and SAGE system are not currently integrated into the national LMIS system, which presents challenges for information sharing and visibility and, conversely, appears to be a clear opportunity for future improvement.

## Understanding the CMM Results

A review of the CMM results presented below must consider how the 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 this module is the sum of scores at each maturity level. Exhibit 8 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; the 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 8. Definitions of Level of Maturity and Contribution to the Overall CMM Score**

LEVEL OF MATURITY	DEFINITION	MAXIMUM CONTRIBUTION TO THE CMM SCORE
Basic	These are the <b>must-have</b> 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	These are not must-haves but are <b>intermediate</b> level policies, structures, processes, procedures, tools, indicators (e.g., an Excel sheet).	30%

Advanced	These are <b>nice-to-have</b> policies, structures, processes, procedures, tools, indicators, reports, and resources to operate a supply chain system (e.g., Rx solution, a dispensing and stock management electronic tool).	15%
State of the art	These are <b>nonessential, SOA</b> 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%

## Capability Maturity Model: Summary Tables

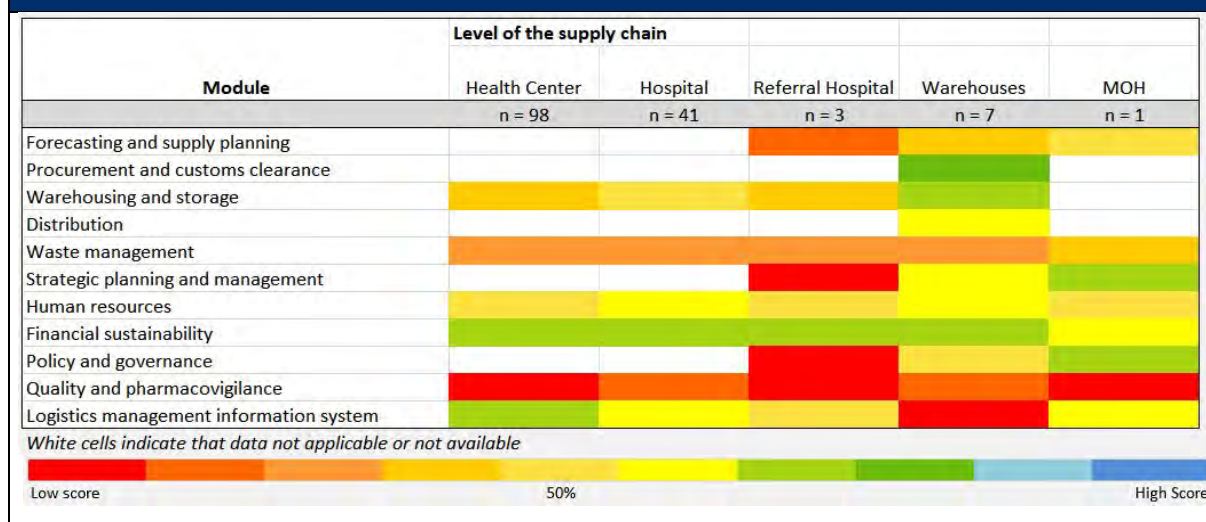
Exhibits 9–11 present a summary of the key data findings for capability maturity metrics across the 11 technical areas and five facility types.

Exhibit 9. Average Capability Maturity Model Score and Range of Scores Presented by Level of Facility for Each Functional Module					
MODULE	Ministry of Health	PCG Warehouses	Referral Hospitals	Hospitals	Health Centers
	n = 1	n = 7	n = 3	n = 41	n = 98
Strategic Planning and Management	66%	55% (29%–77%)	10% (0%–30%)	--	--
Human Resources	45%	53% (38%–76%)	40% (24%–63%)	54% (23%–84%)	48% (11%–79%)
Financial Sustainability	54%	61% (24%–82%)	64% (52%–78%)	64% (32%–91%)	61% (30%–80%)
Policy and Governance	66%	46% (15%–72%)	--	--	--
Quality and Pharmacovigilance	10%	16% (0%–58%)	0% (0%–0%)	13% (0%–35%)	8% (0%–45%)
Forecasting and Supply Planning	41%	39% (24%–55%)	14% (0%–24%)	--	--
Procurement and Customs Clearance	--	72% (n = 1)	--	--	--
Warehousing and Storage	--	66% (49%–83%)	38% (33%–44%)	42% (23%–59%)	39% (21%–57%)
Distribution	--	58% (26%–83%)	--	--	--
Logistics Management Information System	59%	--	45% (43%–46%)	54% (24%–74%)	60% (0%–89%)
Waste Management	31%	20% (0%–52%)	30% (19%–41%)	27% (0%–56%)	24% (0%–56%)

### Exhibit 10. Capability Maturity Model Score for Forecasting and Supply Planning Presented by National Health Program

MODULE	Ministry of Health	National AIDS Control Program	National Malaria Control Program	National Tuberculosis Control Program	National Reproductive Health Program
	n = 1	n = 1	n = 1	n = 1	n = 1
Forecasting and Supply Planning	41%	53%	62%	46%	56%F

### Exhibit 11. Heat Map, Capability Maturity Model



## Select KPIs: Summary Table

Exhibit 12 presents the results of select key performance indicators assessed across warehouses, hospitals, and health centers in Guinea.

Exhibit 12. Select KPI Scores by Level (Average Score with Ranges)				
Key Performance Indicator	Warehouses	Referral Hospitals	Hospitals	Health Centers
	n = 6	n = 3	n = 41	n = 98
Stocked according to plan (tracer commodities)	32%	36%	28%	30%
	(6%–100%)	(0%–67%)	(10%–58%)	(17%–50%)
Stock-out on day of assessment	44%	33%	23%	34%
	(0%–100%)	(0%–100%)	(3%–65%)	(2%–85%)
Average number of stock-out days for 181-day period*	14 days	23.5 days	17.1 days	22.9 days
Average number of days per month with stock-outs, given that there was a stock-out	14.2 days	15.7 days	7.3 days	8 days
Stock card accuracy: percentage of facilities at 100% accuracy	50%	28%	58%	51%
	(0%–100%)	(0%–100%)	(38%–79%)	(0%–61%)
Stock card accuracy: average deviation from 100% accuracy across facilities	777%	73%	2,558%	1,801%
	(85%–2400%)	(22%–100%)	(42%–30830%)	(0% to 15452%)
Wastage from damage, theft, and expiry: damaged, lost, and expired stock as a percentage of the total stock available	0%	7%	7%	5%
		(0%–46%)	(0%–79%)	(0%–27%)
Average number of supply chain positions	7.2	15.6	7.0	4.9
Percentage of positions vacant	18%	18%	17%	12%
Staff turnover ratio	2%	8%	7%	9%

\* The first number in this table refers to the average number of days the commodity was out of stock on average across the facilities during the six months of December 2018 through May 2019. There were 181 days in this period. The number in parenthesis is the percentage of days the commodity was out of stock, on average. Thus,  $6.6/181 = 3.6$  percent.

# By Functional Module: Overall Capability Maturity Model 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; policy and governance; forecasting and supply planning; procurement and customs clearance; human resources; financial sustainability; LMIS; warehousing and storage; distribution; quality assurance and pharmacovigilance; and waste management.

## 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 for progress and performance established. Strategic planning and management are the purview of the MOH, 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, and clear plans for private-sector engagement (see Exhibit 13).

### Exhibit 13. Examples of Scored Strategic Planning and Management Capabilities

<b>Basic</b>	<ul style="list-style-type: none"> <li>Presence of an approved supply chain strategic plan (an intermediate capability for RHs)</li> <li>Monitoring of supply chain implementation plan and presence of specific subsections</li> <li>Supply chain risks are formally assessed biannually</li> </ul>
<b>Intermediate</b>	<ul style="list-style-type: none"> <li>Stakeholder mapping exercise is part of the strategic planning process</li> <li>Presence of a supply chain implementation plan</li> <li>Biannual updates to the supply chain strategic plan or implementation plan</li> <li>Strategic plan or implementation plan includes actions to reform the supply chain system</li> <li>Coordination or engagement with the private sector to improve supply chain within the last year</li> </ul>
<b>Advanced</b>	<ul style="list-style-type: none"> <li>Stakeholder groups meet monthly to review supply chain performance</li> <li>Presence of a risk management and mitigation/prevention plan</li> <li>Formal strategy for using public private partnerships to improve supply chain performance</li> </ul>
<b>SOA</b>	<ul style="list-style-type: none"> <li>Supply chain risks are formally assessed continuously</li> </ul>

The 2017–2024 Strategic Plan for the Public Health Supply Chain (Strategic Plan) is the primary strategic planning and management document in Guinea. Guinea is relatively advanced in having a strategic plan specific to improving the national public health supply chain. The Strategic Plan identifies six core operational functions of a health supply chain and five cross-cutting areas, each accompanied by a SWOT analysis of the current state of Guinea’s system (see Exhibit 14). These areas closely map onto the key technical areas identified by the NSCA as fundamental to an effective supply chain system.

### Exhibit 14. Key Supply Chain Functions, as Identified in Guinea’s 2017 Strategic Plan

Operational functions	Cross-cutting functions
<ul style="list-style-type: none"> <li>1. Specification and quantification of health products</li> <li>2. Purchase, import logistics, and customs clearance</li> <li>3. Warehousing and facility-level storage</li> <li>4. Transportation and distribution</li> <li>5. Waste management</li> <li>6. Quality assurance and quality control</li> </ul>	<ul style="list-style-type: none"> <li>1. Governance, leadership, and coordination</li> <li>2. Regulation</li> <li>4. Financing</li> <li>4. Human resources</li> <li>5. Pharmaceutical information (LMIS, Analytics, M&amp;E, and performance)</li> </ul>

The plan outlined an extensive list of actions to improve the supply chain over the specified seven-year timeframe, organized into four “strategic axes,” or bundles of prioritized actions:

1. Improve the availability of quality health products at all levels of the health pyramid
2. Strengthen supply chain management by developing quality human resources
3. Strengthen coordination, leadership, and supply chain governance
4. Improve the logistics data and information management to support strategic decision making at all levels

A second section of the report specifies timeframes for a further set of activities to improve the system.

These supply chain improvements complement the broader PNDS for 2015–2024, which recognizes the centrality of a reliable supply of medicines and other health products for attaining broader health goals—including, reducing mortality and morbidity from communicable and noncommunicable diseases and strengthening prevention of diseases, management emergency situations, and the national health system.

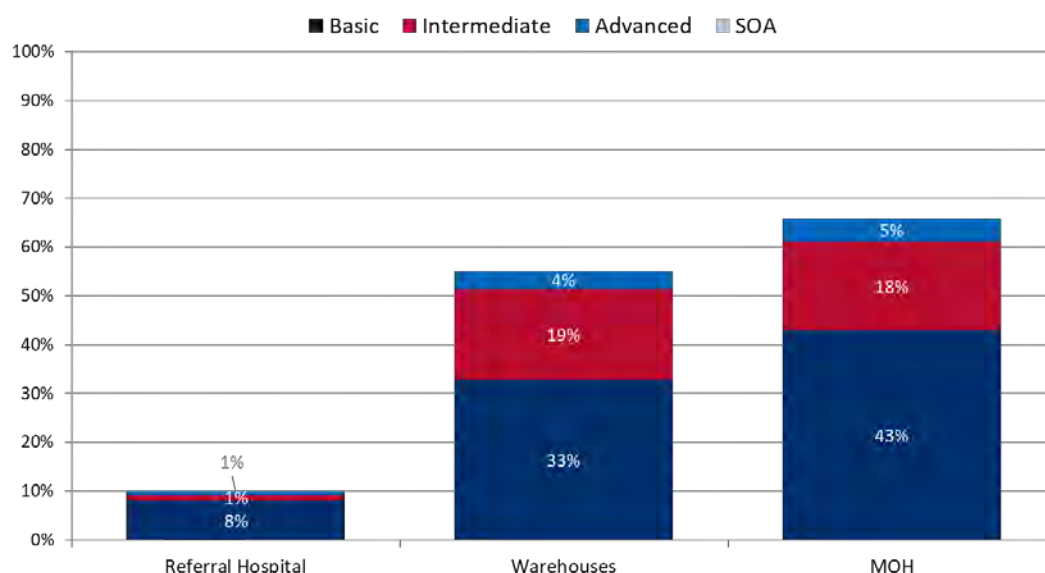
The process for creating the National Supply Chain Strategic Plan began with a National Supply Chain Assessment (NSCA 1.0) in 2016 to evaluate the state of the country’s supply chain, identify gaps and opportunities, and inform priority setting. This was paired with interviews of stakeholders and partners as well as a wide review of previous evaluations of supply chain components. Throughout 2016 and 2017, workshops were organized to develop, vet, and validate the plan, with participation from the ministry, vertical health programs, international NGOs, supply chain actors, and technical and financial partners. The final plan defined supply chain management as the active management of all activities, including purchasing, warehousing, distribution, information management, and coordination, to provide the right-quality product, in good quantity, in good condition, at the right place, at the right time, and at the right cost. It included a SWOT analysis of six key operational functions and five cross-cutting functions of Guinea’s supply chain, each complete with a list of prioritized corrective actions. Prioritized action items were further organized into three main time blocks and across four strategic axes.

The substance of the Strategic Plan is referenced repeatedly in all technical sections of this report, as the formal national roadmap for improving the capabilities and performance of Guinea’s supply chain against which the 2019 NSCA might assess progress, gaps, and opportunities.

## **2019 NSCA Findings**

Strategic planning and management activities remain largely the purview of central-level actors in Guinea (see Exhibits 15 and 16). The MOH records a capability score of 66 percent with 86 percent of basic capabilities in place. Central and regional warehouses record slightly lower capabilities, and referral hospitals only marginally engage in strategic planning at this point in Guinea.

### Exhibit 15. Strategic Planning and Management Capability



### Exhibit 16. SPM KPIs, Maturity Score, and Basic Capabilities in Place

	Ref. Hospitals	Warehouses	MOH
n =	3	7	1
Overall maturity score (range)	10% (0%–30%)	55% (29%–77%)	66%
Percent of basic items in place (range)	16% (0%–48%)	66% (31%–91%)	86%

**Strategic planning and monitoring.** The 2017 Strategic Plan outlines supply chain priorities at the ministry level, and 71 percent of Guinea's central and regional warehouses report having a strategic plan at the facility level. No referral hospitals report developing a strategic supply plan at this point, though this is a best practice in similar facilities in other countries.

The MOH's strategic planning process involves several best practices, including a stakeholder mapping exercise, biannual updates, and efforts to align supply chain priorities with other national health strategic plans (see Exhibit 17). Also, the MOH and all warehouses report having complementary implementation plans, defined as a detailed listing of activities, costs, expected difficulties, and schedules that are required to achieve supply chain objectives; i.e., an operational plan. The MOH and about half of the Regional Medical Store (RMS) report the existence of a monitoring framework and a formal structure to monitor supply chain performance against these plans.

### Exhibit 17. Key Capabilities and Tasks in Strategic Planning, Implementation Planning, and Monitoring

Capability and task	Percent of facilities reporting:		
	MOH	Warehouse	Ref. Hospital
n =	1	7	3
Presence of an approved supply chain	✓	71%	0%
Stakeholder mapping exercise*	✓	86%	0%
Regular update or new development of plan*	Biannually	Annually (57%)	0%



Presence of a supply chain implementation plan*	✓	100%	33%
Monitoring of supply chain implementation plan	✓	100%	0%
Existence of performance monitoring plan or monitoring framework tracking supply chain performance	X	57%	0%
Formal structure to monitor supply chain performance	✓	57%	0%
Existence of a risk management and mitigation/prevention plan**	X	43%	0%
Supply chain risks formally assessed	X	Annually	0%
Basic, *Intermediate, and **Advanced capabilities			

**Risk management.** Supply chain risks are not formally assessed by the MOH but are reportedly assessed annually at all RMS in Guinea. Interviewed key informants across high-level facilities reported a number of risks experienced in the supply chain; most commonly reported risks were financial, human resources, operational, and political (see Exhibit 18).

Exhibit 18. Top Three Types of Risk Experiences in the Supply Chain			
Risk	Percent of Facilities Reporting:		
	Ref. Hospitals	Warehouses	MOH
Financial	100%	71%	✓
Human resource (e.g., leadership and turnover)	33%	71%	✓
Operational	33%	43%	✓
Technology	0%	43%	
Donor issues	33%	43%	
Environmental	0%	29%	
Political	67%	29%	
Legal	0%	29%	

**Public-private partnerships.** Finally, public-private partnerships are considered an important feature to strategically engage and manage in robust public health supply chain systems. The closest approximation of a “public-private partnership” in Guinea is the relationship between the MOH and the PCG. The PCG, as a parastatal institution, has an agreement with the MOH that defines and delegates tasks related to warehousing and storage, procurement and distribution, quality assurance and pharmacovigilance, as explained by key MOH officials interviewed in the NSCA. The PCG is not a fully autonomous private entity, however, as the leaders (directors) are appointed by presidential decree and therefore fall under GOG supervision and guidance. The NSCA is agnostic as to the form of private-public partnerships, and the current arrangement in Guinea suggests a concerted effort to leverage different relationships to support commercial activities within the public health supply chain. A true assessment of the success of this version of PPP or parastatal arrangement in advancing efficiencies in the supply chain depends first on fully implementing the agreement between the GOG and the PCG.

## Recommendations

As the rest of the report shows, the extent to which this plan successfully directed strategic interventions and activities to improve the Guinean supply chain is not clear. Some technical areas have improved more than others in the last two years, in ways not aligned with the strategic plan’s specification of priorities and timelines. At the same time—and in some ways precisely because of the inaction—the document remains an astute assessment of weaknesses in the system and a roadmap for future improvements.

For strategic planning and management (rather than implementation), this NSCA makes the following recommendations:

- Facilitate biannual revision and updating of the Strategic Plan, wherein progress made is interrogated, assumptions and timelines reconsidered, priorities revised and reordered, and specific roles and responsibilities identified for all actors in the supply chain system.
- Ensure that the monitoring plan and framework for supply chain performance tracking is sufficiently resourced and monitors are empowered to act upon findings.
- Institutionalize the practice of strategic planning at lower levels of the health system—expanding the number of regional warehouses participating and introducing the practice to referral hospitals.
- Formalize the analysis of risk management and mitigation/prevention planning.
- Implement public-private partnership agreements and ensure transparency of action through monitoring and reporting.

### Supplemental Exhibit

**Exhibit 19. SPM: Distribution of Questions and Assignment 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
Referral hospitals (3)	30	1.7%	18	1.7%	9	1.7%	2	2.5%
Warehouses (7)	36	1.4%	13	1.2%	6	2.5%	1	5.0%
MOH (1)	36	1.4%	21	1.4%	10	1.5%	1	5.0%

## 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 onboard 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) chain.

**Exhibit 20. Examples of Scored Policy and Governance Capabilities**

<b>Basic</b>	<p>Existence of a national medicines policy (in Guinea, this is the National Pharmaceutical Policy) that includes objectives for supply chain management</p> <p>Five-year updates of national policies related to supply chain management</p> <p>Existence of national Standard Treatment Guidelines</p> <p>Existence of a process for registering new drugs, products, and technologies</p> <p>Publicly available list of registered drugs and products</p>
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<b>Intermediate</b>	Quarterly meetings by supply chain oversight and governance body to discuss supply chain issues Adaptation of national STGs from universal clinical guidelines
<b>Advanced</b>	Existence of a formal, high-level body that provides oversight and governance for the supply chain
<b>SOA</b>	Civil society is a part of the formal supply chain oversight and governance body

The practice of essential drugs designation was adopted alongside the creation of the primary health care system in 1987. Similarly, the country boasts Standard Treatment Guidelines, developed by PNLP, PNLS, and National Tuberculosis Program (PNLAT) to inform and improve prescriptive medicine throughout the system. The 2016 NSCA confirmed the MOH's use of essential drugs and standard treatment policies; however, it also noted that neither had been regularly updated as recommended by the World Health Organization.

Pharmaceutical law and regulations also exist, along with a policy and strategic plan; however, the 2017 Strategy Plan acknowledged that the implementation and monitoring of existing laws and regulations are lacking. It also noted the absence of training of regulatory personnel as a weakness. The Strategic Plan pointed to the WHO's recommendation to create an autonomous drug regulatory agency as an opportunity for improving the country's policy and governance. Other listed corrective solutions included:

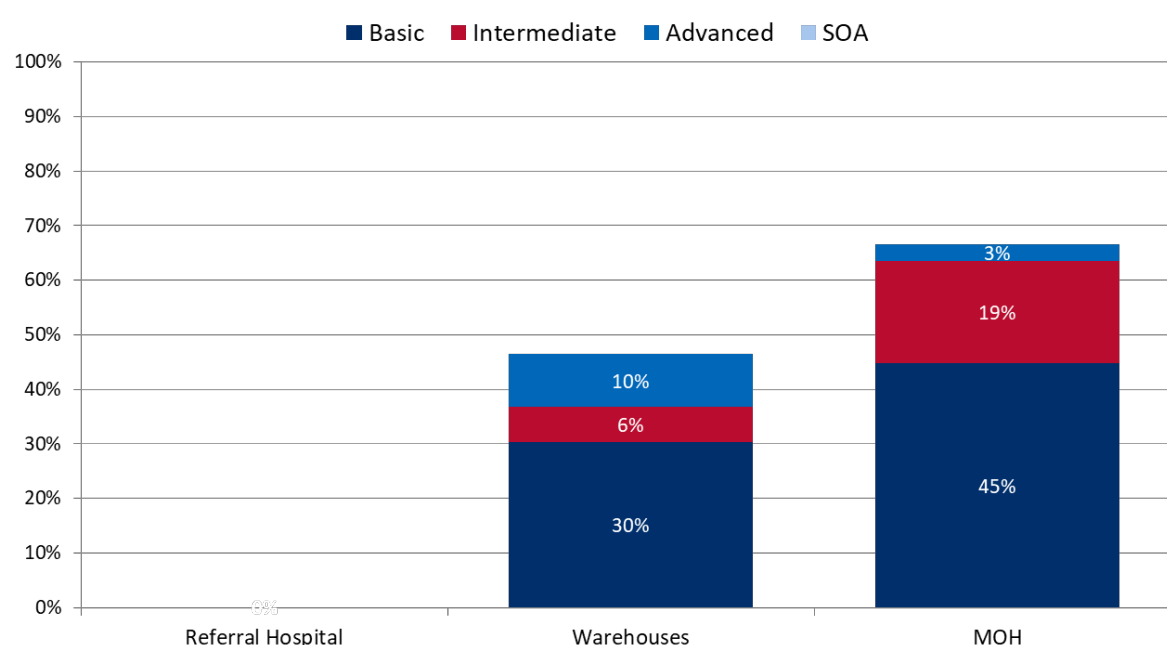
- Evaluate regulatory functions
- Advocate integration of the body of pharmaceutical inspectors into the DNPM
- Promulgate and disseminate pharmaceutical law
- Update STGs and other prescribing aids
- Fund pharmaceutical inspection

Overall, “governance, leadership, and coordination” and “regulation” were identified as two of five cross-cutting functional areas that are critical to an effective supply chain system. In 2017, the Strategic Plan identified the MOH, DNPM, and new LMU as important assets in this functional space, even as it recognized that inconsistent leadership within the MOH was a threat to policy and governance.

## 2019 NSCA Findings

Exhibits 21 and 22 show the NSCA results for Guinea's capabilities and performance in planning and governance of the supply chain system. At the ministry level, nearly all (89 percent) of the NSCA's basic capabilities are in place for planning and governance. Lower levels play a decreasing policy and governance role in Guinea, returning expected lower levels of capabilities. The country's central and regional medical stores reported a capability maturity score of 46 percent, with 66 percent of basic capabilities in place. Meanwhile, in Guinea, referral hospitals do not play the policy and governance role expected by NSCA 2.0 methodology and thus do not have any of the assessed capabilities or processes in place.

## Exhibit 21. Policy and Governance Capability



\*Note: Referral hospitals receive only a handful of questions for policy and governance. This module was implemented at the national hospitals.

## Exhibit 22. Policy and Governance KPIs, Maturity Score, and Basic Capabilities in Place

	Health Centers	Hospitals	Ref. Hospitals	Warehouses	MOH
n =	98	41	3	7	1
Overall maturity score (Range)	--	--	0% (0%–0%)	46% (15%–72%)	66%
Percent of basic items in place (Range)	--	--	0% (0%–0%)	66% (31%–91%)	89%
National STGs exist and are available at the facility site	84%	83%	0%	--	✓

**Policies and guidelines.** The 2019 NSCA again confirms the existence of a national medicines policy and STGs. The latter have been successfully disseminated to much of the country—84 percent of health centers and 83 percent of hospitals could produce physical copies of the STGs on the day of their assessment. Concerningly, however, MOH officials reported that the NEML was updated only every five years and could not say how often, if at all, the STGs were updated.

For supply chain-specific guidelines, the MOH and about half of warehouses could produce policies covering functions, including inventory management, storage, forecasting and quantification, and waste management. Supply chain functions are further monitored by formal governance bodies that provide oversight and governance, meeting quarterly at the central level.

Exhibit 23 summarizes key strengths and gaps in planning and governance capabilities. The process for registering new drugs, products, and technologies jumps out as an area for future improvement. While a process for registering new products exists, it takes over three months on average to complete, and a public list of registered products is not currently available. Overall, the process remains opaque and insufficiently monitored.

## Exhibit 23. Key Capabilities and Gaps in Planning and Governance

	n =	Percent of facilities reporting:	
		MOH	Warehouse
MOH has established a National Pharmaceutical Policy		✓	
Formal body that provides oversight and governance for the supply chain **		✓	100%
Frequency of governance body meetings		Quarterly *	Annually (57%) or less often (43%)
Existence of national STGs		✓	
STGs are adapted from the universal clinical guidelines		✓	
Frequency of revision of national STGs		IDK	
Process for registering new drugs, products, and technologies		✓	
Time it takes to register a new drug on average		More than three months	
Public list of registered products		X	

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 process 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 Guinea. As the above illustrates, the Guinean health system deserves credit for institutionalizing policies, bodies, and processes identified as important by the NSCA; however, equating existence with effective implementation would be a mistake. As other sections of the report show, much evidence suggests that existing capabilities are not effectively translating to good policy and governance execution throughout the country.

## Recommendations

As Guinea has in place many of the basic items for effective planning and governance, recommendations in this space focus on updating and expanding capabilities:

- Update national STGs
- Update the NPP more frequently
- Create an electronically published list of registered drugs
- Ensure that existing policies and guidelines are universally available at lower levels of the system

A broader recommendation is to ensure that existing policies are implemented, regulations monitored, and governance institutions fully authorized to act to correct abuses. To these points, several corrective solutions from 2016 and 2017 remain prescient:

- Create and empower necessary regulatory and inspection bodies
- Fund pharmaceutical inspection activities
- Evaluate regulatory functions

Improving such regulatory and governance implementation will require sustained prioritization and leadership from the MOH.

## Supplemental Exhibit

### Exhibit 24: SPM: Distribution of Questions and Assignment 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

Referral hospitals (3)	9	5.6%	1	30.0%	1	15.0%	1	5.0%
Warehouses (7)	12	4.2%	4	7.5%	2	7.5%	1	5.0%
MOH (1)	19	2.6%	8	3.8%	5	3.0%	1	5.0%

## 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 in a safe and timely manner. The NSCA outlines core human resource 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 25).

### Exhibit 25. Examples of Scored Human Resources Capabilities

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

### The 2017 Strategic Plan: Human Resource assessment, goals, and priority actions

Guinea's 2017 Strategic Plan identified "the development of quality human resources" as a cross-cutting function for effective supply chain systems and, importantly, as one of four strategic axes, or bundles of priority activities, necessary to improve its public health supply chain. The Strategic Plan acknowledged several weaknesses in the existing management of human resources within the system, including:

- Most health centers lacked employees dedicated to inventory management, while staff assigned to perform supply chain tasks rarely had the required skills
- Employees were rarely supervised by managers or the DPS nor inspected by the DNPM
- Existing human resources were insufficiently and poorly distributed throughout the country; much of the skilled labor pool remained concentrated in the capital

The plan explained that key supply chain activities were often considered ancillary tasks by actors at all levels of the health care system. Furthermore, district and central-level authorities were failing to play necessary inspection and oversight roles.

To address this gap, the Plan listed a number of priority actions, including:

- Evaluate supply chain resources skills and making a corrective action plan
- Build human capacity in supply chain functions throughout the system

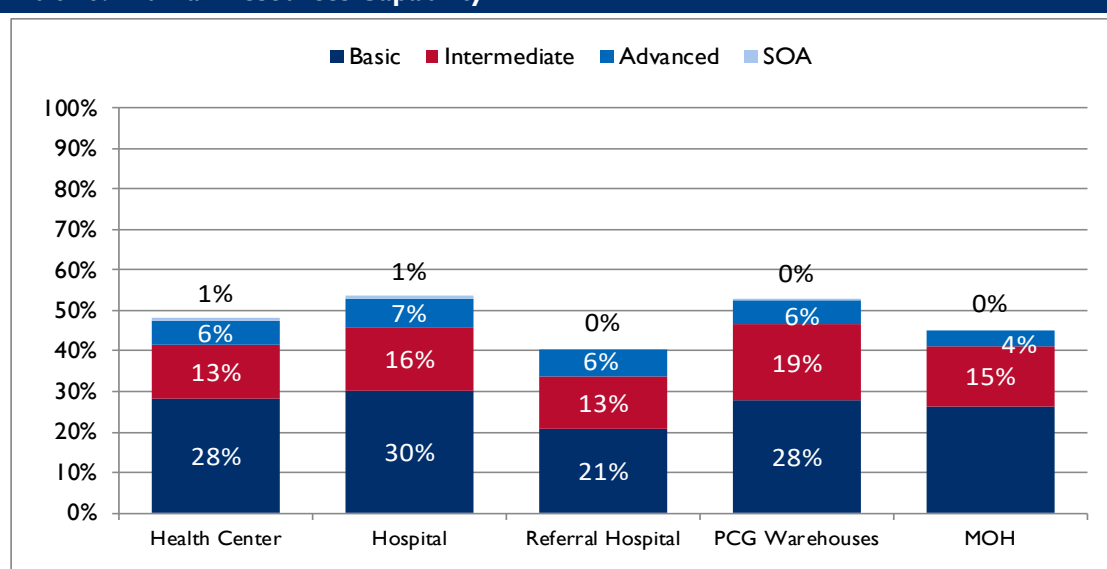
- Operationalize the LMU
- Improve training in public and private universities

Strengthening human resource capacity and performance actions are also interwoven throughout other technical areas of the plan. Designing and disseminating capacity-building trainings to improve awareness and performance in key supply chain activities are mentioned in relation to quality assurance, quantification, waste management, and more.

## 2019 NSCA Findings and Analysis

NSCA 2.0 captures human resource capabilities for the first time. In Guinea, the assessment found that some progress was made in institutionalizing key human resource capabilities throughout the supply chain system, but many of the weaknesses identified in 2017 remain. Exhibits 26 and 27 summarize findings in this technical area.

**Exhibit 26. Human Resources Capability**



**Exhibit 27. Human Resources KPIs, Maturity Score, and Basic Capabilities in Place**

	Health centers	Hospitals	Ref. Hospitals	Warehouses	MOH
n =	98	41	3	7	1
Avg. no. of supply chain positions	4.9	7.0	15.6	7.2	--
Staff turnover ratio	9%	7%	8%	2%	--
Percent of positions vacant	11%	17%	18%	18%	--
Overall maturity score (range)	48% (11%–79%)	54% (23%–84%)	40% (24%–63%)	53% (38%–76%)	45%
Percent of basic items in place (range)	56% (17%–94%)	60% (33%–83%)	42% (29%–63%)	55% (42%–77%)	53%

Human resource maturity scores hovered around 50 percent for all assessed levels of Guinea's health system, with significant variation across sites. Similarly, sites on average reported the presence of about half of queried basic-level capabilities in place.

Dedicated supply chain staff. The presence of dedicated and trained supply chain personnel remains centralized at higher levels within the Guinean system. The warehouses and the Ministry of Health

widely reported that key supply chain functions are included in the job descriptions of staff (see Exhibit 28). Conversely, many important supply chain functions are included inconsistently among the formal job descriptions of staff at hospitals and health centers. For example, only 35 percent of health centers reported that some member of the staff had storage and inventory management formally included in their job responsibilities.

### Exhibit 28. 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:			
	Health Centers	Hospitals	Warehouses	MOH
Warehousing/storage and inventory management	35%	46%	100%	--
LMIS	31%	44%	0%	✓
Ordering and reporting	35%	49%	71%	✓
Waste management	24%	24%	57%	✓
Quality assurance and/or pharmacovigilance	0%	5%	57%	X
Forecasting and quantification			86%	✓
Distribution			100%	✓
Supply planning			57%	✓
Product selection			100%	✓

Despite the 2017 call to evaluate supply chain resource skills and create a corrective action plan, the MOH did not report the presence of a unified supply chain capacity-building plan, and most high-level facilities (referral hospitals, warehouses, and the MOH) reported that a staff recruitment policy is not in place for supply chain personnel.

Capacity training. Most sites reported that key supply chain functions had been covered under capacity-building sessions in the previous year (see Exhibit 29). A plurality of sites reported that minimal members of staff (25 percent or fewer) could attend such sessions.<sup>12</sup> Frequently reported challenges to participation include financial barriers, workload, materials, and the presence of skilled trainers (see Exhibit 29).

### Exhibit 29. Supply Chain Capacity Building Opportunities

Staff reported opportunities in capacity building in the following areas:	Percent of facilities reporting:		
	Health Centers	Hospitals	Warehouses
LMIS	85%	93%	14%
Ordering and reporting	86%	88%	71%
Warehousing/stores and inventory management	81%	71%	86%
Waste management	66%	56%	
Medicine quality assurance	34%	32%	57%
Procurement			71%
Distribution			86%

<sup>12</sup> 43 percent of health centers and 46 percent of hospitals reported that 25 percent or fewer staff attended such trainings, and often explained in the interviews that only the director of the facility attended. About a quarter of assessed service delivery points reported that most or all staff could attend. This question captures only the perception of the key informant, however, which may not be entirely accurate. As a counterpoint, for example, the GHSC-PSM team trained over 700 supply chain staff in 2018 while rolling out the eLMIS, which is hard to reconcile with low reported rates of capacity training.



### Exhibit 30. Critical Barriers to Supply Chain Management Capacity-building Programs

Barrier	Percent of facilities reporting:			
	Health Centers	Hospitals	Warehouses	MOH
Finances	66%	66%	71%	✓
Workload	54%	39%	43%	
Materials	35%	34%	14%	✓
Skilled trainers	14%	17%	29%	✓
Time	11%	5%	0%	✓
Lack of interest	8%	12%	0%	✓
Language	4%	2%	14%	✓

Some sites (21 percent of health centers, 15 percent of hospitals, and 43 percent of warehouses) reported tracking staff participation in such capacity-building sessions using a database (an “advanced” capability). Expanding this practice would facilitate greater targeting of such trainings in the future.

**Supervision.** Finally, some level of supervision capabilities exists throughout the Guinean health system. All regional warehouses reported that staff received supportive supervision in supply chain areas within the last year by the PCG, MOH, or development partners, and most (86 percent) reported that visits result in immediate feedback for the supply chain staff and corrective actions. Fewer but still notable proportions of lower sites also reported supportive supervision visits (44 of health centers and 49 percent of hospitals).

A striking majority of sites reported that staff performance reviews are conducted quarterly, an “advanced” capability in the NSCA assessment.<sup>13</sup> Performance reviews led to performance development plans and, in about half of cases, to the provision of incentives. While a valuable best practice in human resource management, it is concerning that performance reviews are not currently paired with the formal assignation of key supply chain responsibilities to staff at lower levels. That is, staff may be routinely and formally measured against incomplete descriptions of their responsibilities, especially in supply chain management.

### Recommendations

The 2019 NSCA captured some important HR capabilities present in the Guinean supply chain. However, many of the key human resource–related priority actions proposed in 2017 have yet to be fully realized, and remain a prescient list of priority actions in this field, including:

- Establish a competency framework for employees in the supply chain at all levels, including the PCG
- Update and disseminate job descriptions
- Develop a detailed human resource operational plan, including training and annual inspections
- Distribute pharmacists and stock managers across the country, according to the needs of the health districts
- Strengthen the supervisory roles of DRS, DPS, and the LMU

This assessment serves to further underline the importance of key gaps and related recommendations:

- Formalize the inclusion of key supply chain responsibilities in job descriptions throughout the health system

<sup>13</sup> 84 percent of health centers; 59 percent of hospitals; 71 percent of warehouses

- Continue to support capacity-building trainings on supply chain management, with an eye to increasing participation by addressing current barriers, and the further recommendation to track staff participation in trainings
- Consider conducting a supply chain workforce situational analysis to serve as a baseline for future human resource capacity development interventions
- Continue to invest in supportive supervision, especially at lower levels in the system

### Supplemental Exhibit

**Exhibit 31. Human Resources: Distribution of Questions and Assignment 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
Health center (n = 98)	18	2.8%	14	2.1%	7	2.1%	3	1.7%
Hospitals (41)	18	2.8%	14	2.1%	7	2.1%	3	1.7%
Referral hospitals (3)	21	2.4%	17	1.8%	8	1.9%	3	1.7%
Warehouses (7)	23	2.2%	27	1.1%	10	1.5%	6	0.8%
MOH (1)	16	3.1%	24	1.3%	9	1.7%	6	0.8%

## 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 being self-sufficient, the intent of the module is to understand how facilities manage the funds they receive.

**Exhibit 32. Examples of Scored Financial Sustainability Capabilities**

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

**SOA**

Government **or** facility revenue/costs contribute **all** of supply chain operations budget/health commodities (100 percent)

In the 2017 Strategic Plan, financing was identified as one of five cross-cutting functions that support an effective supply chain. The Plan's analysis of the state of supply chain financing pointed to the existence of a budget line in the National Development Budget (BND) for the acquisition of medicines, the cost recovery system, and the commitment of technical and financial partners as strengths. It simultaneously acknowledged numerous weaknesses, including insufficient funding of the BND budget line; insufficient coordination of funding provided by partners, leading to duplication, waste, and redundancies; inability of PCG warehouses to fully recuperate activity costs through activities; insufficient capacity within the PCG to procure authorized drugs; and ultimately, financial barriers for patients in purchasing health care and products. Also, broader threats to the supply chain included the overall poor economic situation of the country and dependency upon donors.

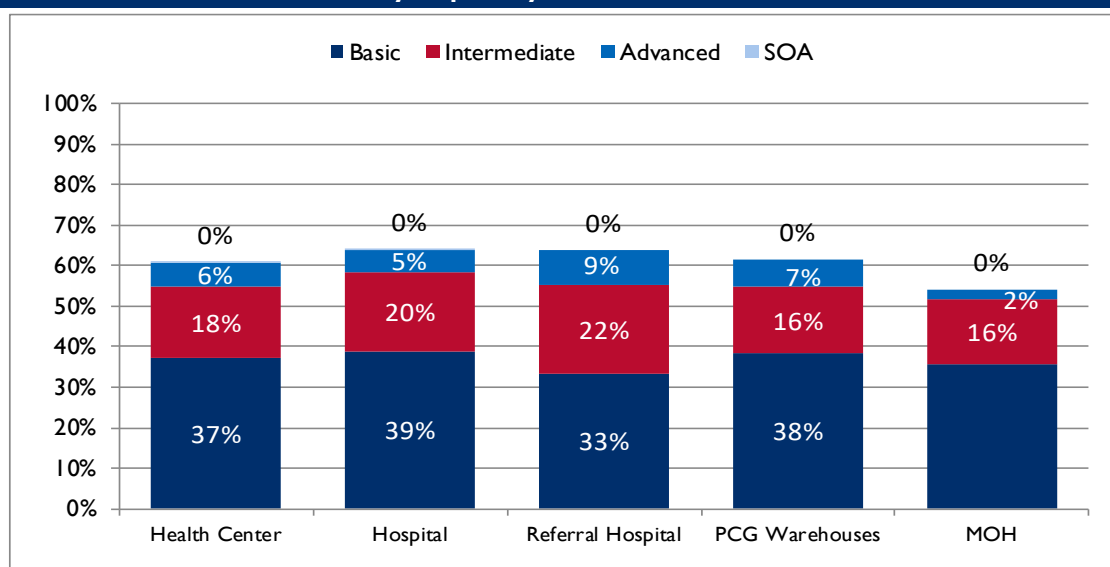
The Strategic Plan outlined several corrective solutions, including:

- Increase the share of the national budget for the purchase of health commodities
- Designate supply chain budget costs at all levels and increase the percentage of the budget so designated
- Address historic financial liabilities with the PCG by providing the PCG procurement unit with sufficient working capability while monitoring financial indicators for sustainability

## 2019 NSCA Findings

Financial sustainability results for maturity model scores and the percentage of facilities reporting key capabilities are displayed in Exhibits 33 and 34. Generally, all facility types scored relatively well, although we need to reiterate that the capabilities measured in this assessment are those that support financial management and understanding of operating costs. It is not, again, a measure of self-sufficiency of the entity itself. The high percentages of facilities across all levels of the public health system that reported budget shortfalls for health commodities suggest that financial sufficiency has yet to be achieved.

**Exhibit 33. Financial Sustainability Capability**



**Exhibit 34. Financial Sustainability KPIs, Maturity Score, and Basic Capabilities in Place**

	Health centers	Hospitals	Ref. Hospitals	Warehouses	MOH
n =	98	41	3	7	1
Overall maturity score (range)	61% (30%–80%)	64% (32%–91%)	64% (52%–78%)	61% (24%–82%)	54%
Percent of basic items in place (range)	74% (29%–100%)	78% (48%–100%)	67% (43%–100%)	77% (29%–100%)	71%
Percentage of facilities that had a budget shortfall for health commodities	66%	37%	67%	57%	Yes
Supply chain costs (e.g., products, warehousing, distribution, personnel) are recorded and records maintained (basic)	64%	68%	33%	86%	No
Percentage of facilities that have a funding strategy explicitly including supply chain costs (“B”)	56%	24%	0%	71%	Yes
Percentage of facilities reporting that government <b>or</b> facility revenue accounts for most or all of supply chain operations budget (“I”/“SOA”)	43%	42%	67%	43%	No

As Exhibit 34 conveys, many sites reported that supply chain costs (e.g., products, warehousing, distribution, personnel) were recorded and records maintained, but fewer reported that funding strategies explicitly included supply chain costs. Most facilities reported that the government contributed some funding for supply chain operations (see Exhibit 35). Untangling the exact percentage is not possible in this assessment, as the NSCA questions to this end jointly ask about the proportion of contributions that come from government funds **or** facility revenues (see Exhibit 35). That said, a minority of health centers and hospitals reported that either government funds **or** facility revenues accounted for most of the supply chain budget or the purchase of health commodities. A large percentage of facilities reported that donor or implementing partners and facility revenue or cost recovery were important sources of funding for supply chain operations.

#### Exhibit 35. Sources of Funding for Supply Chain Operations

Funding source	Percent of facilities reporting:				
	Health Centers	Hospitals	Referral Hospitals	Warehouses	MOH
Government budget	57%	100%	100%	71%	Yes
Donor/implementing partners	64%	66%	33%	86%	100%
Facility revenue/cost recovery	83%	88%	100%	57%	0%
Other	1%	0%	0%	14%	0%

Exhibit 36 outlines several financial best practice capabilities included in the NSCA that are not specific to supply chain operations but that contributed meaningfully to sustainable financial management. At a minimum, most sites prepare budgets annually, and many reportedly include lines for miscellaneous funds (an “intermediate” capability). Some reported that processes were in place for submitting unbudgeted requests (including most warehouses) and that funding could be reallocated by the facility’s management.

### Exhibit 36. Financial Sustainability Key Capabilities in Place

	Health centers	Hospitals	Ref. hospitals	Warehouses	MOH
n =	98	41	3	7	1
Budgets are prepared annually (basic)	78%	88%	67%	57%	Yes
Process exists for submitting unbudgeted requests (basic)	44%	49%	33%	71%	No
Budget includes lines for miscellaneous funds (int)	85%	51%	100%	57%	No
Funding can be reallocated at the management level (adv)	39%	51%	67%	57%	No

Despite progress, the underlying threats to financial sustainability identified in the 2017 Strategic Plan remain. The country still suffers from a poor economy and dependency on donors, which impact financial performance in supply chain management.

### Recommendations

- *Supply chain budget lines.* Clarify budget line items for supply chain functions to ensure that sufficient resources are allocated and to enable better tracking of costs and performance.
- *Capacity training and guidance.* Train lower levels to consistently implement best practices in financial management and record keeping and provide budgetary guidance on supply chain functions specifically.
- *Address shortfalls.* At the strategic level, address shortfalls in health commodity funding needs.

### Supplemental Exhibit

#### Exhibit 37: Financial Sustainability: 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
Health center (n=98)	7	7.1%	11	2.7%	6	2.5%	4	1.3%
Hospitals (41)	7	7.1%	11	2.7%	7	2.1%	4	1.3%
Referral Hospitals (3)	14	3.6%	11	2.7%	7	2.1%	4	1.3%
Warehouses (7)	14	3.6%	11	2.7%	7	2.1%	4	1.3%
MOH (1)	7	7.1%	12	2.5%	7	2.1%	4	1.3%

## Forecasting and Supply Planning

The forecasting and supply planning (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 38).

### Exhibit 38. Examples of Scored Forecasting and Supply Planning Capabilities

<b>Basic</b>	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
<b>Intermediate</b>	Data assumptions documented as part of the supply plan Data quality assessed for consumption data before use in forecasting
<b>Advanced</b>	Performance standards or benchmarks against which forecast accuracy is assessed Forecasting SOPs updated annually or more often
<b>SOA</b>	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

## 2017 Strategic Plan and 2016 NSCA

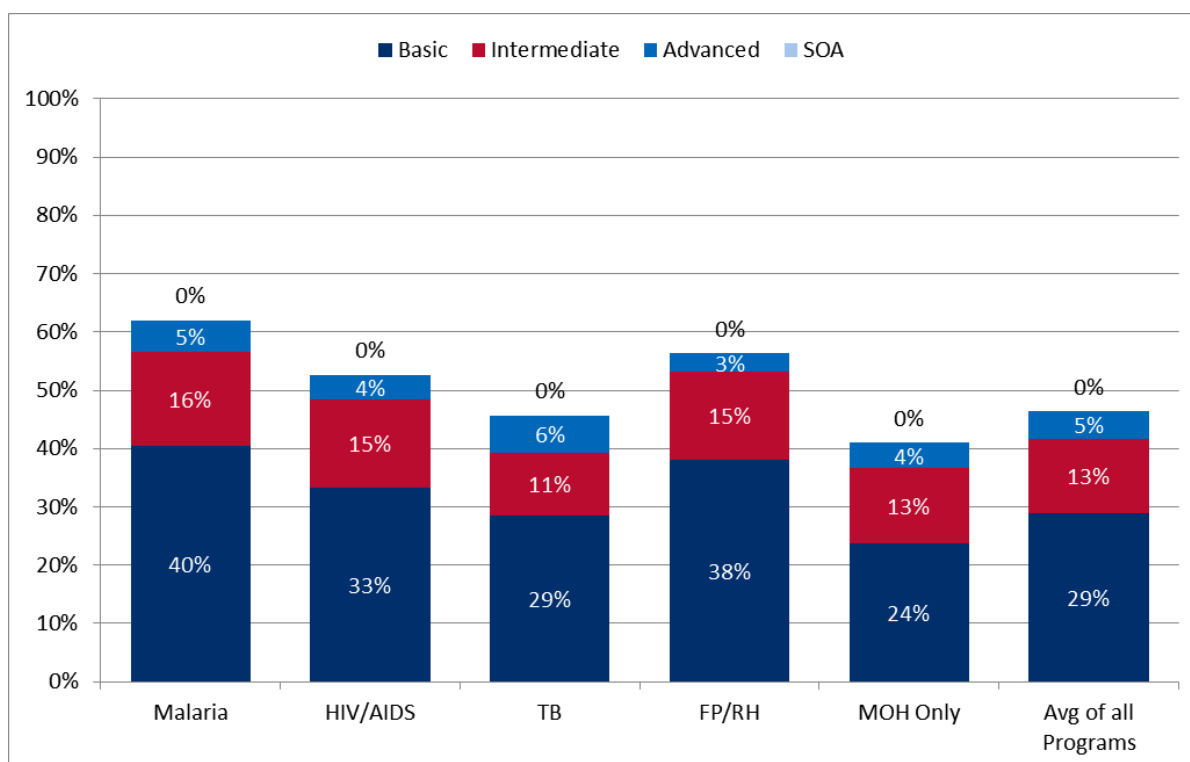
The 2016 NSCA found that forecasting was not being conducted in a systematic and coordinated way. Vertical disease programs were using varied sources of data and varied methodologies to arrive at their forecasted commodity needs. The 2017 Strategic Plan subsequently recommended that with the establishment of the LMU within the DNPM, this new unit should coordinate and oversee all FASP processes that support MOH health programs. It also recommended that this new unit contain strengthened FASP capabilities to lead and oversee this function for programs across the government. Also, the Strategic Plan included activities to “operationalize the national quantification committee,” “institutionalize quarterly quantification subcommittees for all programs, including the data improvement task,” and “develop the integrated manual of procedures for quantification.”

## 2019 NSCA Findings

Reviewing forecasting and supply planning practices across all applicable entities within MOH, we find that FASP remains predominately financially supported by donors, with every major program identifying donor support as key to executing the function. Vertical programs lead forecasting process for malaria, HIV/AIDs, and TB while the MOH leads for FP/RH. Exhibit 39 details the CMM scores for each vertical program assessed, while Exhibit 40 compares and contrasts the various processes and data sources used in the forecasting process. The 2017 recommendation of consolidating and standardizing the forecasting process under the LMU has not happened yet. This is apparent when reviewing the disparities in Exhibit 41.

Looking at the CMM scores for each vertical program, we see that no program has reached the optimal benchmark of 80 percent. The malaria program has the highest score of any program assessed. This high score translates into the most accurate forecast for 2018 as well. Exhibit 39 details forecast accuracy and supply plan accuracy for selected tracer commodities from the vertical disease programs, MOH/DNPM, and the PCG. While each commodity has its own unique demand profile, challenges in accurately forecasting, and unique limitations, we believe that some standardization and oversight from the DNPM through the LMU could help improve forecasting and supply planning across the board.

### Exhibit 39. Forecasting and Supply Planning CMM Scores for Vertical Disease Programs



**Exhibit 40. Forecasting Processes Employed Across the MOH**

	Central-Level Vertical Programs			
	Malaria	HIV/AIDS	TB	FP/RH (MOH)
Leader of forecasting process	Vertical program	Vertical program	Vertical program	MOH
Time horizon of forecasts developed	Three years or more	One year or less	One year or less	Three years or more
Methodologies used during forecasting	Morbidity-based Consumption-based Demographic projections Service statistics	Morbidity-based Consumption-based Demographic projections	Morbidity-based Consumption-based	Morbidity-based Consumption-based Demographic projections
Forecasts used to mobilize funding/ inform health commodity procurement	✓✓	✓✓	✓✓	✓✓
FASP SOPs are available	X	X	X	X
Forecast accuracy is assessed annually	X	X	✓	X
Supply planning for commodity procurement	✓	✓	✓	✓
Potential supply interruptions/delays are communicated to facilities	✓	X	✓	X
Entity responsible for funding FASP activities	Donors	Donors	Donors and MOH (25–50%)	Donors
CMM score earned for FASP	62%	53%	46%	56%
Percent of basic items in place	81%	57%	57%	76%

**Exhibit 41. Forecast Accuracy and Supply Plan Accuracy for Selected Commodities**

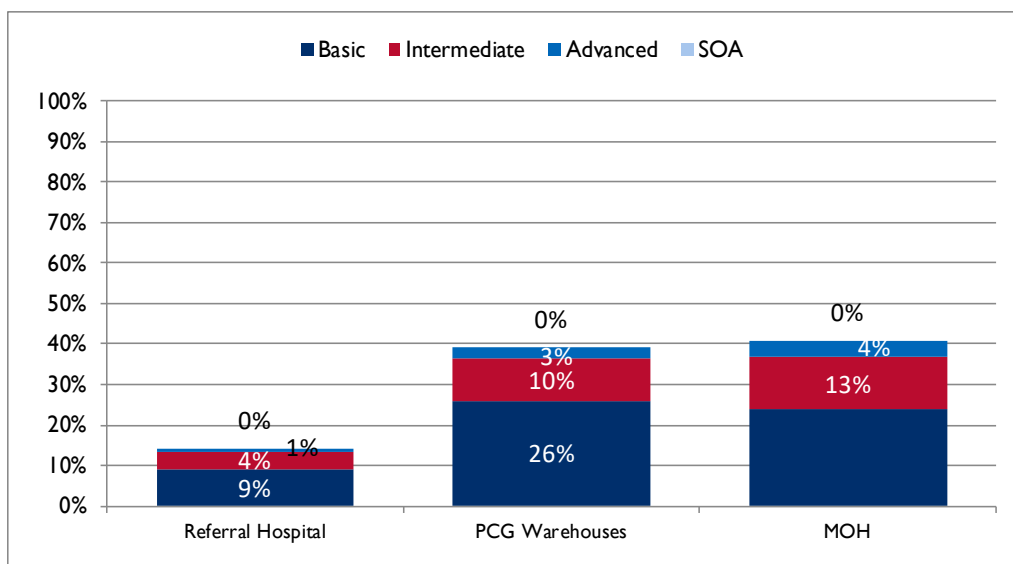
Commodity	Program Responsible	Forecast Accuracy	Supply Plan Accuracy
TB: rifampicin-isoniazid (RH)	PNLAT	48%	100%
TB: RHZE	PNLAT	-3%	-800%
Artemether/lumefantrine 6x1	PNLP	80%	--
Malaria rapid diagnostic test	PNLP	94%	--
Determine HIV rapid test kit	PNLSH	--	100%
Zidovudine/lamivudine/nevirapine	PNLSH	--	100%
Combined oral contraceptives	FP/RH (MOH)	-86%	--
Two-rod implant	FP/RH (MOH)	-4%	--
Oxytocin (10ui/ml) inj.	MNCH (MOH)	-119%	--
Magnesium sulfate (50%) solution	MNCH (MOH)	23%	--
Amoxicillin 500 mg tablet	MNCH (MOH)	32%	--
Amoxicillin 500 mg tablet	PCG	-787%	--
Paracetamol, 500 mg tablet	PCG	-383%	--
Ketamine, 10 ml vial	PCG	-471%	100%
Ringer's lactate, infusion bottle 500ml	PCG	2%	--
Sodium chloride solution (0.9%), 500ml	PCG	-240%	--
Ceftriaxone, 1g vial powder	PCG	92%	100%

The team also assessed forecasting and supply planning practices at national hospitals and PCG warehouses. In NSCA 2.0 methodology, referral hospitals are expected to engage in FASP activities as presumably the most advanced service delivery facility type in the health system. This assessment found that FASP activities within these sites are only at the most nascent stages. National hospitals were found to have only 18 percent of basic items in place and received an overall CMM score of just 14 percent. As the health system continues to mature and FASP is institutionalized at the MOH level, additional support should be given to these facilities to help standardize their practices as well. For example, only one of the three national hospitals assessed has received any formal training or has FASP as a part of a staff member's official job description.

At PCG warehouses, we see also lower-level capabilities as evidenced by the 39 percent maturity score. This is explained by many of the basic processes being absent. Only 43 percent of warehouses use Excel as a means of forecasting with no warehouses using specialized software such as PipeLine. Forecasts are created only for one year at a time in 86 percent of PCG warehouses and only 29 percent of warehouses document methodology, data sources, and assumptions for the most recent forecast. Encouragingly, 71 percent of warehouses have received formal FASP training, and 86 percent of PCG warehouses have FASP as formal duties in job descriptions. Some points were not awarded to PCG facilities for lack of inclusion of other stakeholders in the forecasting process, although this is understandable, considering that that GOG is not fully leveraging its relationship with the PCG. The maturity of FASP processes and the quality of performance of the FASP function within the PCG system could be highly enhanced by a coordinated effort by the DNPM through the LMU to bring the PCG to the table for all national forecasting exercises.

**Exhibit 42a. Forecasting Processes Employed Across the MOH**





**Exhibit 42b. Forecasting and Supply Planning KPIs, Maturity Score, and Basic Capabilities in Place**

	Ref. Hospitals	PCG Warehouses	MOH
n =	3	7	1
Overall maturity score (range)	14% (0%–24%)	39% (24%–55%)	41%
Percent of basic items in place (range)	18% (0%–27%)	52% (40%–65%)	48%

## Recommendations

The key recommendations of 2017 have not materialized. Therefore, this assessment will make similar suggestions, as the symptoms of not having those items in place continue to manifest today. To improve on current forecasting and supply planning, the GOG should:

- Empower the DNPM to have full authority over all forecasting and supply planning processes within the Ministry of Health to standardize the process and bring all stakeholders to the table (vertical programs, the PCG, MOH officials, development partners, etc.) for effective and accurate quantification and planning
- Follow through on the recommendation from 2017 to create an integrated manual for forecasting to bring consistency and transparency to the forecasting process for all programs and stakeholders
- Institute a performance monitoring framework for all vertical programs to consistently monitor FASP performance, and use this information to adjust forecasts as appropriate

## Procurement and Customs Clearance

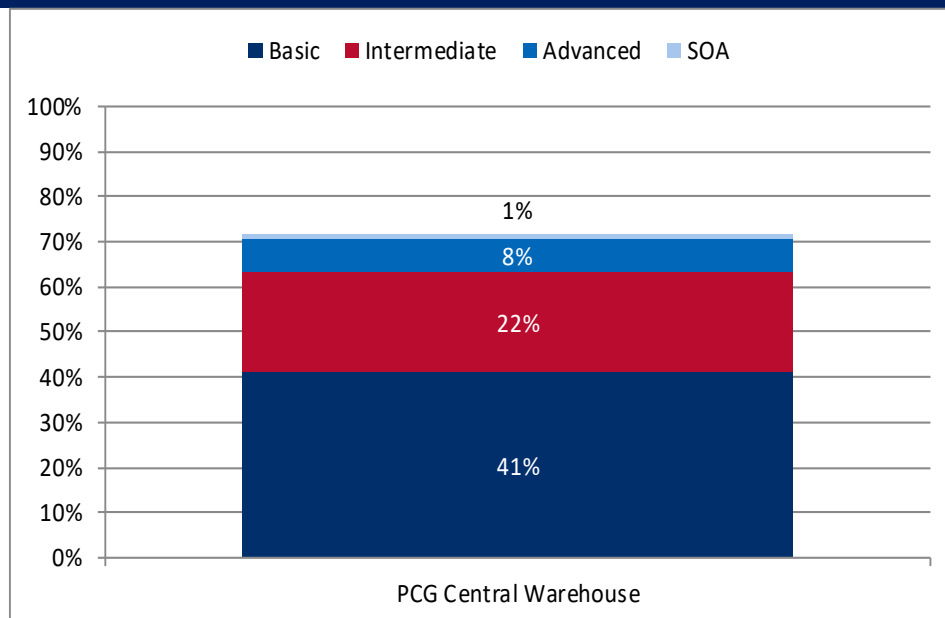
The procurement and customs clearance section seeks to determine that procurements are done transparently and in accordance with best practices. Exhibits 43 and 44 show procurement and customs clearance results. Major areas that were factored into the scoring for this CMM module are transparent, auditable procurement systems governed by policies and procedures, active management of vendor performance, and well-functioning customs clearance processes. This module was designed with public-sector procurement systems in mind.

### Special Note

Obtaining information about government-led procurement proved challenging. During key informant interviews with the PCG, it was acknowledged that despite the presence of a memorandum of understanding (MOU) signed with the Government of Guinea, designating the PCG as the sole procurer of medicines for the GOG's public health programs, the PCG has yet to purchase a single commodity with funding from the government. However, the PCG is still held responsible for storing all products procured by the government, which are procured without any coordinated forecasting and supply planning strategy. This poses serious challenges for the PCG to remain financially stable—if it does not have clients for whom to purchase, store, and distribute, generating enough revenue year on year can be challenging. The authors of this report are aware that the GOG purchases bundled commodities in what are known as health kits but their contents, degree of planning, and methods for forecasting are unknown. Therefore, this section will review only procurement capabilities and performance of the PCG and not the government itself.

### PCG Central Warehouse

**Exhibit 43. CMM Scores for PCG Central for Procurement and Customs Clearance**



Looking at the PCG, the procurement and customs clearance shows encouraging signs. Overall, the score for PCG Central was 72 percent, which is close to the optimal 80 percent benchmark. Internal controls are in place for procurement, such as value thresholds, formally enforced order and approval protocols, a Procurement and Adjudication committee, and a clear separation of roles in the procurement process. The procurement system is subject to external audits annually or more often (an advanced capability). Audits were recommended in the 2016 NSCA and subsequently implemented

in the intervening years. Looking at the tender process, all tenders have terms and conditions, formal processes are in place to maintain vendors' proprietary information as confidential, and a formal, documented procurement appeals process is in place.

The facility was assessed to have 83 percent of all basic items in place. The missing basic items were:

- Ensuring a standard frequency for updating procurement guidelines, manuals, or procedures (e.g., SOPs)
- Not including review/use of medical and laboratory supplies list during sourcing and procurement
- Having less than 50 percent of procurements requiring vendor competition for tenders

Also, PCG Central had 73 percent of intermediate items in place. Some of the intermediate items missing were:

- No active monitoring of KPIs related to procurement performance
- No active contract management in their internal procurement systems
- Lack of a procurement website that is accessible to external stakeholders
- Lack of an approved formal contract for outsourced customs clearance services
- Value for money is not part of the formal vendor performance assessment

## Pricing Data Performance

Although the PCG does not procure commodities on behalf of the government, they do procure essential medicines that are then distributed throughout the country in a cost-recovery model. These essential medicine procurements represent one of the most effective revenue-generating strategy that the PCG can implement at this time. Looking at pricing data, we find that the PCG is successfully managing to secure prices well below the international reference price, ensuring that the medicines it uses to generate cost-recovery funds are competitively priced. Exhibit 44 shows the average percent of international reference price paid for four essential medicines.

### Exhibit 44. Percentage of International Reference Price Paid

Average value for four commodities of percentage of international reference price paid

Commodities include amoxicillin 500 mg tablet, Ringer's lactate 500 ml infusion bottle, ceftriaxone 1 g powder vial, paracetamol 500 mg tablet

59%

## Recommendations

- The PCG is a competent and capable procurement entity. The GOG should be fully leveraging its MOU to allow transparent, auditable procurement processes to be conducted for GOG-funded procurements of commodities.
- The PCG should develop a standard timeline for updating all procurement-related guidelines and SOPs and adhere to those revision schedules.
- The PCG should implement a monitoring system for a set of KPIs to ensure all areas of its procurement are performing well.

## Warehousing and Storage

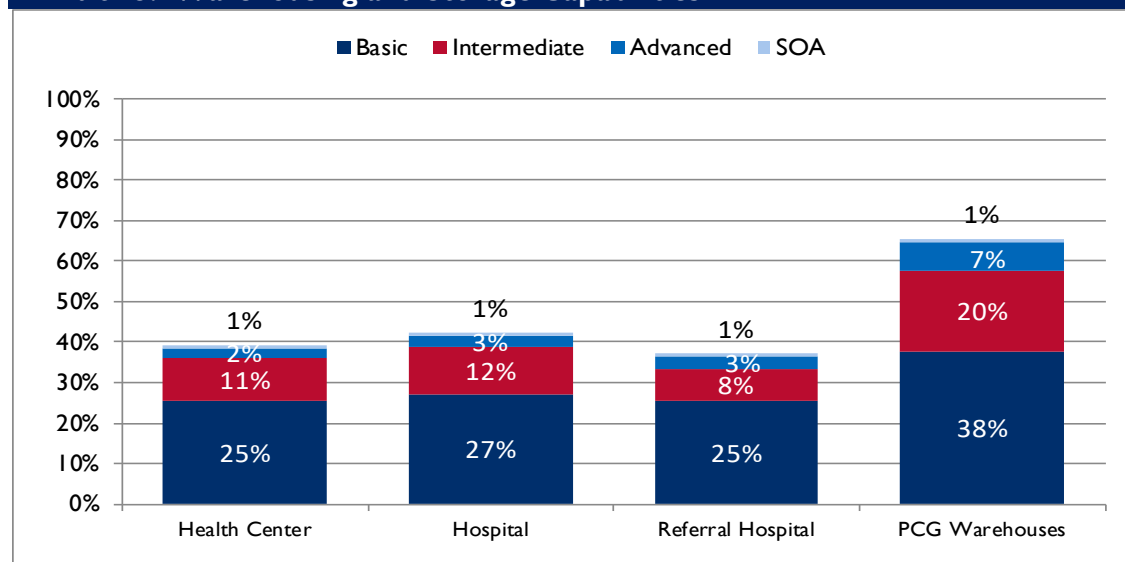
The warehousing and storage module of the NSCA examines whether pharmaceuticals are stored using the most appropriate method to ensure their quality for patient use. Exhibit 45 shows warehousing and storage results. Items of note that have a significant influence on the score of this module are existence of, and adherence to, SOPs for storage and inventory management, adequate physical infrastructure and safety equipment for storage of commodities, and appropriate security and accountability mechanisms in place.

The 2016 NSCA and the 2017 Strategic Plan identified that storage space and equipment within all PCG warehouses were insufficient. Also, cold chain equipment and stable power sources for the PCG and health centers were lacking. Warehouses were cluttered with outdated or damaged products, and overall infrastructure was lacking. The plan identified key corrective actions that should be implemented to address these deficiencies, including improving the central PCG storage situation, providing sites with cold chain infrastructure, strengthening the storage space and equipment of health centers and hospitals, and clearing out all outdated and unusable products and equipment.

### 2019 NSCA Findings

Overall, warehousing and storage capabilities continue to be well below optimal levels. Exhibit 45 details the CMM scores for warehousing, by facility type. Generally, capability scores trend downwards from the regional level to the last-mile facilities. With a CMM score of 66 percent, PCG warehouses have the strongest performance but still fall short of the optimal benchmark of 80 percent. The specific results are detailed in four sections: storage practices, stock card use practices, storage conditions, and stock availability.

**Exhibit 45. Warehousing and Storage Capabilities**



### Storage Practices

Looking at storage practices, we find that many facilities in Guinea were without SOPs on hand for warehousing and storage. Only 38 percent of health centers, 56 percent of hospitals, and zero percent of national hospitals nationwide had SOPs available the day of the visit. Encouragingly, 71 percent of PCG warehouses visited did have them available. The Integrated Logistics SOP Manual (2016) has

sections dedicated to warehousing and storage,<sup>14</sup> and more than 1,500 copies were distributed throughout the country in 2018. Understanding whether these copies were subsequently lost or whether facilities are simply not unaware of—and thus not using—their value as SOPs for warehousing and storage bears on what next steps should be taken.

Nonetheless, adherence to the basic practices critical to supply chain function is strong. For example, 98 percent of health centers, 100 percent of hospitals, and 100 percent of national hospitals nationwide maintain proof of delivery (POD) records. Also, 100 percent of health centers and 95 percent of hospitals adhere to the First-in, First-Expiry principle for organizing and dispensing stock. Encouragingly, 91 percent of health centers also have minimum and maximum stock values for their products, and 77 percent use these thresholds to inform their ordering. A total 94 percent of health centers report considering buffer stock in their inventory management system. Also, 82 percent of health centers had assigned locations for all products on the shelves, and this was physically verified. This indicates that while SOPs may be missing or unused, many of the basic operating principles are adhered to.

Still, other basic best practices are not widely followed in Guinea. Only 9 percent of health centers maintain storeroom temperature logs, and only 38 percent have a log to track issues of controlled substances. Also, 29 percent of health centers report no audits of any kind (internal or external). The need is evident to ensure that all service delivery points are provided with updated and accurate SOPs to ensure that they are aware of what procedures are required and how to comply with them.

#### Stock Card Use Practices

The assessment found that facilities existed on a polarized spectrum for stock card practices. During the CMM interview, 100 percent of health centers surveyed claimed to be using stock cards to manage products. However, upon inspection, facilities were either well organized with consistently, accurately filled stock cards or facilities had such poor historical stock data that their information could not be included in the analysis. This indicates an inconsistency in the level of support facilities are receiving, which is consistent with 29 percent of health centers receiving no form of audit as mentioned above.

#### Storage Conditions

The assessment found that some of the basic requirements for optimal storage conditions were in place throughout the country, but many were still lacking. Looking at health centers, we see that 87 percent had permanent and leak-free roofing, 86 percent had smooth and nonporous flooring, and 94 percent had appropriate shelving for commodities. At the same time, only 40 percent had adequate ventilation, and 27 percent had a detected quarantine area for products. It is these large proportions of facilities nationwide missing basic requirements of storage conditions that has had a large impact on the low maturity scores for service delivery points. Also, many facilities continue to have minimal equipment for executing their daily functions. For example, only 35 percent of health centers have fire extinguishers, and only 11 percent have handcarts to move commodities and equipment. A key improvement to note is the increased presence of free-standing fridges in many facilities. This is a basic component of the cold chain that helps ensure temperature-sensitive commodities are stored appropriately and was noted to be lacking significantly in 2016.

### Exhibit 46. Warehousing and Storage KPIs, Maturity Score, and Basic Capabilities in Place

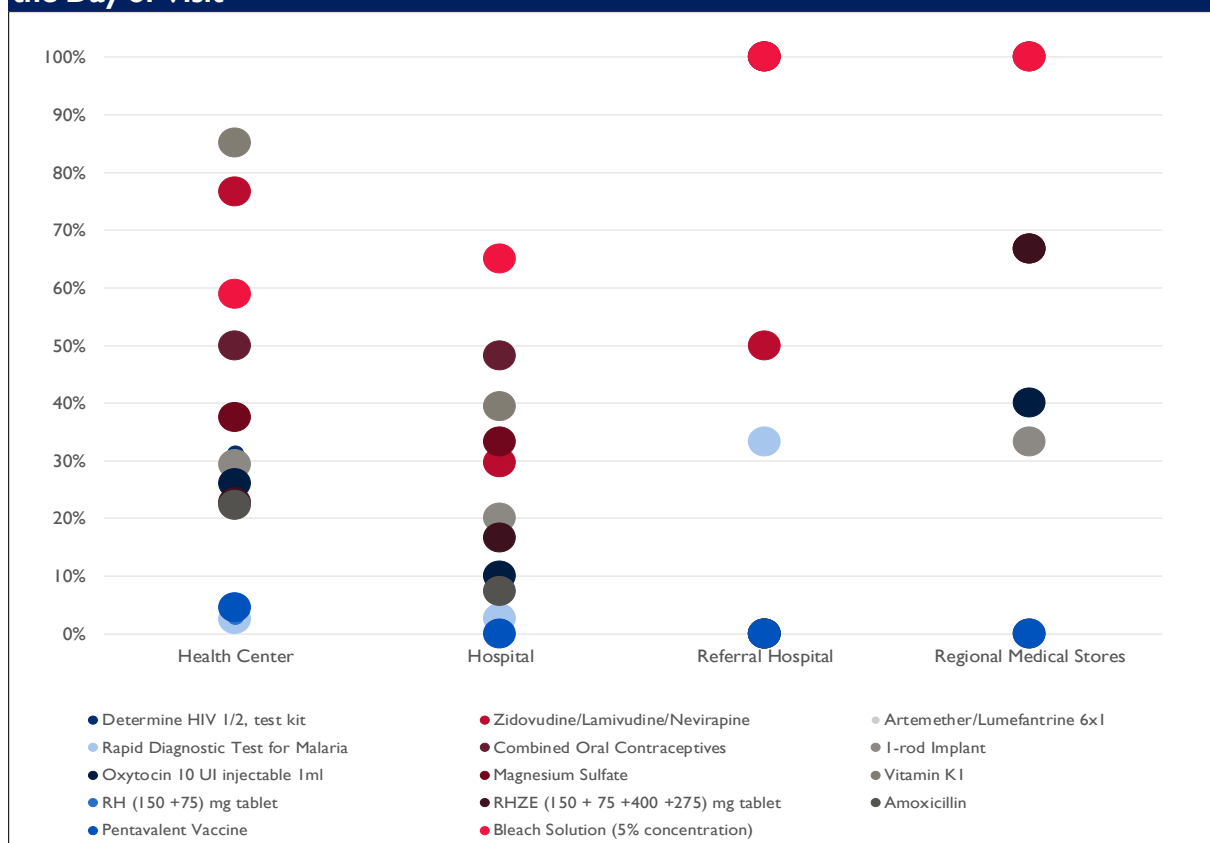
Health Centers	Hospitals	National Hospitals	Warehouses
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<sup>14</sup> For example, pages 24–28 provide the rules for inventory management at all levels, specifying what min/max levels are. Page 49 provides instructions about maintaining adequate storage conditions. Page 100 lists a set of best storage practices recommended for all health facilities.

	n =	98	41	3	7
Overall maturity score (range)		39%	42%	38%	66%
Percent of basic items in place (range)		51%	54%	51%	75%
Percent of facilities with electrical lighting installed		55%	83%	100%	100%
Percent of facilities with designated area for storage of hazardous substances		14%	29%	0%	57%
Percent of facilities with free-standing refrigerator		93%	85%	100%	86%
Percent of facilities using min/max process for calculating reordering quantities		77%	71%	0%	71%

## Stock Availability

**Exhibit 47. Percentage of Facilities That Were Stocked Out of a Tracer Commodity on the Day of Visit**



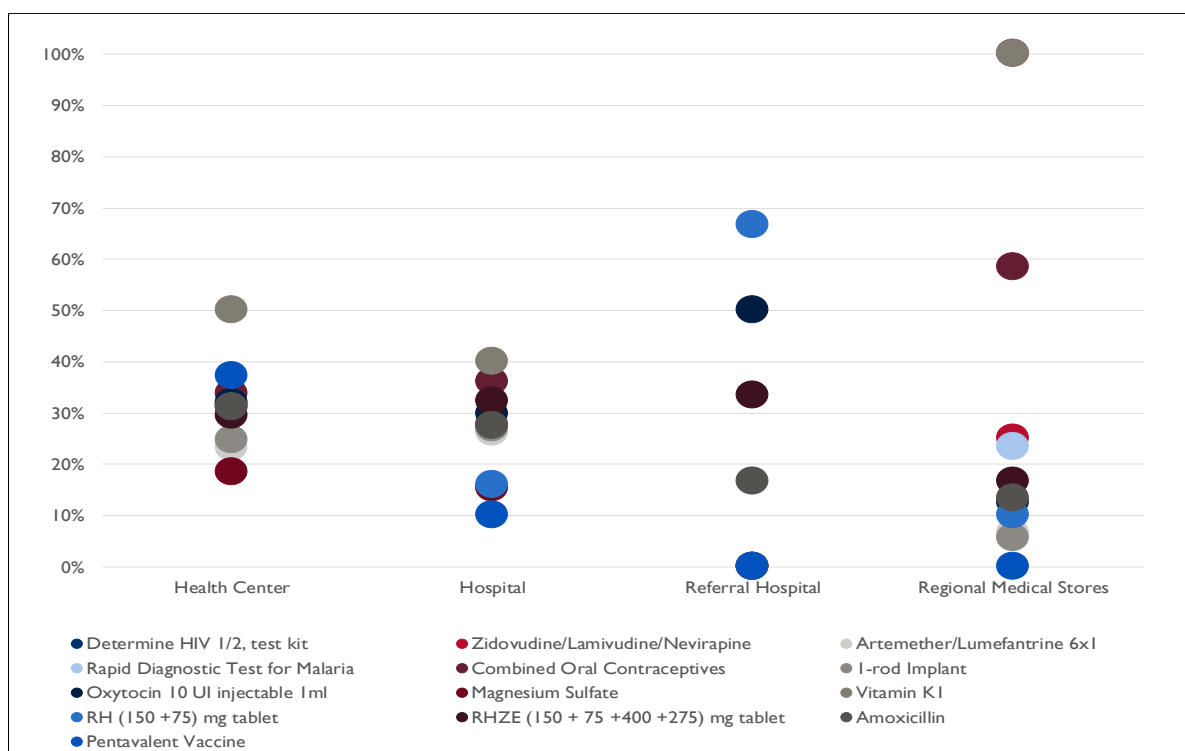
The stock availability situation in Guinea paints a concerning picture of access to medicines for patients. On the day of the assessment, many important commodities were stocked out. The average stock-out rate across the 14 tracer commodities was 34 percent at health centers, 23 percent at hospitals, and 32 percent at national hospitals. For health centers, this ranged from 3 percent for the TB-drug RH to as high as 85 percent for vitamin K1 injectable. Also, the central warehouse had a 20 percent stock-out rate of applicable tracer commodities on the day of the visit. Exhibit 48 displays the stock-out rates on the day of the assessment, by facility type, by tracer commodity.

**Exhibit 48. Percentage of Facilities With Stock-out on Day of Assessment**

	Health Centers	Hospitals	National Hospitals	Regional Depots	PCG
Number of observations	98	41	3	7	1
Determine rapid test kits (RTKs)	31%	21%	33%	0%	0%
Zidovudine/lamivudine/nevirapine (pediatric formulation)	77%	30%	50%	67%	100%
AL 6x1	26%	17%	33%	0%	0%
Rapid diagnostic test for malaria (mRDT)	2%	3%	33%	0%	0%
Combined oral contraceptives	50%	48%	100%	67%	0%
Two-rod implant	29%	20%	0%	33%	0%
Oxytocin injectable	26%	10%	0%	40%	0%
Magnesium sulfate solution 50%)	38%	33%	100%	100%	
Vitamin K1 injectable	85%	39%	0%	100%	
RH	3%	17%	0%	0%	0%
RHZE	23%	17%	0%	67%	0%
Amoxicillin	22%	7%	0%	0%	100%
Pentavalent vaccine	5%	0%	0%		
Bleach solution (5%)	59%	65%	100%	100%	
<b>Average</b>	<b>34%</b>	<b>23%</b>	<b>32%</b>	<b>44%</b>	<b>20%</b>

While these stock-out rates are concerning, they must be viewed in the broader context of how commodities are received. When asked what the major challenges facing health centers are (in to warehousing and storage), 70 percent of health centers and 78 percent of hospitals cited late deliveries, while 63 percent of health centers and hospitals also cited partial deliveries. Furthermore, only 32 percent of health centers reported receiving a distribution schedule in advance. Systemic issues in commodity distribution may be having an impact on stock availability at the last mile. This issue is also discussed in the distribution section. Considering the uncertainty of timing and quantity of the deliveries received, we can see that stocked according to plan rates are also performing poorly. Exhibits 49 and 50 show the stocked according to plan rates from December 2018 to May 2019.

**Exhibit 49. Stocked According to Plan by Facility Type and Tracer Product From December 2018 to May 2019**



**Exhibit 50. Stocked According to Plan by Facility Type and Tracer Product From December 2018 to May 2019**

	Health Centers	Hospitals	National Hospitals	Regional Depots	PCG
Number of facilities	98	41	3	7	1
Determine RTK	34%	31%	--	11%	0%
Zidovudine/lamivudine/ nevirapine (pediatric formulation)	32%	28%	0%	25%	
AL 6x1	23%	26%	17%	7%	0%
Malaria rapid diagnostic test	31%	15%	67%	23%	0%
Combined oral contraceptives	34%	36%	--	58%	0%
Two-rod implant	25%	27%	--	6%	40%
Oxytocin injectable	32%	30%	50%	13%	0%
Magnesium sulfate solution (50%)	18%	15%	--	100%	--
Vitamin K1 injectable	50%	40%	--	100%	--
RH	31%	16%	67%	10%	100%
RHZE	29%	32%	33%	17%	100%
Amoxicillin	31%	27%	17%	13%	0%
Pentavalent vaccine	37%	10%			--
Bleach solution (5%)	17%	58%			--
<b>Range</b>	Range: 17%–50%	Range: 15%–58%	Range: 0%–67%	Range: 0%–43%	Range: 0%–100%

Although medicine availability rates are concerning, some signs are encouraging. Comparing performance in 2016 to 2019, we see some significant improvements in availability of medicines in



facilities (notably amoxicillin, mRDTs, and TB drugs). However, in some cases (notably, contraceptives and maternal and child health products), it is worse. Exhibit 51 compares stock-out rates at health centers for key commodities tracked in both assessments.

<b>Exhibit 51. Comparison of National Stock-out Rates in Health Centers for Key Commodities Between NSCA Implementations</b>			
	2016	2019	Difference
Determine HIV rapid test kit	41%	31%	–10%
Artemether/lumefantrine 6x1	28%	26%	–2%
Combined oral contraceptives	16%	50%	+34%
Malaria rapid diagnostic test	21%	2%	–19%
RH	15%	3%	–12%
Amoxicillin	42%	22%	–20%
Magnesium sulfate solution (50%)	13%	38%	+25%
Vitamin K1 injectable	51%	85%	+34%
Oxytocin	10%	26%	+14%

## Recommendations

A key finding of the NSCA is that SOPs for warehousing and storage practices are not present throughout the system. As a result, only some key functions and practices are being implemented regularly. Also, storage capacities continue to be insufficient, from the central warehouse all the way down to the last mile. This report recommends the following actions:

- The MOH needs to ensure that all facilities nationwide have the correct warehousing and storage SOPs and that all store managers have been trained properly on procedures and expectations. Strengthening storage capacities nationwide is a priority action of the strategic plan and should be done together with distributing SOPs and providing supportive supervision of facility staff.
- Health centers throughout the country have a wide gap in capability. With a range of nearly 40 percent in capability scores, the MOH needs to apply a more consistent supervision approach and help those poor-performing facilities with targeted coaching to improve their warehousing and storage practices.
- With storage space and infrastructure still lacking in all PCG warehousing facilities, the MOH must expedite renovations of existing regional depots and planned construction of the new central warehouse. This will be critical for the long-term resiliency of the national health supply chain.
- Service delivery points across the nation are missing half of the basic items needed to be in place for warehousing and storage. The MOH needs to inventory storage capacities, warehousing equipment, and safety equipment to understand the gaps facility by facility. This information should be used to advocate for funding in the next national budget to ensure facilities are properly equipped.

## Supplemental Exhibit

**Exhibit 52: Warehousing & Storage: Distribution of Questions and Assignment 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
Health center (n=98)	48	1.0%	29	1.0%	13	1.1%	7	0.7%
Hospitals (41)	48	1.0%	29	1.0%	13	1.1%	7	0.7%
Referral Hospitals (3)	53.3	0.9%	30	1.0%	13	1.2%	6	0.8%
Warehouses (7)	74.7	0.7%	37	0.8%	14	1.1%	5	1.0%

\*The number of questions and the question weighting for these modules are variable because they include some conditionally scored questions; 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 service delivery points. 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 53).

### Exhibit 53. Examples of Scored Distribution Capabilities

<b>Basic</b>	<ul style="list-style-type: none"> <li>Existence of an approved distribution plan that defines when products will be delivered to clients</li> <li>Existence of a data management system that captures distribution plans and operations</li> <li>Existence of manual systems for capturing and maintaining transportation data</li> <li>Temperature monitoring devices used to track temperature excursions during transportation</li> <li>Security management measures: unannounced inspections/security guards</li> <li>Process for recording loss incidents</li> <li>Manual tracking of ownership of commodities throughout the system</li> <li>POD records maintained manually</li> </ul>
<b>Intermediate</b>	<ul style="list-style-type: none"> <li>Distribution routes are preplanned/included in the communication to health facilities/reviewed annually</li> <li>Existence of policies that cover the distribution and transportation of commodities/aspects of fleet management (list of policies areas/key aspects)</li> <li>Documented SOPs for managing transportation assets available at site</li> <li>Existence of electronic systems for capturing and maintaining transportation data</li> <li>Collection of distribution cost data/using Excel</li> </ul>
<b>Advanced</b>	<ul style="list-style-type: none"> <li>Products from different programs and partners distributed in an integrated manner wherever product characteristics allow (most products = an intermediate capability)</li> <li>Daily or real-time capture of transportation data</li> <li>Temperatures recorded in transit</li> <li>Security management measures: video surveillance/two-way radio/barcode scanning</li> </ul>
<b>SOA</b>	<ul style="list-style-type: none"> <li>Government budget or facility revenue covers 100% of recurring distribution costs</li> <li>Security management measures: RFID tags</li> </ul>

Distribution, like storage, is outsourced to the PCG along with its regional warehouses, which in turn supply service delivery points. The PCG has an MOU with the MOH as the primary distribution (and procurement) agency for Guinea's public health facilities. The PCG manages its own fleet of vehicles, which it uses to run quarterly distributions of program commodities. In 2016, the NSCA found that overall capabilities for transportation in Guinea were reasonable, reflecting the presence of a sizable fleet, relatively defined processes, and some technology use. Limited funds, poor data, and significant exogenous factors such as challenging transport infrastructure, however, contributed to ultimately low order fill rates—24.5 percent for health facilities orders and 51 percent for regional depots according to the 2016 NSCA.

The 2017 Strategic Plan identified distribution and transportation as one of six core operational functions in an effective supply chain. The plan specified several weaknesses that it sought to address in the coming years, including:

- Partial or inconsistent integration of the distribution system (e.g., vaccines, blood transfusion)
- Inefficiencies in fleet use, especially at the regional level, where vehicles are simultaneously often unused and insufficient
- Long delays in distribution plans and dissatisfaction with quarterly distribution frequency
- Specific resource gaps, including cold transport, temperature monitoring procedures and tools, and reverse logistics systems (especially for TB testing and unusable products)

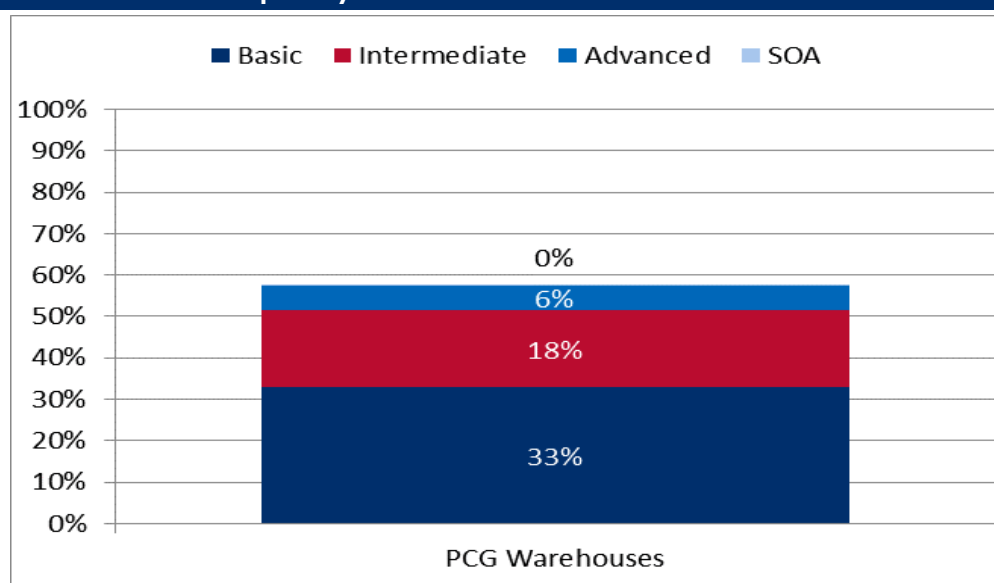
These weaknesses, the analysis explained, reflected the fact that the PCG did not have enough resources, technical expertise (i.e., fleet management and maintenance), or funds to provide an effective and efficient transport service. Also, the PCG's distribution network was not conceived as an integrative and exhaustive "transmission/distribution service provider," end-to-end (including reverse logistics, etc.).

Distribution-specific recommendations were folded into the Plan's first strategic axis, "Improve the availability of quality health products at all levels of the health pyramid." Generally, the recommendation was to evaluate and strengthen the PCGs' distribution capabilities, with technical assistance from distribution experts and logistics training.

## 2019 NSCA Findings

The MOH continues to outsource distribution responsibilities to the PCG and its regional warehouses. Capability maturity and performance metrics are displayed in Exhibits 54 to 57. The PCG warehouses scored 58 percent on distribution capability maturity, ranging from 26 percent to 83 percent, with an average of 66 percent of basic distribution capabilities in place, ranging from 29 percent to 100 percent.

**Exhibit 54. Distribution Capability**



**Exhibit 55. Distribution KPIs, Maturity Score, and Basic Capabilities in Place**

	Health centers	Hospitals	National Hospitals	Regional Warehouses	PCG
n =	98	41	3	7	1

Turnaround time, routine orders, days		24.5		1.6		
Type	Planned	94%	89%	100%	92%	100%
	Emergency	6%	11%	0%	8%	0%
OTD	Percent of orders with all relevant dates	22%	30%	100%	42%	0%
	OTD, routine orders	76%	64%	100%	96%	N/A
	OTD, emergency orders	13%	12%	N/A	50%	N/A

#### Exhibit 56. Key Distribution Performance Measures

Percentage of orders adjusted by warehouses	65%
Percentage of orders delivered in full by warehouses	53%

#### Exhibit 57. Examples of Scored Distribution Capabilities

<b>Basic</b>	Existence of an approved distribution plan that defines when products will be delivered to clients	86%
	Existence of a data management system that captures distribution plans and operations	71%
	Existence of manual systems for capturing and maintaining transportation data	57%
	Temperature monitoring devices used to track temperature excursions during transportation	71%
	Security management measures: unannounced inspections/security guards	14%/29%
	Process for recording loss incidents	57%
	Manual tracking of ownership of commodities throughout the system	86%
	POD records maintained manually	86%
	Quarterly capture of distribution costs	71%
<b>Intermediate</b>	Distribution routes are preplanned/included in the communication to health facilities	86%/71%
	Existence of policies that cover the distribution and transportation of commodities/ aspects of fleet management (list of policy areas/key aspects)	71%/29%–86%
	Documented SOPs for managing transportation assets available at site	57%
	Existence of electronic systems for capturing and maintaining transportation data	57%
	Security management measures: integrated audit procedures at front and back ends	86%
	Collection of distribution cost data/using Excel	71%/71%
	Temperatures recorded upon arrival	57%
<b>Advanced</b>	Products from different programs and partners are distributed in an integrated manner wherever product characteristics allow (most products = an intermediate capability)	71% (most = 29%)
	Daily or real-time capture of transportation data	0%
	Temperatures recorded in transit	0%
	Security management measures: video surveillance/two-way radio/barcode scanning	0%
	Distributions routes are reviewed biannually	57%
<b>SOA</b>	Government budget or facility revenue covers 100% of recurring distribution costs	14%
	Security management measures: RFID tags	0%

A surprising finding was the number of capability questions where most warehouses responded affirmatively that the policy, practice, process, or asset existed, yet one or two responded negatively. This suggests that distribution capabilities are either inequitably distributed throughout the system or insufficiently disseminated. Inequitable distribution requires revising strategic priorities to ensure that all warehouses are equally or sufficiently resourced, while insufficient dissemination requires investing in capacity training to ensure that policies and best practices are universally communicated and implemented. It is encouraging that 85 percent of warehouses reported capacity trainings on distribution specifically within the last year, and all reported that distribution responsibilities were formally included in staff job descriptions.

The performance metrics for distribution are okay but leave plenty of room for improvement. 53 percent of orders are reportedly delivered in full, average turnaround time for orders placed by health centers exceeds three weeks (24.5 days), but encouragingly 76 percent of orders are reportedly

delivered on time. Fewer hospitals (only 64%) reported on-time deliveries of orders in the assessment's six-month period of interest. An important caveat to these numbers is the small proportion of orders with all relevant dates recorded. At each facility site, enumerators were instructed to collect data directly from order forms from the previous six months (one year in the case of referral hospitals and warehouses). Required data included order dates, delivery dates, ordered quantity, and delivered quantity. As Exhibit 57 illustrates, few order forms included all necessary dates to enable the assessment team—or the facility—to track distribution performance. This makes it difficult to diagnose specific gaps or identify potential interventions.

Finally, exogenous threats to efficient distribution outlined in the 2017 Strategic Plan remain. Health facilities in the country are not always accessible by road, and poor infrastructure generally remains a fundamental and unaddressed threat to distribution. Also, PCG continues to operate with only limited funds. Addressing these challenges would require higher-level strategic interventions at the government level and, in the meantime, will continue to impact distribution in the public health supply chain.

## Recommendations

- **Provide training.** While most warehouses in the country report the presence of basic and intermediate capabilities, one or two in most cases lacks the assessed item or fails to perform the assessed best practice (e.g., approved distribution plans, collection of distribution cost data, recording temperatures upon arrival). This suggests an opportunity for human resource trainings to increase distribution capabilities (and performance) simply by ensuring that all warehouse staff across the country are aware of and properly implementing best practice guidance and activities that already exist elsewhere in the country.
- **Improve information systems.** Many recommendations flow from and depend upon more complete, accurate, and timely order and distribution data. While the warehouses have a baseline level of physical capabilities for electronic systems, staff would benefit from more trainings and supervision to ensure that information practices are properly and consistently implemented. Similarly, warehouses—and policymaker strategic decision making—would benefit from better order and delivery data collected at the level of SDPs to better inform their understanding of distribution performance and help identify and redress problems. This, too, appears to require capacity training at lower levels to ensure that the record keeping and data collection systems already in place are properly implemented. Finally, distribution information systems are not currently integrated with the national LMIS system. Integration presents an opportunity to increase visibility and improve decision making for distribution plans.
- **Optimize (or outsource) regional fleet.** Distribution from regional PCGs to health centers appears to have remained a challenge. Delayed distributions suggest that fleets are not being used with maximum efficiency. Thus, the 2017 goal of better optimizing regional fleets remains. Alternatively, the MOH may consider forming a private-public partnership wherein the PCG would retain responsibility for distribution to the regional warehouses and to districts, but would outsource last-mile distributions (from districts to health facilities) to private wholesalers. In the meantime, it is good that distribution plans are reportedly reviewed twice a year. With better data, revisions made during these reviews might reflect and redress challenges and opportunities for improvement.
- **Improve cold transport capabilities.** Cold transport capabilities remain a gap in the Guinean distribution system in physical assets (cold trucks, in-transit monitoring systems) and universal implementation of best practices. Purchasing assets and increasing training are again options for improving capabilities in this area. The parallel vaccine distribution system presents an opportunity to leverage outside capacities and human resources to train and inform improvements to PCG's cold transport capabilities, with the goal of eventual integration.

- **Reverse logistics.** The current distribution system does not include reverse logistics, which the waste management and quality assurance modules identify as areas of opportunity to improve the supply chain’s functioning. First, a national-level decision needs to be made on prioritized waste management practices. If central collection of unusable pharmaceuticals is a chosen method of disposal, then reverse logistics needs to be systematically unrolled in the distribution system—including SOPs, training, dedicated resources, and financial budgeting.

Finally, an overarching medium- to long-term goal must be to increase responsiveness to orders, increase distribution frequency beyond quarterly, and address the delays in distribution plans. Aiming for more ambitious distribution goals and improving performance across the board should follow from improvements outlined above.

## Logistics Management Information Systems

Accurate and timely data are critical for effective decision making throughout the public health system. The logistics management information systems is the system of records and reports—paper-based or electronic—that are used to aggregate, analyze, validate, and display data to inform logistics decisions and manage the supply chain. Major areas that were 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 58).

**Exhibit 58. Examples of Scored Logistics Management Information System Capabilities**

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

Improving the logistics data information system to support more effective decision making was identified as a strategic axis, or bundle of priority actions, in the 2017 Strategic Plan. “Without effective and efficient LMIS,” the Strategic Plan warned, “it is unlikely that the supply chain can be significantly improved.” In 2016, the first NSCA found that facility reporting performance for reporting rates was 64.9 percent for hospitals and health centers (see Exhibit 59). At the time, reporting systems were not integrated, with different LMIS systems operating for distinct vertical programs (HIV/AIDS, malaria, MCH, and PNLP). Overall, the malaria program had the highest average reporting rate—87.8 percent of facilities reporting for period of June—August 2016, i.e., 87.8 percent—which likely reflected that the PNLP had been operating an LMIS the longest (since early 2013), supported with routine supervisions and on-the-job training.

#### Exhibit 59. NSCA 2016, LMIS Reporting Performance, CS and Hospitals

Reporting rate	65%
On-time reporting rate	67%
Reports' completeness	46%

With support from USAID, the MOH implemented a single harmonized paper LMIS reporting form for all SDPs in 38 districts of Guinea and an electronic LMIS for hospitals and CMCs. Before the rollout, the first NSCA emphasized that sustained donor support for the LMIS was critical to achieving the MOH's end goal of data visibility—and health product availability—at all levels of the supply chain system. Specifically, donors should operate on the assumption that a successful transition to full MOH ownership, management, and financial responsibility would require a long-term time horizon. Even as supply chain professionals were trained during the LMIS rollout, further support through supervision and on-the-job training would be required for continuous quality monitoring and improvement.

The 2017 Strategic Plan's SWOT analysis<sup>15</sup> of the newly rolled out paper LMIS form and partially implemented eLMIS system recognized performance challenges in accuracy, completeness, and promptness. At the SDP level, the analysis explained that lack of accountability, "low reporting culture," and the fact that the activity was considered auxiliary with no or few staff formally assigned to reporting tasks as main causes of historic poor performance. At higher levels in the system, the analysis highlighted the challenge of low motivation of district and regional officials and insufficient frameworks for analyzing collected data. As the Strategic Plan sought to mobilize efforts for improving the LMIS system, it outlined the following corrective solutions:

- Review LMIS performance quarterly
- Implement the eLMIS deployment plan
- Provide the LMU with human and material resources to support LMIS
- Strengthen decentralized consultative frameworks (set up IMPACT teams) for analyzing supply chain data at health district, regional, and central levels
- Strengthen human resource reporting capacity in the supply chain

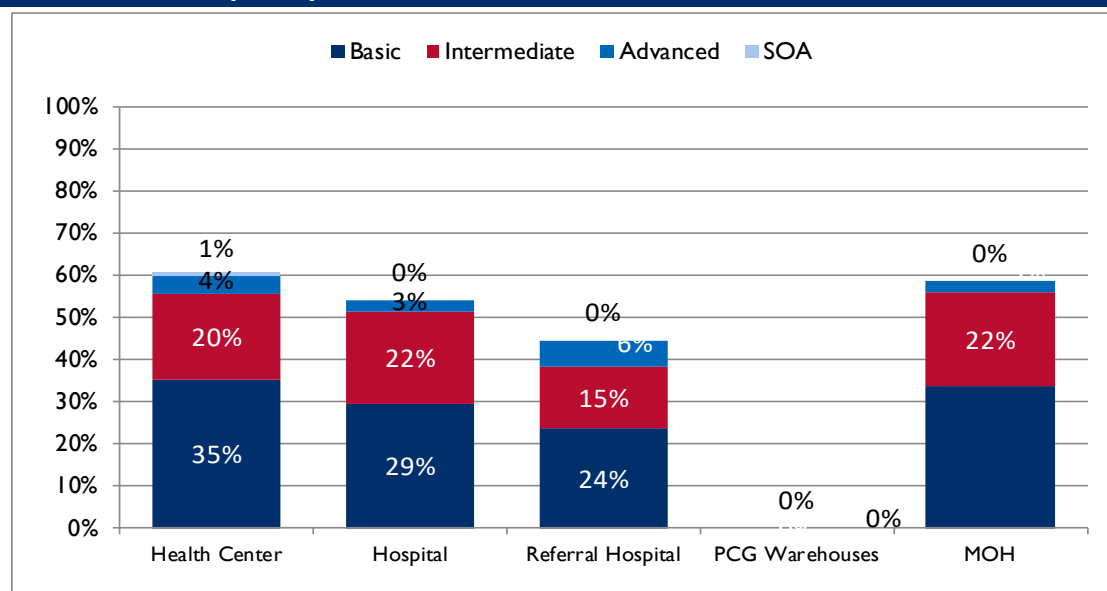
## 2019 NSCA Findings

LMIS capability and performance results from the 2019 NSCA are presented in Exhibits 60 to 62. As an increasing number of LMIS capabilities are put in place throughout the country, performance indicators are improving but still lag behind, especially in reporting accuracy. Stock cards and LMIS materials are widely available in health facilities; however, the country's supply system reaps uncertain benefit from these capabilities because important performance metrics remain low. Stock cards were frequently and widely inaccurate. The decreasing capability maturity scores moving up the supply chain in part reflect the NSCA's expectations of and thus assessment against greater capabilities at higher levels of the system.


<sup>15</sup> LMIS was identified as one of five cross-cutting functions supporting effective supply chains.



## Exhibit 60. LMIS Capability



## Exhibit 61. LMIS KPIs, Maturity Score, and Basic Capabilities in Place

		Health Centers	Hospitals	Ref. Hospitals	Regional Warehouses	PCG
	n =	98	41	3	7	1
Overall maturity score (range)		60% (0%–89%)	54% (24%–74%)	45% (43%–46%)		59%
Percent of basic items in place (range)		71% (0%–100%)	59% (19%–92%)	47% (44%–52%)		67%
 Stock cards/ paper	LMIS Stock card accuracy: percentage of facilities with 100% accurate stock card, average across tracers	51%	58%	28%	85%	44%
	Stock card accuracy: percentage points deviation from 100% accuracy (range across tracer commodity)	0%–15,452%	42%–30,830%	22%–100%	85%–2,400%	0%–50%
	Stock card up to date: Average of average—facilities reporting up-to-date x tracer commodities	48%	75%	50%	74%	100%
Electronic LMIS	eLMIS record accuracy: percentage of facilities with 100% accurate stock card, average across tracers	---	33%	17%	35%	----
	eLMIS record accuracy: percentage points deviation from 100% accuracy (range across tracer commodity)	----	0%–993%	0%–812%	0%–1,415%	----
	eLMIS record up to date: average of facilities reporting up to date for 14 tracer commodities*	----	30%	64%	65%	----

\*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, it was removed from the denominator



## Exhibit 62. LMIS Facility Reporting Rates by National Program (GHSC-PSM Quarterly Reporting Data)

		Malaria	Reproductive Health	Maternal & Child Health
Fiscal Year 2019 Quarter 1 (October, November, December 2018)	Percentage of facilities reporting complete reports	96%	89%	89%
Fiscal Year 2019 Quarter 2 (January, February, March 2019)	Percentage of facilities reporting complete reports	98%	97%	97%
Fiscal Year 2019 Quarter 3 (April, May, June 2019)	Percentage of facilities reporting complete reports	100%	96%	96%

Key strengths, gaps, and transitions in LMIS capabilities and performance within the Guinean health system are summarized in Exhibit 63. At the central level, the MOH with donor support has successfully standardized LMIS tools and reporting frequency across the supply chain—geographic regions, health programs, and health system levels—and rolled out an eLMIS at hospitals. Lower down, the LMIS capability maturity score for health centers was 60 percent, with 71 percent of basic capabilities in place at facilities and near-universal (97 percent) use of a paper-based LMIS system.

In performance, LMIS reporting rates positively increased since the 2016 NSCA. In the third quarter of fiscal year 2019, 100 percent of required facilities (453 total) successfully reported LMIS data for the National Malaria Control Program. Similarly high rates were reported by other program streams in recent quarters (see Exhibit 63). Performance accuracy, however, remained concerningly low. The metric for stock card accuracy at the health center level was only 51 percent—an average of cases of 100 percent accurate stock cards, averaged across facilities and tracer commodities—and deviations from 100 percent accuracy ranged from an astounding 0 percent to 15,452 percent.

## Exhibit 63. Strengths and Gaps and Transitions

<b>Strengths</b>	<p>Standardized LMIS tools and frequency across the supply chain—geographic regions, health programs, and health system levels</p> <p>97 percent of health centers report using a paper-based LMIS system</p> <p>90 percent of hospitals report using both paper- and electronic-based LMIS</p> <p>Existence of LMIS policies, with relatively good dissemination (41 percent of health centers and 60 percent of hospitals could physically produce the SOP)</p> <p>Standard process to review LMIS data (88 percent of health centers, 80 percent of hospitals)</p> <p><i>From human resources (HR) module:</i> Most facilities had an LMIS-specific capacity training session in the last year (85 percent of health centers, 93 percent of hospitals)</p>
<b>Gaps</b>	<p>Warehouses, and WMS are not integrated into the LMIS system</p> <p>31 percent of CS and 35 percent of hospitals report a stock-out of stock cards in the previous year</p> <p>Over 40 percent of SDPs still report that they are required to submit four to six separate supply chain and commodity reports per reporting cycle</p> <p><i>From HR module:</i> Most facilities have yet to include LMIS and reporting responsibilities formally into the job descriptions of some staff personnel (only 31 percent of health centers and 44 percent of hospitals do)</p>
<b>Transitions</b>	<p>A fair number of sites report conducting DQAs (49 percent of CS, 41 percent of hospitals, 33 percent of referral hospitals), and data are subsequently reportedly widely used and shared</p> <p>Monthly data collection: Timely data are important for strategic decision making. In the long term, will want to increase reporting frequency.</p>

The availability of LMIS tools and key process inputs was highlighted as another key gap: 31 percent of health centers and 35 percent of hospitals reported a stock-out of stock cards in the previous year. An analogous key challenge for hospitals and CMCs in eLMIS reporting was Internet connectivity. Only 18 percent of hospitals reported that the Internet was always or almost always available, 21 percent reported that the Internet was available but often did not work, while the plurality (55

percent) reported that the Internet simply was not available at the facility. By way of explanation, many respondents offered that personnel at the facility most commonly used individual data plans as an Internet stop gap to submit required LMIS reports. Exhibit 64 outlines the most frequently cited challenges with the LMIS systems—for the paper LMIS by health center informants and for the eLMIS by hospital informants. The MOH also highlighted the challenges of delayed feedback from higher levels, difficulties in filing, insufficient training or HR, insufficient staff, data quality, or data entry errors. One positive practice that will likely contribute to improved performance in the future is the widespread reports of facilities engaging in data quality assessments (see Exhibit 65).

<b>Exhibit 64: Most Frequently Cited Challenges with LMIS</b>			
<b>Health centers (paper LMIS)</b>		<b>Hospitals (eLMIS)</b>	
	<b>% facilities</b>		<b>% facilities</b>
Stock out of tools	56%	Internet connectivity	92%
Difficulties in filing	38%	Insufficient training or HR capability	50%
Challenges in retrieval of data	37%	Lack of time due to other tasks	37%
Challenges in analysis of data	36%	Challenges in retrieval of data	34%
Data quality or data entry errors	28%	Availability of computers	32%
Data loss	27%	Data quality or data entry errors	32%
Diff. version of tools in the same system	25%	Slow adaptation of revisions within tools	26%
Slow adaptation of revisions within tools	23%	Insufficient staff	26%
Delayed feedback from higher levels	20%	Challenges in analysis of data	21%

<b>Exhibit 65. Data Quality Assessments</b>	<b>Percent of facilities reporting:</b>	
	<b>Health center</b>	<b>Hospitals</b>
MOH	38%	29%
Regional/intermediate warehouses	16%	24%
Other district authorities	43%	24%
Staff at this facility	75%	61%
Other	9%	7%

The human resource aspect of LMIS capabilities is mixed. On the one hand, most facilities reported that some staff had attended capacity training on LMIS in the previous year—including 85 percent of health centers and 93 percent of hospitals. On the other, the plurality also reported that LMIS has yet to be institutionalized as an assigned staff responsibility. Only 31 percent of health centers and 44 percent of hospitals reported that LMIS was formally included among some members' job descriptions.

Finally, warehouses currently remain outside of the country's LMIS system. The WMS used by warehouses is not integrated, although this has been flagged as a potential future activity for donors to support. In data accuracy, however, the country's regional warehouses performed comparatively better on stock card accuracy metrics. The seven assessed warehouses scored an 85 percent on stock card accuracy (an average of instances of 100 percent accurate stock cards, averaged across facilities and tracer commodities). Potential future integration of warehouses—and their WMS system—into the national LMIS system would facilitate multiple advanced supply chain functions, including reverse logistics.

## Recommendations

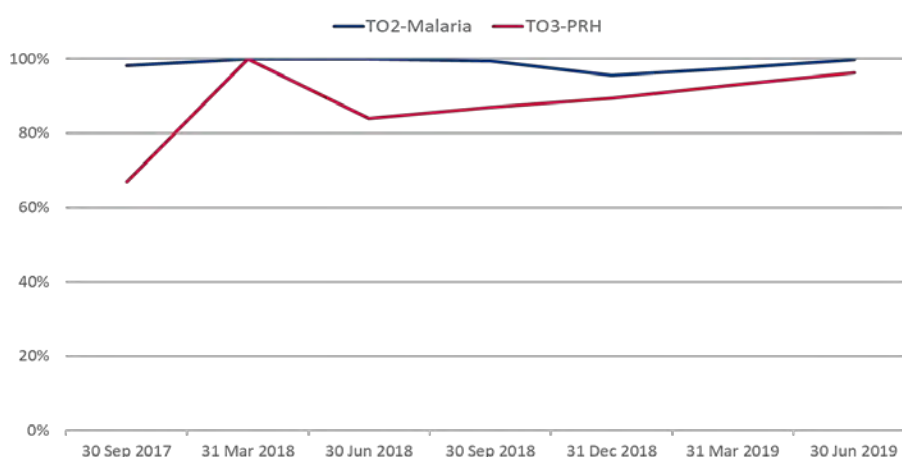
The Strategic Plan's focus on increasing the functionality of the LMIS—in accuracy, completeness, and promptness—to facilitate decision making throughout the supply chain system remains an important priority in 2019. The 2019 NSCA found that an increasing number of key capabilities and processes

are in place throughout the system but that these have yet to fully translate into gains in LMIS performance. This, in part, reflects a natural learning curve for new LMIS tools, one predicted by the 2016 NSCA, which emphasized the need for sustained donor engagement in this space. Phrased another way, LMIS presents an opportunity for great strides in improving performance if targeted investments are made in human capital, processes, and infrastructure:

- Make sure that reporting is formalized as a key task in the job description of at least one staff member at every reporting facility, and accuracy included in their performance review.
- Continue to invest heavily in training health personnel at all levels of the system.
- Refine the tool to make it more accessible, and figure out a way to finance and streamline sustainable access to the paper tool.
- Continue to support DQAs, including training district and regional officials to implement rigorous DQAs, provide supportive supervision, and translate results into targeted recommendations and improvements.
- In the long term (after performance with the current capabilities improves), work to increase LMIS reporting frequency (increase capability maturity) to improve access to timely data for decision making. Increasing reporting frequency, however, likely requires expanding the eLMIS system to lower-level facilities and thus a significant investment in physical infrastructure.

### Supplemental Exhibit

**Exhibit 66. LMIS Reporting Rate (GHSC-PSM Quarterly Reporting Data)**



## Quality Assurance and Pharmacovigilance

Ensuring that the health 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 drug quality and that facilities at all levels understand and can act on their role in pharmacovigilance for medicines. Exhibit 67 outlines key capabilities of an effective quality assurance and pharmacovigilance strategy, including the existence of formal guidelines and SOPs, regular quality control testing, and the availability of data collection tools and processes for pharmacovigilance.

## Exhibit 67. Examples of Scored Quality Assurance and Pharmacovigilance Capabilities

<b>Basic</b>	Formally approved national-level product quality assurance strategy or policy Formally approved guidelines or manual/SOPs
<b>Intermediate</b>	Samples of received pharmaceutical products taken for quality control testing (intermediate capability at MOH, RMS, and RH levels, advanced for SDPs) Quarterly (or more frequent) quality control samples Data collection tools available for pharmacovigilance
<b>Advanced</b>	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
<b>SOA</b>	Action protocols, based on pharmacovigilance results

In 2016, the first NSCA found that a clear governance structure and multiple policy documents and guidelines existed related to pharmacovigilance but that overall capability and thus implementation remained limited. The country lacked a national pharmacovigilance center but had a dedicated unit within the DNPM to oversee a patient adverse reactions notification system and liaise with international pharmacovigilance institutions.<sup>16</sup> As a regulatory authority, this unit reportedly oversaw the PCG and the donor-led supply system to ensure quality assurance in procurement and was equally responsible for pharmacovigilance activities in the country. Policy on pharmacovigilance existed in diffused forms, included in the DNPM policy document and in laws regulating medical safety. A more formal national guideline on pharmacovigilance also existed; however, it was not widely referenced and it remained unclear when it was last updated. The 2016 NSCA found that designated staff responsible for safety and pharmacovigilance existed, but more generally an acute shortage of human resources contributed to poor performance in key functions—including medicine registration and marketing authorization, quality control testing, inspection of pharmaceutical establishments, quantification and management of needs, management of adverse medicine use reactions and risks, and related communications.

The dubious import and impact of these formal mechanisms are underlined by the 2017 National Supply Chain Strategic Plan's conclusion that quality assurance and quality control were not in fact institutional in law nor operational at any level of the health system. The Strategic Plan concluded that quality assurance was not prioritized in the implementation of supply chain activities because it did not receive government funding. The failure to ensure product quality after procurement and before distribution and insufficient training of laboratory staff and equipment were identified as key weaknesses.

As a corrective measure, the Strategic Plan emphasized the importance of “quality assurance and quality control” as one of six fundamental operational functions of an effective supply chain. Quality assurance is defined as the wider commitment to ensuring, at all points of the supply chain, that health commodities are safe, effective, and of good quality. Quality control is defined as an important quality assurance activity, wherein products are sampled and tested as they travel through the system to ensure continued quality. The Strategic Plan outlined a goal to revitalize quality assurance practices within Guinea's supply chain priorities through implementing several recommended actions, including:

- Validate and disseminate the national quality control policy
- Support laboratory capacity, including strengthening staff capacity in laboratory analysis techniques, purchasing operational materials and consumables, and allocating operational budgets

<sup>16</sup> Also, a national commission on medicines safety and a subcommittee on pharmacovigilance. The subcommittee's responsibilities reported included investigation of prescription problems, postmarketing surveillance of medicines use, and communication in case of product risks.

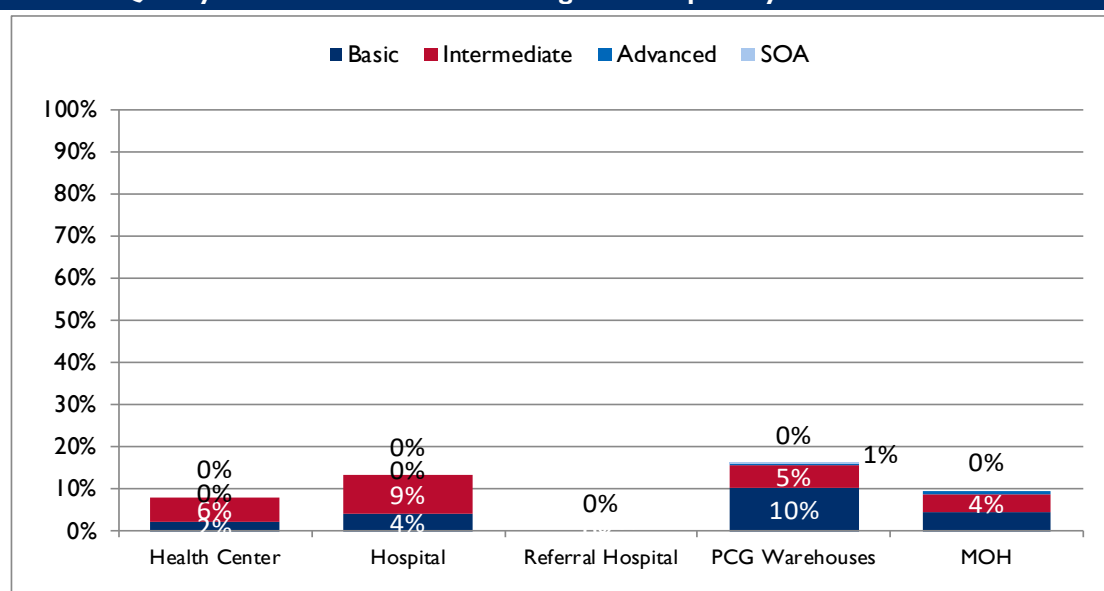
- Strengthen the capacity of health structures to maintain product quality, including improving storage capacity and training pharmacists in good drug distribution practices

Overall, quality assurance and pharmacovigilance are embedded with the goal of the first strategic axis, “improve the availability of quality products at all levels of the health pyramid,” which includes “follow[ing] the quality assurance plan” as a priority action.

## 2019 NSCA Findings

The 2019 NSCA found that little progress had been made to clarify, disseminate, fund, or train on quality assurance and pharmacovigilance issues in the country. Survey responses on available capabilities in this technical area were largely negative or contradictory. Exhibit 68 displays the resulting capability maturity scores for quality assurance and pharmacovigilance across assessed facility types.

**Exhibit 68. Quality Assurance and Pharmacovigilance Capability**



Note that this is a short section in the NSCA. At the lowest level (SDPs—health centers and hospitals), there are only 12 questions, so each response carries greater weight.

National policies and standard operating procedures on quality assurance and pharmacovigilance have yet to be fully disseminated, even at central levels. MOH officials were unable to produce a copy of a national-level quality assurance strategy or policy, but did provide a copy of national guidelines (that are infrequently updated). Few facilities could physically produce SOPs for quality assurance or pharmacovigilance, including the MOH (see Exhibit 69).

**Exhibit 69. Quality Assurance and Pharmacovigilance KPIs, Maturity Score, and Basic Capabilities in Place**

	Health Centers	Hospitals	Ref. Hospitals	Warehouses	MOH
n =	98	41	3	7	1
Overall maturity score (range)	8% (0%–45%)	13% (0%–35%)	0% (0%–0%)	16% (16%–58%)	10%
Percent of basic items in place (range)	5% (0%–50%)	8% (0%–50%)	0% (0%–0%)	20% (0%–71%)	9%
SOPs for quality assurance/ quality control available at the facility	4%	15%	0%	29%	X

SOPs for pharmacovigilance are available at the facility	15%	17%	0%	X
Data collection tools for pharmacovigilance exist/are available at the facility	31%	59%	0%	✓
Pharmacovigilance data shared with higher-level authorities	25%	34%	0%	100% (international)

Only two assessed facilities—the Conakry-based warehouses—reported that received pharmaceutical products were taken for quality control testing.<sup>17</sup> No lower-level facilities reportedly engaged in quality control testing. At these two warehouses, samples were reported taken quarterly, but the labs are not accredited by a competent body. While quality testing data were incomplete, the assessment did find evidence of 10 batches of pharmaceuticals tested for quality at the PCG central warehouse in Conakry. Of those 10, 100 percent passed quality assurance testing. For pharmacovigilance, the MOH reported that, yes, such tools are available, but caveated this with acknowledgement that data are not routinely collected from lower levels. Indeed, 31 percent of health centers and 59 percent of hospitals reported that tools were available at the facility level, and a subset of these facilities reported that pharmacovigilance data are shared with higher-level authorities. However, several respondents added that it did not appear that anything was done with these shared data.

Overall, the 2017 call for elevating quality assurance and control actions in the supply chain has yet to be achieved. No health centers, and only 5 percent of hospitals, report that QPV is included in a staff member's job description. About half of the country warehouses included QPV, as did the MOH, although the MOH was unable to provide documentation of QPV's formal inclusion in staff job descriptions. Finally, the government does not appear to have dedicated funding to the area, and few facilities reported trainings on issues of medicine quality assurance or pharmacovigilance in the prior year.<sup>18</sup>

Broader improvements in distribution and storage capabilities contribute to maintaining—though not ensuring—the quality of products as they move through the system. Please see the relevant sections of this report for more information on capabilities and performance in these areas. Little progress has been made, however, in explicitly prioritizing quality assurance and control in the Guinean supply chain system.

## Recommendations

This report agrees with much of the 2017 Strategic Plan's assessment that quality assurance and control are a fundamental operation of effective and safe public health supply chain. Much room remains for improvement focused on quality assurance and pharmacovigilance.

- **Leadership and strategy.** Validate, update, and disseminate national quality control policies and standard operating procedures. Clarify roles at all points in the supply chain, and consider a reasonable timeframe for expanding quality control capacity, responsibilities, and oversight at lower levels of the supply chain. Consider creating a distinct national medicines regulatory authority.

<sup>17</sup> Note: Performance indicators on quality testing excluded donor procured or donated commodities that were tested outside of the country. GHSC-PSM, Global Fund, and United Nations agencies, for example, all have quality testing protocols outside of the Guinean system.

<sup>18</sup> CS: 34 percent; H: 32 percent (medicine quality assurance); W: 29 percent (Pharma), MOH X

- Support laboratory capacity. For the two warehouses that are conducting quarterly quality checks, provide guidance and funds to increase the frequency of testing from quarterly tests to more frequent. Also, assign oversight responsibilities to a specific government body to ensure quality testing.
- Institutionalize and train staff on the pharmacovigilance reporting system to ensure that pharmacovigilance tools are widely used and data are consistently reported and reviewed. Reciprocally, work on a system for monitoring international news on drug safety and communicating relevant reports to local actors.
- Allocate sufficient budgets for pharmacovigilance activities at all levels of the system.

### Supplemental Exhibit

**Exhibit 70. QPV: Distribution of Questions and Assignment 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
Health center (n=98)	4	12.5%	3	10.0%	4	3.8%	1	5.0%
Hospitals (41)	4	12.5%	3	10.0%	4	3.8%	1	5.0%
Referral Hospitals (3)	5	10.0%	8	3.8%	4	3.8%	1	5.0%
Warehouses (7)	7	7.1%	9	3.3%	8	1.9%	3	1.7%
MOH (1)	11	4.5%	15	2.0%	14	1.1%	3	1.7%

## 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 71).

**Exhibit 71. Examples of Scored Waste Management Capabilities**

<b>Basic</b>	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
<b>Intermediate</b>	Disposal methods: on site incineration, inertization or solidification Waste disposal events authorized and documented Internal audits of waste management
<b>Advanced</b>	Disposal supervised and certified by a regulatory authority Unusable pharma waste products sorted by method of disposal
<b>SOA</b>	Waste management system integrated with LMIS

Guinea's 2017 Supply Chain Strategic Plan identifies waste management as one of six core operational functions of an effective health supply chain system. It simultaneously recognizes that, to date, "Waste management and obsolescence has not been a priority in the chain's activities." Indeed, the commission found that the presence of expired products without approved disposal means was "a growing and



handicapping phenomenon” that limited storage capacity throughout the system, among other detrimental impacts.

The Strategic Plan’s waste management SWOT analysis highlighted the new development of ministry instructions for the destruction of pharmaceutical waste as a potential future strength, recognizing that these SOPs had yet to be disseminated nor employees trained. Similarly, the 2017 Strategic Plan points to existing incinerator infrastructure as a relative strength, but equally acknowledged that the lack of maintenance on these incinerators was a weakness that left many SDPs without operational means of waste disposal. The year before, an NSCA assessment found that 68 percent of hospitals and 24 percent of health centers had incinerators, but only 10 percent of facilities had preventative maintenance plans in place. Finally, the 2016 NSCA also noted with concern that more than half of assessed health facilities did not have separate storage areas for unusable products, a basic competency of effective supply chain systems.

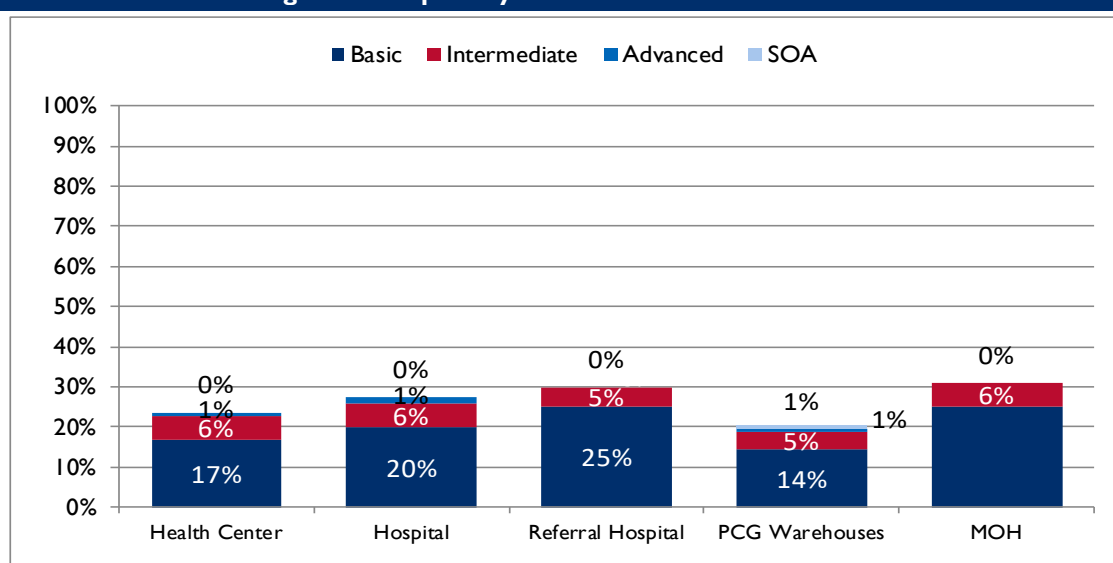
The Strategic Plan outlined several specific actions for improving waste management throughout the system, including:

- Train health professionals on the existing central-level waste management procedures
- Include waste management in supervision guidelines as part of routine monitoring
- Integrate reverse logistics into the transport distribution system
- Purchase more incinerators and ensure regular maintenance
- Define budget lines for waste management
- Work with partners SIAPS and Catholic Relief Services in launching a countrywide exercise to draw up an inventory of expired commodities

## 2019 NSCA Findings and Analysis

Exhibits 72 and 73 depict the 2019 NSCA results for waste management in the Guinean supply chain system. While certain action items outlined in 2017 have been achieved, waste management remains an under resourced and largely ad-hoc area in Guinean health care.

**Exhibit 72. Waste Management Capability**





**Exhibit 73. Waste Management KPIs, Maturity Score, and Basic Capabilities in Place**

	Health centers	Hospitals	Ref. Hospitals	Warehouses	MOH
n =	98	41	3	7	1
Presence of approved SOPs for waste management and disposal	22%	34%	33%	14%	NO
Unusable pharmaceutical products stored separately	59%	78%	67%	71%	
Percentage of facilities reporting incinerator as a waste disposal strategy	28%	39%	0%	14%	
Overall maturity score (range)	24% (0% to 56%)	27% (0 to 56%)	30% (19 to 41%)	20% (0% to 52%)	21%
Percent of basic items in place (range)	34% (0% to 75%)	40% (0 to 75%)	50% (25% to 75%)	29% (0% to 75%)	30%

While national waste management regulations exist, along with a department for managing implementation, best practices are inconsistently known, resourced, and practiced at lower levels of the supply chain. Few lower-level facilities reported the presence of approved SOPs for waste management and disposal—22 percent of health centers, 34 percent of hospitals, 33 percent of referral hospitals, and 14 percent of warehouses. Confusingly, key informants at the central level reported that guidelines and SOPs for waste management and disposal do not exist. What is clear is that waste management continues to remain an underprioritized and under resourced area within the supply chain.

While the Strategic Plan emphasized the role incineration would play in the national strategy for improving waste management practices, few facilities reported incineration as a current method of waste disposal (see Exhibit 74). Rather, a plurality of sites reported “transport to higher-level government facility or warehouse” as a means for waste disposal. In 2018, with funding from USAID Guinea, GHSC-PSM supported the Guinea MOH in unclogging its health supply chain through removal and safe disposal of unusable medical and pharmaceutical products waste. Working with the DNPM and the General Inspection of the MOH, GHSC-PSM carried out collection, consolidation, and transportation of 153 tons of medical and pharmaceutical waste from more than 500 health facilities. Working with the incineration facility, the project successfully completed treating and disposing of the shipped medical and pharmaceutical waste in an approved, high-temperature incineration system that is compliant with all applicable permits and environmental regulations. The 153 tons of waste incinerated comprised 147 tons of nonhazardous waste and six tons of hazardous waste. Removal and safe disposal of this waste have not only freed up approximately 1,139 m<sup>3</sup> of storage space, allowing health facilities to use this space to store usable stock, but also eliminated risks for pharmacy managers using wrong products or expired ones by mistake. This marks a successful completion of an action listed in the Strategic Plan, but without any future plans to repeat this activity, it is not itself a sustainable solution to closing waste management gaps in the country.

**Exhibit 74. 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:			
	Health Centers	Hospitals	Ref. Hospitals	Warehouses
Transport to higher-level government facility or warehouse	72%	51%	100%	57%
Incineration (onsite) followed by landfill disposal of ash residues	28%	39%	0%	14%

Municipal landfill disposal	30%	32%	67%	14%
Steam autoclaving followed by landfill disposal of treated waste residues	12%	10%	0%	0%
None: Disposal is not done	7%	12%	0%	14%

A plurality of health centers (66 percent) and hospitals (56 percent) reported that some member of the staff attended capacity training on waste management in the previous year; however, less than a quarter (24 percent) reported that waste management was explicitly part of the job description of employed personnel.<sup>19</sup> Reported monitoring practices were similarly ambiguous. A plurality of sites reported that audits were performed of waste management practices, although who performs what type of monitoring is unclear. The MOH reported that waste management was each individual site's purview (reporting only onsite monitoring), while several field sites also reported the existence of formal internal and external audits.

**Exhibit 76. Methods of Audits for Waste Management**

Audit methods	Percent of facilities reporting:				
	Health Centers	Hospitals	Ref. Hospitals	Warehouses	MOH
External audits	21%	32%	0%		X
Internal audits	31%	46%	67%		X
On-site monitoring	55%	46%	100%	29%	✓
None of the above or "I don't know"	12%	12%	0%	43%	X

## Recommendations

A key finding of this NSCA is the need for central-level leadership on waste management protocol and practices. Lower in the supply chain, many of the recommendations for improving waste management remain those originally outlined in the 2016 NSCA and 2017 Strategic Plan:

- For leadership and governance, as a first step, greater clarity is needed on the existence and specifics of a national standard protocol for waste management and disposal. As part of this, strategic decision making is needed to determine what will be the main mode of waste management in the future. In past strategic documents, incineration is elevated as the chosen waste management strategy; however, after the 2018 central collection activity, most sites appear to expect transport to be a prominent method in the future. While either method—incineration or reverse logistics—is a reasonable waste management practice, clear decision making is needed to communicate, fund, and train on the chosen protocol(s).
- Clarify, revise, and disseminate manuals on waste management.
- Clarify monitoring roles and responsibilities. Implement 2017 recommendation to involve DNPM executives and General Inspectorate of Health (IGS) to integrate waste management criteria into supervisory activities.
- Incorporate waste management roles and responsibilities in formal job description(s) and ensure sufficient training is available to employed individuals.
- If prioritizing incineration, ensure the procurement and maintenance of sufficient incinerators.
- If prioritizing centrally led waste management, integrate reverse logistics of usable pharmaceuticals into the transport and distribution system
- Provide line budgets for waste management at all levels of the system.

<sup>19</sup> 57 percent of warehouses reported that waste management was included in some staff personnel job description.

# Supplemental Exhibit

## Exhibit 77. Waste Management: Distribution of Questions and Assignment of Weight Across Capability and Facility Levels

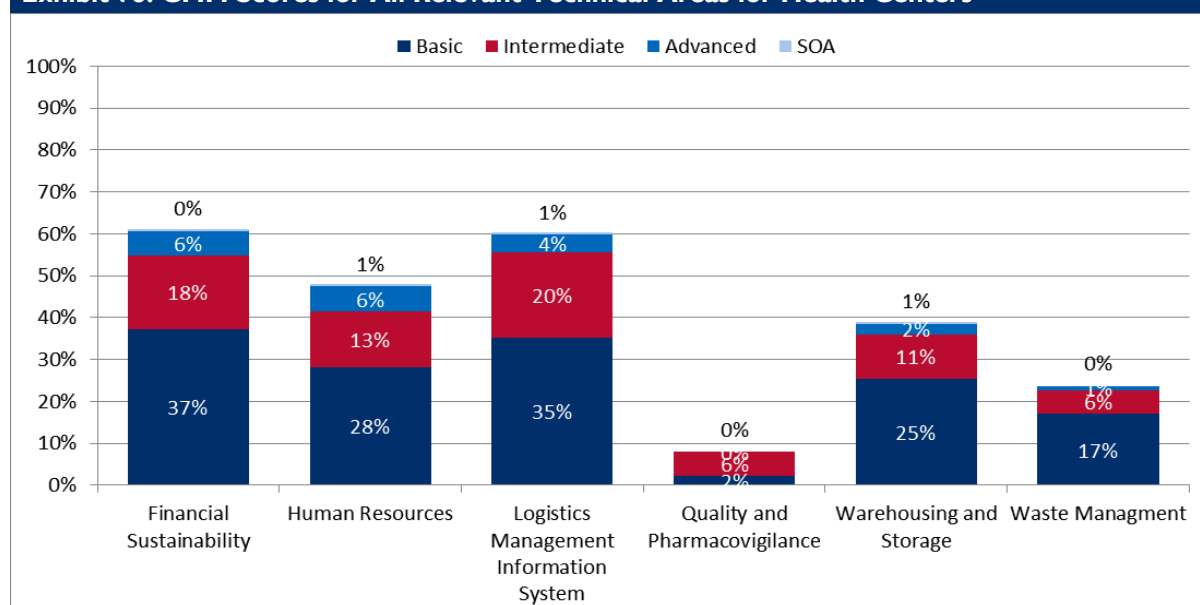
MODULE	BASIC (50%)		INTERMEDIATE (30%)		ADVANCED (15%)		SOA (5%)	
	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT	# of Qs	WEIGHT
Health center (n=98)	48	1.0%	29	1.0%	13	1.1%	7	0.7%
Hospitals (41)	48	1.0%	29	1.0%	13	1.1%	7	0.7%
Referral Hospitals (3)	4	12.5%	10	3.0%	6	2.5%	2	2.5%
Warehouses (7)	4	12.5%	10	3.0%	6	2.5%	2	2.5%
MOH (1)	10	5.0%	5	6.0%	3	5.0%	2	2.5%

## Cross-cutting Analysis

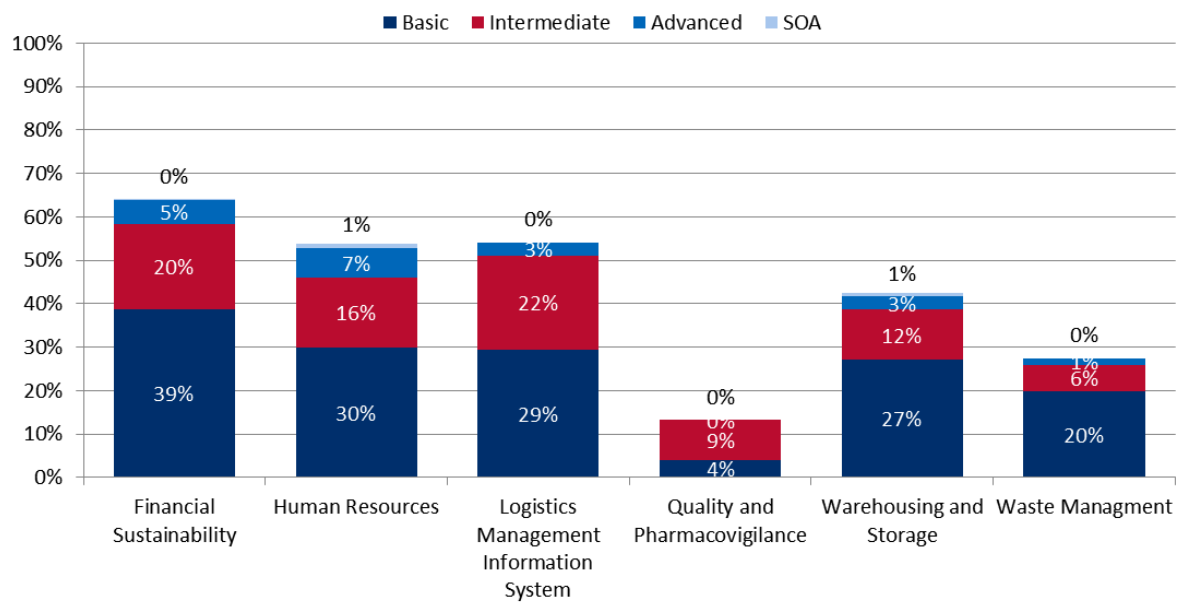
This report examines the pharmaceutical supply chain across the various technical/functional areas that inform and shape the way the supply chain operates. However, it is also important to notice trends across technical areas but within a certain tier of the health system. CMM scores are presented by facility type. Major takeaways from a cross-cutting perspective are:

- The national hospitals have consistently scored lower than other facility types in Guinea across a variety of technical areas. These facilities are supposed to be the most advanced service delivery points within the Guinean health system. As such, they are judged by slightly higher standards than normal SDPs according to NSCA methodology. In a perfect system, these hospitals would be the benchmark against which other facilities are measured and to which they strive to emulate. This relationship is not currently in existence within the context of the Guinean health system in regard to supply chain management. As the largest facilities with the closest proximity to higher concentrations of resources, the opportunity is great to make them into model supply chain institutions for other facilities in the country to model themselves after.
- While policy and governance is its own module in the NSCA, the need for strengthened governance is apparent in every technical area examined in this report. This in combination with increased transparency (in distribution schedules, procurement practices, waste management expectations, etc.) would prove greatly beneficial for the entire health supply chain system.
- Pharmacovigilance and waste management as areas of focus seem to be off the radar of those in charge of reforming the public health supply chain. These areas have been documented to have the lowest capabilities at every tier in the system. Leaders need to give additional focus and effort to these areas to bring them up to a basic level of functioning in the system.

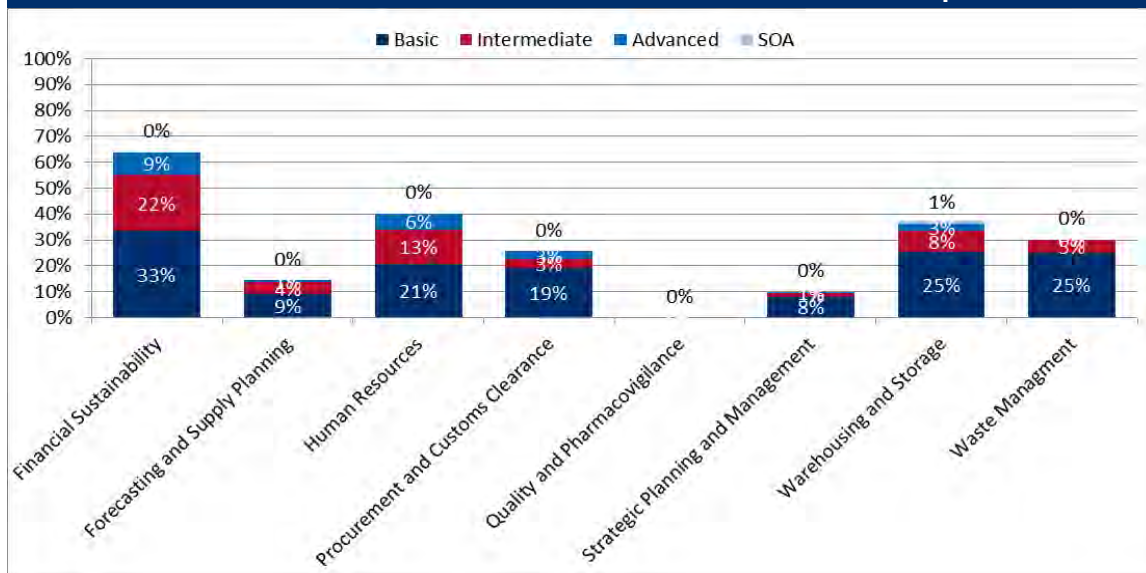
**Exhibit 78. CMM Scores for All Relevant Technical Areas for Health Centers**



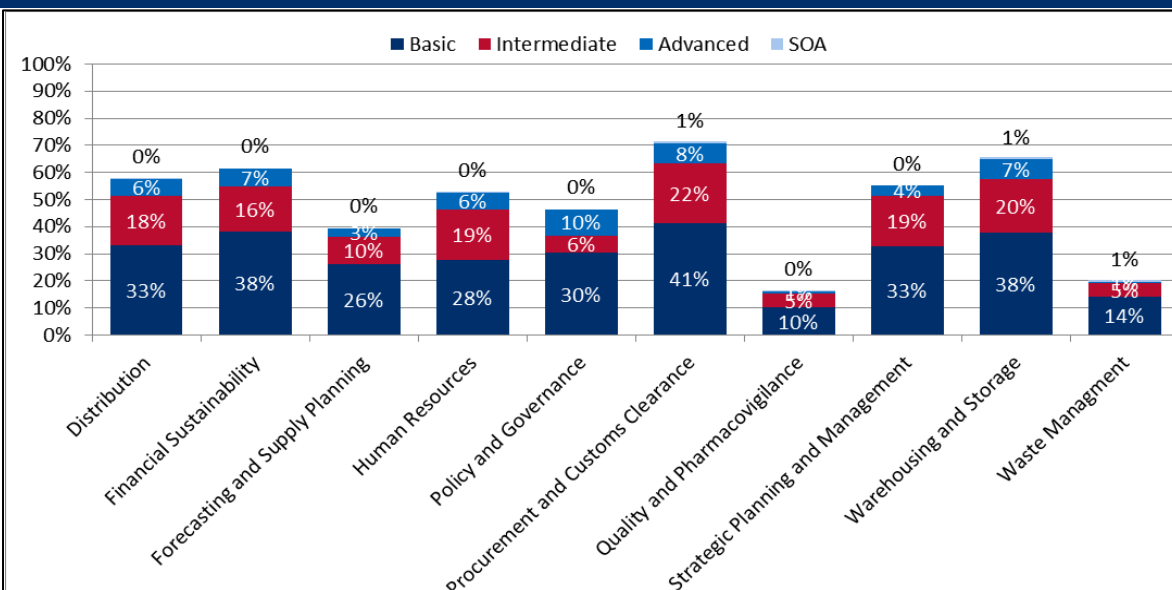
**Exhibit 79. CMM Scores for All Relevant Technical Areas for Hospitals**



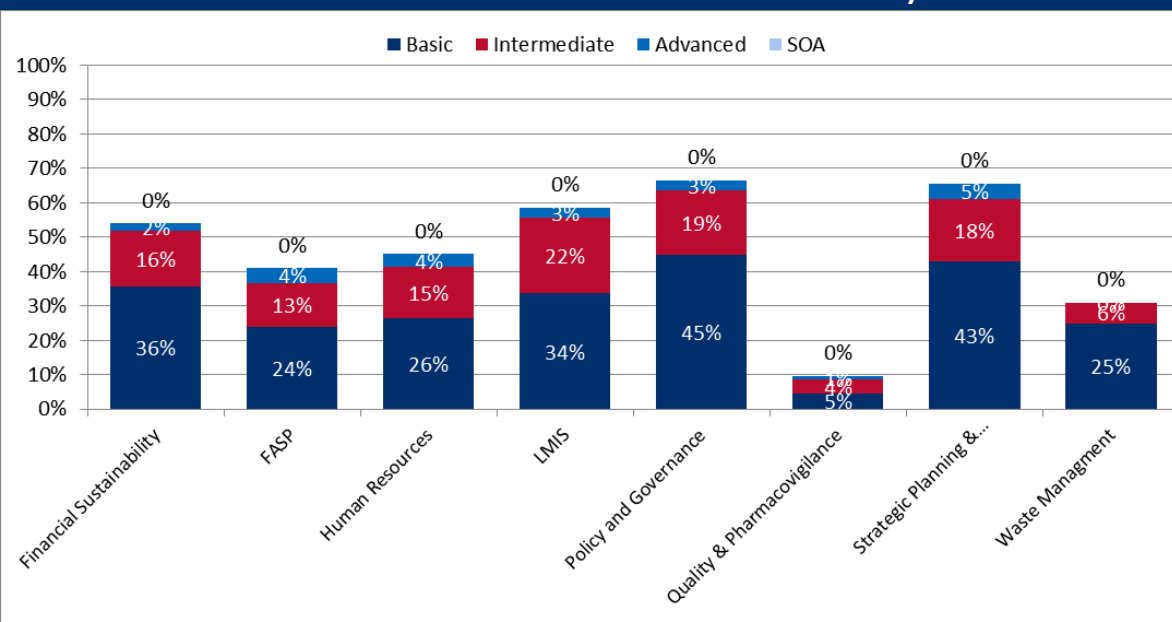
**Exhibit 80. CMM Scores for All Relevant Technical Areas for National Hospitals**



**Exhibit 81. CMM Scores for All Relevant Technical Areas for PCG Warehouses**



**Exhibit 82. CMM Scores for All Relevant Technical Areas for the Ministry of Health**



# Consolidated Recommendations

NSCA methodology produces targeted, actionable recommendations across the entire supply chain. To facilitate coordinated planning and action, those recommendations from across the report are consolidated here, by technical area.

The 2017 Strategic Plan included a thoughtful SWOT analysis of key functional areas of an effective supply chain, coupled with lengthy lists of logical “priority actions.” In updating and revising the Strategic Plan, one overarching recommendation is to push leadership to approach prioritizing specific actions more aggressively. Actions to improve the supply chain can be prioritized in three ways:

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

To model how to prioritize actions, we select below two recommendations per technical area that the NSCA assessment team further emphasizes. 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 MOH and GOG. Additional targeted recommendations are found at the end of each technical section in this report.

To ensure that workstreams remain on track for implementing the national strategic pharmaceutical supply chain plan, the GOG should consider prioritizing the following recommendations:

## Strategic Planning and Management

- Facilitate biannual revision and updating of the Strategic Plan, wherein progress made is interrogated, assumptions and timelines reconsidered, priorities revised and reordered, and specific roles and responsibilities identified for all actors in the supply chain system. [Prevailing priority]
- Ensure that the monitoring plan and framework for supply chain performance tracking are sufficiently resourced and monitors are empowered to act upon findings. [Prevailing priority]

## Policy and Governance

- Update national policies and guidance, including the national STGs, and NPM. [Prevailing priority]
- Ensure that existing policies are implemented, regulations monitored, and governance institutions are fully authorized to act to correct abuses, including empowering existing regulatory bodies, funding pharmaceutical inspection activities, and strengthening implementation of the regulations emanating from the recently promulgated pharmaceutical law. [Prevailing priority]

## Human Resources

- Establish a competency framework for employees in the supply chain at all levels, including the PCG, incorporating appropriate supply chain functions into public health job descriptions and into existing supportive supervision practices. [Low-cost/high-yield priority]
- Strengthen the supervisory roles of Regional Directorates of Health (DRS), Prefectural Directorates of Health (DPS), and the LMU. [Low-cost/high-yield priority]

## Financial Sustainability

- Clarify budget line items for supply chain functions to ensure that sufficient resources are allocated and to enable better tracking of costs and performance. [Prevailing priority]
- Lower-level facilities need to consistently implement best practices in financial management and record keeping and provide budgetary guidance on supply chain functions specifically. [Low-cost/high-yield priority]

## Forecasting and Supply Planning

- Empower the LMU to have full authority over all forecasting and supply planning processes within the Ministry of Health to standardize the process, bring all stakeholders to the table (vertical programs, PCG, MOH officials, development partners, etc.) for effective and accurate quantification and planning, and institute a performance monitoring framework. [Prevailing priority]
- Follow through on the recommendation from 2017 to create an integrated manual for forecasting to bring consistency and transparency to the forecasting process for all programs and stakeholders. [Low-cost/high-yield priority]

## Procurement and Customs Clearance

- PCG is a competent and capable procurement entity. The GOG should be fully leveraging its MOU to allow transparent, auditable procurement processes to be conducted for GOG-funded commodity procurement. [Prevailing priority]
- PCG should implement a monitoring system for a set of key performance indicators to ensure all areas of its procurement are performing well. [Low-cost/high-yield priority]

## Warehousing and Storage

- With storage space and infrastructure still lacking in all PCG warehousing facilities, the MOH must expedite renovations of existing regional depots and planned construction of the new central warehouse as soon as possible. This will be critical for the long-term resiliency of the national health supply chain. [Prevailing priority]
- Service delivery points across the nation are missing half of the basic items needed for warehousing and storage. The MOH needs to inventory storage capacity, warehousing equipment, and safety equipment to understand the gaps facility by facility. This information should be used to advocate for funding in the next national budget to ensure that facilities are properly equipped. [Time-order priority]



## Distribution

- Optimize (or outsource) the regional fleet. Distribution from regional PCGs to health centers remains a challenge. Delayed distributions suggest that fleets are not being used with maximum efficiency. The 2017 goal of “better optimization of regional fleet” remains. Alternatively, the MOH could consider forming a private-public partnership wherein the PCG would retain responsibility for distribution to the regional warehouses and to districts but would outsource last-mile distributions (from districts to health facilities) to private wholesalers. [Prevailing priority]
- Improve distribution information systems. Ensure that staff at all levels in the supply chain system have necessary trainings and supervision to ensure that record keeping, and data management are done correctly. Equally, integrating the distribution information system with the national LMIS system presents an opportunity to increase visibility and improve decision making for distribution plans. [Prevailing priority]

## Logistics Management Information System

- Continue to invest heavily in training health personnel at all levels of the system and ensure that reporting is formalized as a key task in the job description of at least one member of staff at every reporting facility, and accuracy included in their performance review. [Prevailing priority]
- Continue to support DQAs, including training of district and regional officials to implement rigorous DQAs, provide supportive supervision, and translate results in targeted recommendations and improvements, particularly in accessibility of reporting forms. [Low-cost/high-yield priority]

## Quality and Pharmacovigilance

- Leadership and strategy. Validate, update, and disseminate national quality control policies and standard operating procedures. Clarify roles at all points in the supply chain, and consider a reasonable timeframe for expanding quality control capacity, responsibilities, and oversight at lower levels of the supply chain. Consider creating a distinct national medicines regulatory authority. [Time-order priority]
- Institutionalize and train staff on the pharmacovigilance reporting system to ensure that pharmacovigilance tools are widely used and data are consistently reported and reviewed. Reciprocally, work on a system for monitoring international news on drug safety and communicating relevant reports to local actors. [Prevailing priority]

## Waste Management

- Clarify the existence and specifics of a national standard protocol for waste management and disposal. At a strategic level, determine what will be the main mode of waste management in the future. In past strategic documents, incineration is elevated as the chosen waste management strategy; however, after the 2018 central collection activity, most sites appear to expect transport to be a prominent method for the future. While either method—incineration or reverse logistics—is a reasonable waste management practice, clear decision making is needed to communicate, fund, and train on the chosen protocol(s). [Time-order priority]
- Clarify monitoring roles and responsibilities. Implement 2017 recommendation to involve DNPM executives and IGS to integrate waste management criteria into supervisory activities. [Low-cost/high-yield priority]

## Conclusion

This NSCA finds that Guinea's public health supply chain benefits from a plethora of strategic-level plans for the overall health system, pharmaceutical sector, and supply chain management specifically. This is a valuable starting point for improving system capabilities and performance. The next important step, however, is implementation, which in turn requires thoughtful prioritization. The 2017 Strategic Plan is an ambitious list of "priority actions" but lacks a level of critical prioritization. The 2019 NSCA findings present an opportunity to update understanding of Guinea's public health supply chain context and revisit and restructure these priorities.

Many of the priority action items from the strategic plan remain incomplete as of the writing of this report. While some of these priority actions do require financial support, what they need more is strong and committed leaders who are willing to commit to the reforms needed. Many of the recommendations listed in the previous section start with effective leadership and governance. This includes empowering existing units and institutions (e.g., the LMU and the PCG) with the resources and authority to fully implement their supply chain mandates, committing to address neglected areas of supply chain management (e.g., quality assurance and waste management), and providing national guidance and supportive supervision that ensures that supply chain functions are an integrated and supported part of the public health human resource development in the country. The authors of this report are confident that with a renewed commitment by public health leadership, coupled with effective governance, the appropriate reforms can be implemented.

Warehousing and storage, procurement, and LMIS stand out as areas of sizable increases in capabilities in recent years. Attainments in basic and intermediate capabilities are good starting points for gaining more advanced capabilities with further investment into the future. More imminently, they present opportunities for improvements in *performance* throughout Guinea's public health supply chain. An overarching finding of this NSCA was that performance generally lags behind capabilities in all technical areas of Guinea's public health supply chain system. This is largely to be expected, given that many of the capabilities are newly installed. Continued investment in capacity training and supportive supervision in these areas is vital to achieving latent potential.

LMIS is particularly important for supply chain performance improvement. As the NSCA found, many of the key basic capabilities are already in place in Guinea. With a real commitment to consistent training and time, expect improvements in LMIS performance, which in turn can inform more accurate forecasting, supply planning, and procurement, and ultimately more efficient and timely distribution of health commodities throughout the country. In support of this, addressing identified incidental gaps in basic capabilities—e.g., ensuring a consistently available stock of stock cards at all facilities—will go far to improve performance.

In contrast, quality assurance and testing and waste management were revealed as continued gaps in Guinea's public health supply chain. Where policies exist, strategic or leadership commitment to disseminate these policies or provide the resources needed to implement is lacking. In waste management, the outsized impact of a single donor-led exercise is concerning, as it underlines the absence of sustainable solutions to this core challenge.

The authors of this report are confident that with leadership, strategic investment of financial and human resources, and proper empowerment of key stakeholders, appropriate reforms can be implemented to further advance the capabilities and performance of Guinea's public health supply chain.