

**USAID GLOBAL HEALTH
SUPPLY CHAIN PROGRAM**
Procurement and Supply Management



GHSC-PSM TASK ORDER 2 (MALARIA)

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The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project is funded under USAID Contract No. AID-OAA-I-15-0004. GHSC-PSM connects technical solutions and proven commercial processes to promote efficient and cost-effective health supply chains worldwide. Our goal is to ensure uninterrupted supplies of health commodities to save lives and create a healthier future for all. The project purchases and delivers health commodities, offers comprehensive technical assistance to strengthen national supply chain systems, and provides global supply chain leadership.

GHSC-PSM is implemented by Chemonics International, in collaboration with Arbola Inc., Axios International Inc., IDA Foundation, IBM, IntraHealth International, Kuehne + Nagel Inc., McKinsey & Company, Panagora Group, Population Services International, SGS Nederland B.V., and University Research Co., LLC. To learn more, visit ghsupplychain.org

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Acronyms

3PL	third-party logistics
ABC	activity-based costing
ABC/ABM	activity-based costing/management
ACT	artemisinin-based combination therapy
ABREMA	Burundian Authority for the Regulation of Human Medicines and Food Products (French)
AIDC	automatic identification and data capture
AL	artemether-lumefantrine
AMF	Against Malaria Foundation
API	active pharmaceutical ingredient
APTS	auditable pharmaceutical transactions and services
ARTMIS	Automated Requisition Tracking Management Information System
ASAQ	artesunate + amodiaquine
CAMEBU	Centrale d'Achat des Médicaments Essentiels du Burundi
CAPA	corrective and preventive action
CHAI	Clinton Health Access Initiative
CHW	community health worker
CMAM	Central De Medicamentos E Artigos Médicos

CoC	certificate of conformance
COVID-19	coronavirus disease 2019
CPhI	Convention on Pharmaceutical Ingredients
CRS	Catholic Relief Service
DHA-PPQ	dihydroartemisinin–piperaquine
DNPM	Direction Nationale de la Pharmacie et du Médicament
DPS	Directorate of Pharmacy Services
DRC	Democratic Republic of the Congo
DSNIS	Direction du Système National d’Information Sanitaire
EAC-RCE-VIHSCM	East African Community Regional Centre of Excellence for Vaccines, Immunization & Health Supply Chain Management
eLMIS	electronic logistics management information system
ENABEL	Belgian Cooperation Agency
EPSS	Ethiopian Pharmaceuticals Supply Service
EUV	end-use verification
FASP	forecasting and supply planning
FAO	Food and Agricultural Organization
FY	fiscal year
GDSN	Global Data Synchronization Network

GHSC-PSM	USAID Global Health Supply Chain Program-Procurement and Supply Management Project
GLN	Global Location Number
GTIN	Global Trade Item Number
HRP2	histidine-rich protein 2
I2I	Innovation to Impact
IPA	International Procurement Agency
ITN	insecticide-treated net
KPI	key performance indicator
KSM	key starting material
LLIN	long-lasting insecticide-treated net
LMIS	logistics management information system
LQAG	LLIN Quality Assurance Group
LTA	long-term agreement
M-DIVE	Malaria Data Integration for Visualization platform
M&E	monitoring and evaluation
MIS	management information system
MINSANP	Ministry of Public Health
MOH	Ministry of Health
MOHCC	Ministry of Health and Child Care

MOPDD	Malaria and Other Parasitic Diseases Division
mRDT	malaria rapid diagnostic test
MMV	Medicines for Malaria Venture
NFO	non-field office
NMCP	National Malaria Control Program
NMEC	National Malaria Elimination Centre
NMEP	National Malaria Elimination Program
NMSA	National Medical Supplies Agency
NPC	National Product Catalog
NSCA	National Supply Chain Assessment
ONPC	National Office for Pharmaceutical and Chemical Products
OOS	out-of-specification
OTD	on-time delivery
OTIF	on time in full
PATH	Program for Appropriate Technology in Health
PBO	piperonyl butoxide
PCG	Pharmacie Centrale de Guinée
PCMT	product catalog management tool
Pf	Plasmodium falciparum

pLDH	parasite lactate dehydrogenase
PMED	Plan Monitoring and Evaluation Directorate
PMI	U.S. President's Malaria Initiative
PMI-EM	U.S. President's Malaria Initiative Eliminate Malaria
PNLP	Program Nationale de Lutte contre le Paludisme
PPMRm	Procurement Planning and Monitoring Report for malaria
PO	purchase order
PQ	prequalification
PSI	Population Services International
Pv	Plasmodium vivax
Q	quarter
QA	quality assurance
QAT	Quantification Analytics Tool
QC	quality control
QMS	quality management system
QPL	Quantification Analytics Tool Problem List
RAS	rectal artesunate suppository
RDC	regional distribution center
RMS	Regional Medical Store

RO	requisition order
SDP	service delivery point
SMC	seasonal malaria chemoprevention
SOP	standard operating procedure
SP	sulfadoxine-pyrimethamine
SPAQ	sulfadoxine-pyrimethamine + amodiaquine
SSA	(sole-sourced) semi-synthetic artemisinin
STTA	short-term technical assistance
TA	technical assistance
TO2	Task Order 2
TOM	Task Order Malaria
TWG	technical working group
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VSI	vendor-stored inventory
WHO	World Health Organization
WMS	warehouse management system
ZAMMSA	Zambia Medicines and Medical Supplies Agency

Executive Summary

This semi-annual report presented by the USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project highlights the accomplishments and performance of the malaria Task Order 2 (TO2) during the first half of the fiscal year 2023 (FY 2023). Aligned with the objectives of the U.S. President's Malaria Initiative (PMI), GHSC-PSM's work plays a vital role in contributing to reducing malaria deaths and significantly decreasing malaria morbidity, ultimately seeking the long-term goal of elimination.

GHSC-PSM actively supports USAID and PMI programs by procuring, managing, and delivering high-quality, safe, and effective malaria commodities. Collaborating with national malaria control programs, the project enhances strategic planning, logistics, data analytics, and capacity strengthening. Moreover, GHSC-PSM assumes leadership in global supply, demand, financing, and product development initiatives.

Under the PMI-funded TO2, GHSC-PSM supplies lifesaving prevention and treatment pharmaceuticals, malaria rapid diagnostic tests (mRDTs), long-lasting insecticide-treated nets (LLINs), and lab supplies. In the first half of FY 2023, GHSC-PSM continued to maintain high global supply chain performance, achieving an on-time delivery rate of 86 percent, exceeding the 80 percent target in each quarter. Also, the project collaborated with stakeholders, such as USAID Missions, suppliers, and logistics providers, to procure more than \$92 million in malaria commodities for 27 PMI partner countries, including six countries where GHSC-PSM has no field presence. And 99.9 percent of procurement value during this time period was managed under framework contracts—exceeding the 95 percent target for major product categories. As of the end of Q2, GHSC-PSM had generated commodity cost savings on core malaria products of \$244 million over the life of the project, including \$33 million in the first half of FY 2023. GHSC-PSM also saved \$447,189 on TO2 logistics in the first half of FY 2023 by managing open competition in freight lanes and optimizing the regional distribution center (RDC) network to three strategically placed warehouses (**Section A.1**).

GHSC-PSM works to strengthen global logistics processes and national supply chains to improve malaria commodity availability. In Q1–Q2, GHSC-PSM worked with third-party logistics (3PL) providers and USAID Missions to mitigate supply chain challenges by applying strategies such as proactive monitoring of potential impacts and early delivery where necessary. These challenges included variability in vessel scheduling, port labor and truck driver shortages, transshipment and border crossing delays, local government restrictions, and conflict and security threats (**Section A.2**).

In Q2, GHSC-PSM held business review meetings with LLIN and mRDT suppliers to discuss supplier performance. The project uses metrics to promote supplier performance improvements and inform order allocation decision-making, positively impacting the project's overall supply chain performance (**Section A.1**).

GHSC-PSM continues to facilitate more robust quality assurance (QA) and quality management systems for the products the project procures (**Section A.3**). GHSC-PSM noted rising quality concerns regarding mRDTs and initiated a root-cause review in Q2 to determine the appropriate corrective and preventive actions (CAPAs) to address them. The project also performed enhanced quality assurance/quality control (QA/QC) activities to ensure new mRDTs that detect parasite lactate dehydrogenase (pLDH) met

GHSC-PSM's quality requirements to fulfill a procurement of a non-WHO prequalified product from Ethiopia.

In the first half of FY 2023, GHSC-PSM provided technical expertise to eight PMI partner countries to conduct the end-use verification (EUV) survey. This was the first time Sierra Leone conducted an EUV (**Section A.4**). Over Q1–Q2, GHSC-PSM developed an indicator dashboard that allows users to interact with EUV data to gain insights into trends across time and locations. These views provide new ways to use the EUV survey data.

In the first half of FY 2023, GHSC-PSM built the Task Order Malaria (TOM) Power BI Management View Dashboard to enable efficient and targeted portfolio management. GHSC-PSM will roll out the dashboard in Q3 (**Section A.4**).

GHSC-PSM also continues to focus on activities in line with the five focus areas outlined in PMI's 2021 six-year strategy, End Malaria Faster—channeling efforts to end malaria by reaching the unreached, strengthening community health systems, keeping malaria services resilient, investing locally, and innovating and leading. Below are some highlights from the first half of FY 2023.

1. Reaching the unreached

GHSC-PSM supports PMI to achieve, sustain, and tailor deployment and uptake of high-quality, proven interventions focusing on hard-to-reach populations.

For instance, GHSC-PSM is working to procure mosquito repellent for the first time under TO2 (**Section A.1**) to fulfill the request from the Kingdom of Cambodia, specifically targeting forest goers.

2. Strengthening community health systems

GHSC-PSM works with PMI to transform and extend community and frontline health systems to end malaria. Some examples include:

At the request of PMI-Washington, in Q2, GHSC-PSM began developing a Community Health Worker (CHW) module for the EUV survey to inform activities designed to strengthen supply chain functionality at the community/CHW level (**Section A.4**).

GHSC-PSM worked with PMI on a malaria community supply chain advocacy paper that advocates for integrating community supply chain practices and highlights best practices for long-term investment, targeting community health facilities and CHWs. The paper will be finalized in Q3 (**Section B.1**). In addition, GHSC-PSM presented the final report of the Malaria Community Supply Chain Landscape Analysis Survey to PMI. The survey encompassed data gathered from 55 key informants across 27 PMI-partner countries (**Section B.1**).

In Q1 FY 2023, GHSC-PSM finalized updates and disseminated the amended stockout reduction initiative playbook to all PMI partner countries, including Kenya under Task Order 5 (TO5), and six non-field office (NFO) countries (**Section B.1**).

3. Keeping malaria services resilient

GHSC-PSM works with PMI to make malaria services more resilient against challenges such as emerging biological threats, conflict, and climate change.

In Q1, the project began Master Data Management and barcode data collection in Uganda during receiving and stock movements within the Joint Medical Store warehouse (**Section B.1**).

GHSC-PSM is developing a modeling tool for low consumption malaria commodities to analyze and guide malaria strategy and operations in low malaria-endemic countries and optimize supply chain management. In Q1, GHSC-PSM collected malaria supply chain system information from three countries and used this information in Q2 to develop a model. The project is testing the tool and will refine it and develop guidance for testing in other countries (**Section B.1**).

4. Investing locally

GHSC-PSM supports countries and communities to lead, implement, and fund malaria programs. The sustainability of PMI and GHSC-PSM efforts hinges on investing effectively in local partners to lead the fight against malaria, including developing procurement strategies with local manufacturers.

A good example of these localization efforts is related to LLINs. Throughout numerous collaboration sessions, PMI and GHSC-PSM discussed strategies to use procurement as a way to accelerate USAID's agenda on localization and further incentivize suppliers through various levers to expand local manufacturing of LLINs on the continent of Africa. GHSC-PSM then started to focus on those levers we could incorporate into the project's LLIN strategy and tender. Upon finalizing the tender evaluation for LLIN offers received for FY 2023 in Q1, the project pivoted to structuring its FY 2024 strategy for LLINs in Q2 (**Section A.1**).

GHSC-PSM also aims to support partner country governments to execute malaria programs successfully, which includes workforce development activities. In Q2 FY 2023, GHSC-PSM developed a two-phase project plan and timeline for assessing workforce development activities in PMI partner countries and began implementing Phase I in Malawi (**Section B.3**).

Examples of in-country workforce development activities include Ethiopia, where GHSC-PSM worked with the Ministry of Health (MOH) to train 736 staff from 26 health facilities on auditable pharmaceutical transactions and services (APTS) in five regions in Q2. By cost-sharing the training with the Ethiopian government, the project was able to promote government ownership and sustainability of the APTS initiative (**Section B.3**). In Zimbabwe, GHSC-PSM, working with the Directorate of Pharmacy Services, developed a mentorship curriculum for all levels of the supply chain and a training package for the curriculum. As a result, 75 mentors selected from 10 provinces received training and visited 667 health facilities countrywide, with future mentorship visits to be conducted quarterly (**Section B.3**).

For much of the first half of FY 2023, GHSC-PSM prepared for a Regionalization Workshop to take place in Q3 and be attended by representatives from USAID, GHSC-PSM, GHSC-QA, PQM+, MTaPSs, IQVIA, and all four GHSC-PSM task orders (TOs). The objective of the workshop is to "identify key elements, opportunities, and challenges that should be considered in developing a supply chain strategy that would support the U.S. Government's strategic goals on localization."

5. Innovating and leading

Through this strategic focus area, PMI and GHSC-PSM work to leverage new tools, optimize existing tools, and shape global priorities to end malaria faster.

Significant discrepancies between malaria service data and logistics consumption data raised PMI and GHSC-PSM concerns about country management of malaria commodities. In Q2, the project developed a systematic methodology and tool and collaborated with PMI on an accompanying Malaria Commodity Accountability Guide to provide stakeholders with the tools they need to identify commodity accountability discrepancies between service data and dispensing data within their product portfolios—particularly for ACTs (**Section B.1**).

Due to the scale, scope, and complexity of malaria as a public health challenge, global collaboration is essential. The project participated in the consultation on the World Health Organization (WHO) Guideline for Prequalification of Insecticide Treated Nets (ITNs). In Q2, the project participated in a meeting organized by Innovation to Impact (I2I) and CHAI to inform Module 7 (Post-Market Information) of the guideline, discussing data requirements and data collection (**Section C.1**).

The project also updated the certificate of conformance report to include the appropriate shelf life and lifespan requirements for LLINs. GHSC-PSM worked to understand how suppliers defined these attributes and recommended a solution for standardization (**Section A.3**).

Examples of GHSC-PSM's commitment to strengthening global collaboration are provided throughout the report. In Q1, the project updated the Malaria Pharmaceuticals Sub-Working Group on the status of a supplier product quality investigation, as well as plans to mitigate country stockouts of seasonal malaria chemoprevention products in Benin, Burkina Faso, Ghana, Mali, and Nigeria through the use of an alternate supplier (**Section C.1**).

A country example in this area is the participation of GHSC-PSM in a multi-donor effort—including the MOH, and Catholic Relief Service (CRS), and the Global Fund—to build a prefabricated warehouse in Guinea. The project held coordination meetings and reviewed and evaluated bids to contract a construction monitoring institution (**Section C.1**).

GHSC-PSM monitors and reviews project performance with the objective of continual improvement (**Section D**). The project uses a USAID-approved monitoring and evaluation plan with performance indicators that reflect the results framework. **Annex A** provides the framework, and **Annex B** provides the list of indicators and their definitions. **Annex C** details the sources of all the commodities the project procures. **Annexes D–F** provides project performance as detailed by the indicators.

TRANSITION PLANNING FOR NEXTGEN

In Q1–Q2, GHSC-PSM made strides in planning and preparing for the transition to the USAID Supply Chain Next Generation (NextGen) suite of projects. The Transition Management team continued to develop Country Transition Plan templates to assist countries in drafting their contractual transition deliverables. For those GHSC-PSM countries that have already completed transition and closeout activities, the project facilitated after-action reviews to document lessons learned that were then shared across a wider project audience. The Transition Management team will continue to collect and share learnings and best practices as country and HQ teams transition their activities. The Transition Management team also hosted a global supply chain-focused technical working group with USAID colleagues to further elaborate procurement-specific transition strategies, including stockpiling and supplier

contract handover. Similarly, GHSC-PSM routinely hosts transition-focused meetings with USAID to coordinate transition planning and risk mitigation. Through these fora, Transition Management is advancing discussions on communication protocols and the process for country transition plan development.

GHSC-PSM also advanced preparations for an in-person Country Director Meeting taking place in May, where the predominant theme will be project transition and legacy. This meeting will feature presentations and in-depth discussions on the transition preparations of various teams across the project.

A. Improved Availability of Health Commodities

The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project improves the availability of health commodities in supported countries through procurement and delivery. The project enhances commodity procurement, strengthens global logistics processes, promotes adherence to quality assurance (QA) requirements, and improves data visibility. Activities, achievements, and relevant performance indicators include:

A. Improved Availability of Health Commodities

A.1 Enhancing Global Health Commodity Procurement

Under the U.S. President's Malaria Initiative (PMI)-funded Task Order Malaria (TO2), GHSC-PSM supplies lifesaving prevention and treatment pharmaceuticals, malaria rapid diagnostic tests (mRDTs), long-lasting insecticide-treated nets (LLINs), and lab supplies.

GHSC-PSM Approach to Improving Malaria Commodity Markets

The project enhances supply security, accelerates innovation, and drives value for money, supporting near- and long-term access to appropriate, quality-assured products at sustainable prices.

GHSC-PSM applies a three-step approach to improving global malaria commodity markets:

1. **Conduct market health assessments** for all products to identify risks and market-shaping opportunities.
2. **Design market-shaping interventions** with global partners to inform sourcing strategies.
3. **Conduct strategic sourcing and procurement activities** to implement interventions and improve delivered good timeliness, reduce costs incurred by recipient countries, and sustain market health.

GHSC-PSM advances strategies for the best value, increases supply chain efficiencies for on-time delivery (OTD), and supports market health across the malaria product portfolios. Through long-term agreements (LTAs), the project is expected to expedite order procurement time—shortening lead times from order to delivery—and reduce complexity throughout the supply chain by standardizing procurement-related decisions. In Q1–Q2, 100 percent of procurement value was managed under LTAs—exceeding the 95 percent target for major product categories. See Annex E, indicator A10.

Stockpile Strategy and Vendor Stored Inventory

GHSC-PSM uses the regional distribution center (RDC) in Belgium to fulfill essential and/or urgent malaria commodity orders for sulfadoxine-pyrimethamine + amodiaquine (SPAQ) and artemether-lumefantrine (AL). The project rapidly moves SPAQ and AL by leveraging a rotating emergency loan fund to secure large volumes of supplier production capacity, including in markets where the supply is constrained, and places orders based on data-driven demand signals to secure production capacity earlier in the ordering process—often in advance of receiving orders.

GHSC-PSM uses the stockpile in the RDC to access critical commodities when countries need them, as well as reduce fulfillment lead times, and hedge uncertainty and disruption in the markets. These strategies are partially informed through demand data—derived from quarterly country supply plans and the monthly Procurement Planning and Monitoring Report for malaria (PPMRm)—which the project translates into country stock risk dashboards illustrating the timing and scope of upcoming stock risks. The project designed these strategies to mitigate future stockout risks, ensure timely delivery in constrained markets, and avail favorable market conditions (favorable pricing, etc.).

In the first quarter (Q1) of fiscal year 2023 (FY 2023), GHSC-PSM signed a contract with a second awarded vendor-stored inventory (VSI) supplier for AL. The project began placing VSI orders for Burkina Faso, Côte d'Ivoire, Nigeria, and Uganda under the VSI strategy with the two contracted suppliers in Q2. These VSI orders of AL are fulfilling urgent orders that have shorter requested delivery dates than the project's average lead times to mitigate stockout risks.

In Q2, GHSC-PSM delayed the pickup of the SPAQ to be shipped to the RDC. The product was placed on hold at the supplier's facility to cater to an urgent need in Ghana and will be shipped to Ghana directly. In the meantime, the project fulfilled a SPAQ order for Cameroon from the stockpile.

Supplier Engagement and Vendor Negotiations

The project engages with suppliers for all malaria commodities to deepen strategic relationships and support market health:

- **Supplier-specific forecasts.** GHSC-PSM shared forecasts with malaria commodity suppliers that were allocated volumes in Q1–Q2. These forecasts improve suppliers' ability to plan production and meet their active pharmaceutical ingredient (API), key starting material (KSM), and key component sourcing needs.
- **Mosquito repellent procurement.** GHSC-PSM conducted broad market research and supplier outreach to clarify the landscape and availability of registered topical mosquito repellent in Mekong countries. While mosquito repellent spray had not been procured historically under the Malaria Task Order, in Q2 the project brought a new supplier under contract through a competitive bidding at the request of the Kingdom of Cambodia in collaboration with the National Center for Parasitology, Entomology and Malaria Control to provide to forest goers. The first order is expected to be placed by the country office in Q3.
- **Commodity risk assessments.** GHSC-PSM evaluates programmatic impact to update commodity risk profiles by examining the geographical sourcing of commodities, market updates, and supplier-specific ability to meet goods availability dates. GHSC-PSM draws information about

sourcing KSM, raw materials, and packaging materials to mitigate and minimize any near- and long-term supply disruptions.

- **Business reviews.** In Q2, GHSC-PSM held 15 business review meetings with nine LLIN suppliers and six mRDT suppliers, to share and discuss supplier performance based on scorecards that emphasize five components: 1) purchase order (PO) line-level on-time performance; 2) occurrence and severity of inability to meet contractual requirements; 3) occurrence and severity of quality and regulatory incidents; 4) compliance with Global Standards for product traceability; and 5) qualitative internal feedback on supplier communication, flexibility, and responsiveness. The project shares these scorecards with suppliers semi-annually to address performance issues. Performance metrics promote supplier performance improvements while informing order allocation decision making. These efforts positively impact the project's overall supply chain performance.
- **Supplier visits.** In Q1, GHSC-PSM attended the Convention on Pharmaceutical Ingredients (CPHI) and met with current suppliers of malaria commodities under contract, three API suppliers, colleagues from Medicines for Malaria Ventures, Medicines for All Institute, and the United States Pharmacopeia. In Q1–Q2, project discussions with suppliers centered on perceptions of the API and KSM markets, insights into African manufacturing, and opportunities for improvement. In addition, GHSC-PSM visited the headquarters of a critical pharmaceutical supplier to finalize remaining details of a VSI agreement and learn about developments in their product pipeline.

Strategic Sourcing Activities

In the first half of FY 2023, GHSC-PSM sourcing efforts focused on structuring the project's FY 2024 strategic approach to LLINs. Upon finalizing the tender evaluation for LLIN offers received for FY 2023 in Q1, the project pivoted to structuring its FY 2024 strategy in Q2. Because nets can be manufactured in phases, the capital investment and regulatory approvals needed to manufacture on the continent of Africa create a relatively lower barrier to market entry compared to other malaria products. Over the course of numerous collaboration sessions, PMI and GHSC-PSM discussed strategies to use procurement as a way to accelerate USAID's agenda on localization.

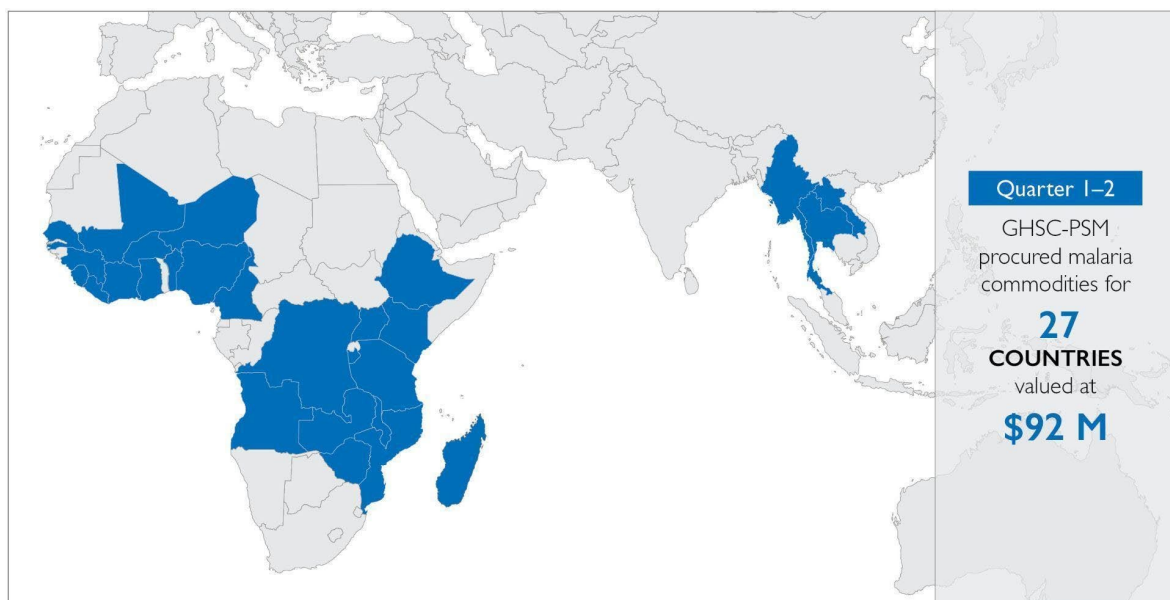
Procurement of Malaria Commodities

For procurement and end-to-end order management—from receipt through to delivery and payment—GHSC-PSM requires planning, open communication, and coordination among a broad group of internal and external supply chain stakeholders. In the first half of FY 2023, GHSC-PSM collaborated with stakeholders, such as USAID Missions, suppliers, and logistics providers, to support procurement of malaria commodities for 27 PMI-partner countries¹ valued at more than \$92 million (see Exhibit I below).

¹ Angola, Benin, Burkina Faso, Burundi, Cameroon, Côte d'Ivoire, DRC, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Niger, Nigeria, Senegal, Sierra Leone, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe.

This included project headquarter staff providing procurement support to six countries where GHSC-PSM has no field presence.²

Exhibit I. Countries for which GHSC-PSM procured malaria products in Q1–Q2 FY 2023



Cost Savings on Malaria Commodities

Commodity cost savings³ on core malaria products reached \$244 million over the life of the project, including \$33 million in savings in the first half of FY 2023. This represents 23 percent of the total procurement value for these core commodities over the life of the project, and 20 percent of the total procurement value for all malaria products over the life of the project.

Savings on ACTs totaled \$9.6 million in Q1–Q2. Despite price increases for several artemisinin-based combination therapy (ACT) products in recent years, costs remain below baseline prices, and savings continue to accrue.

Cost savings for LLINs continued to grow, amassing \$6.6 million in the first half of FY 2023. Savings are now driven almost entirely by piperonyl butoxide (PBO) nets, as most countries are phasing out single pyrethroids. While current average prices for PBO nets remain below baseline prices, funding delays during this period led the project to procure from higher-priced vendors with greater capacity to meet shorter fulfillment lead times. This initiative resulted in an increased average price per net compared to recent periods. When countries with limited funding have multiple upcoming requested delivery dates for

² Benin, Côte d'Ivoire, DRC, Madagascar, Senegal, and Tanzania.

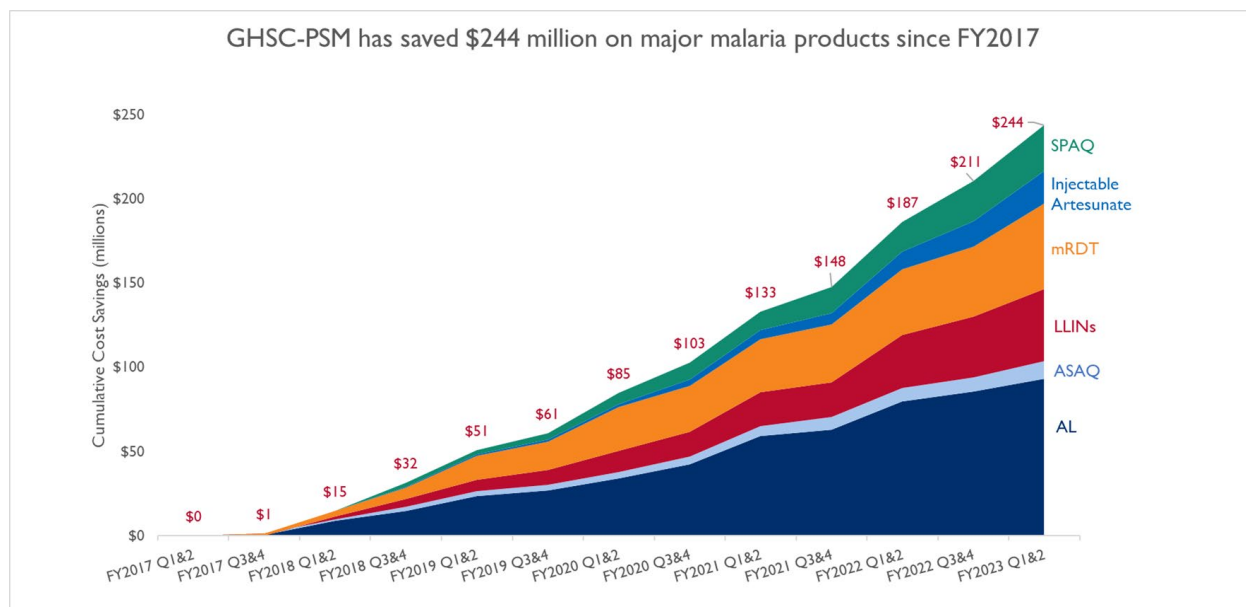
³ Commodity cost savings are calculated in comparison to baseline prices for each commodity (i.e., when the project began tracking cost savings for that commodity). Cost savings calculations are adjusted for inflation and are the averages of cost savings by tracer product type.

various malaria commodity types, the project and PMI will prioritize fulfilling prevention and treatment products over LLINs.

GHSC-PSM achieved \$9.7 million in cost savings for mRDTs in the first half of FY 2023. The mRDT market remains competitive and priced below the baseline. Savings accrued rapidly this period due to a surge of orders, nearing 90 million tests for the project's most commonly procured mRDT product.

GHSC-PSM also generated about \$3.6 million each in savings on 60 mg artesunate injectables and SPAQ. SPAQ saw price improvements due to increased competition in the market. Pricing for artesunate injectables has been stable in recent periods.

Exhibit 2. Cumulative cost savings of \$244 million on major malaria products since 2017



Commodity Procurement Indicators

GHSC-PSM procured malaria commodities worth more than \$92 million in the first half of FY 2023, including RDC stockpile orders and direct drops to countries, as shown in Exhibit 3.

Exhibit 3. GHSC-PSM procurement totals for the first half of FY 2023

Product category	Value
ACTs	\$ 14,584,398
Laboratory supplies	\$ 667,724
LLINs	\$ 40,553,791
Other non-pharmaceutical products	\$ 109,336
Other pharmaceuticals	\$ 148,400
mRDTs	\$ 22,146,169
Severe malaria medicines	\$ 7,514,610
Seasonal malaria chemoprevention (SMC)	\$ 4,950,815
SP	\$ 1,997,608
Other RTK	\$ 7,194
TOTAL	\$ 92,680,044

Annex C lists GHSC-PSM sources of mRDTs, LLINs, ACTs, laboratory supplies, and other pharmaceutical products.

In the first half of FY 2023, the project procured 100 percent of all core product categories (Exhibit 3) through framework contracts, except for laboratory products. Procurements through framework contracts represented 96 percent of lab procurements. When aggregated across all product categories, the overall framework contracting percentage by commodity value for Q1–Q2 FY 2023 was 99.9 percent, exceeding the annual target of 95 percent. GHSC-PSM uses several indicators to measure its performance. Procurement results are summarized in Annex E.

A.2 Strengthening Global Logistics Processes

The project applied strategies developed and lessons learned during the pandemic to deal with new challenges in the first half of FY 2023 that slowed the processing, shipping, and clearance of products for delivery. A couple of the strategies applied include heightened proactive monitoring of potential risks and early delivery. Challenges included variability in vessel scheduling, labor shortages, truck driver shortages, transshipment and border crossing delays, local government restrictions, conflict and security threats, and minimal port office staff. In Q1–Q2, GHSC-PSM worked with third-party logistics (3PL) providers and USAID Missions to mitigate these issues and meet demand across countries to deliver malaria commodities to 27 countries.⁴

Country/Region-specific Logistics and Transport Challenges

The project saw minimal coronavirus disease 2019 (COVID-19)-related supply chain disruptions to global logistics in Q1–Q2, but continued to face regional logistics and transport challenges. Chinese Lunar New Year shutdowns resulted in several weeks of manufacturing closures, shipping delays, and backups at ports during the holiday that affected three orders of artesunate injectables for Angola, Mali, and Uganda. This led to a three-week delay in goods being available for pick-up due to supplier closure. However, the delays did not result in any country-level stockouts.

- **Freight costs.** By the end of FY 2022, any volatility in the freight market was unrelated to COVID-19 impacts, but primarily driven by carrier load scheduling and demand. In Q1–Q2 FY 2023, GHSC-PSM completed the second freight rate refresh. The project employs this strategy to leverage stability in freight markets and to align with market rates where volatility remains. In the first half of FY 2023, the project experienced fewer fluctuations in freight rates, better predictability in shipping costs, faster bookings, and fewer spot rates compared to FY 2022.
- **Origin challenges.** Drought and labor shortages in Europe affected logistics in Q1–Q2. The drought restricted shipping due to low river water levels. This transferred pressure onto trucking services, leading to increased prices.
- **Air freight.** Carrier capacity into Africa remained low in Q1–Q2 (8 percent lower than pre-COVID-19 levels). Airline labor shortages of ground staff, baggage handlers, cabin crews, and pilots continued, which affected carrier operations. Higher-than-normal reliance on freighter services remained a challenge, with service going mainly to large commercial markets, leaving traditionally underserved markets with less air freight capacity.
- **Ocean freight.** The extended drought affected barge use in Europe in Q1–Q2. Exports from China were down in Q1, and carriers adjusted to the limited demand by blanking sailings and aligning schedules with demand.
- **Intra-Africa.** Logistics problems in the first half of FY 2023 stemmed primarily from conflict and climate change. Extremists active throughout the Sahel region carried out attacks in Burkina Faso,

⁴ Angola, Benin, Burkina Faso, Burundi, Cameroon, Congo DRC, Côte d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Niger, Nigeria, Senegal, Sierra Leone, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe.

Mali, Niger, and Nigeria. These militants also launched attacks in Benin, Côte d'Ivoire, and Togo. Meanwhile, the conflict between the Democratic Republic of the Congo (DRC) and Rwanda is escalating to the brink of open war.

Severe weather plagued Africa during the first half of FY 2023. The heavy precipitation in Nigeria, in addition to the excess water from the Lagdo dam in neighboring Cameroon, resulted in a flood that led to hundreds of deaths and displaced persons. The extreme flooding cut off road traffic to many delivery locations, including downstream Niger, which was also affected. The Southern African Development Community was also subject to extreme weather with tropical storms and a longer-than-usual rainy season. As a result, the region's ports experienced severe damage, causing delays in shipping schedules.

- **Temperature-controlled cargo.** GHSC-PSM and 3PL partners weigh risks according to consignment regardless of the mode of transportation to identify the most appropriate temperature-controlled supply chain solutions and to maintain cargo integrity. In Q1–Q2, there were fewer flights to destination countries (compared to pre-COVID levels) and temperature-controlled cargo could not move as booked. GHSC-PSM sourced the best routing from available carriers to arrive on time for clearance and delivery. The project also avoided routings that could cause weekend arrivals to prevent any delays.

Freight Procurement Activities

In Q1, GHSC-PSM undertook the second semi-yearly rate refresh activity, which aligned freight costs with market pricing. Under this rate refresh, should the market dynamics change, and rates increase, the 3PLs can reject a shipment award or accept it contingent on using the revised rates. For rejected awards, GHSC-PSM considers booking with a secondary or tertiary 3PL or opening the lane to spot bidding. Through this rate refresh, the project secured competitive rates in a less volatile, but more expensive market.

For large shipments and new lanes—a new supplier origin or new destination (country that GHSC-PSM has never shipped from or to)—GHSC-PSM uses spot bidding. With spot bidding, 3PLs secure competitive rates based on the lane or cargo volumes by negotiating with carriers at the market level. However, spot bids increase the shipment lead time because of the quoting process—awarding and booking activities follow sourcing, evaluation, and application of rates to subsequent operations.

In Q1–Q2, market prices were stable, although the Ukraine/Russia conflict impacted fuel pricing and created some market uncertainty. This uncertainty is one reason GHSC-PSM conducts a rate refresh every six months instead of annually. The project will continue to spot bid large shipments to obtain competitive pricing through its 3PL partners, as they can typically use larger loads to increase their buying power and drive down air and ocean freight costs. In the first half of FY 2023, the project continued to price lanes not included in the rate refresh and followed the spot-bidding process for large shipments for any new countries.

On-time Delivery and On-time Delivery in Full

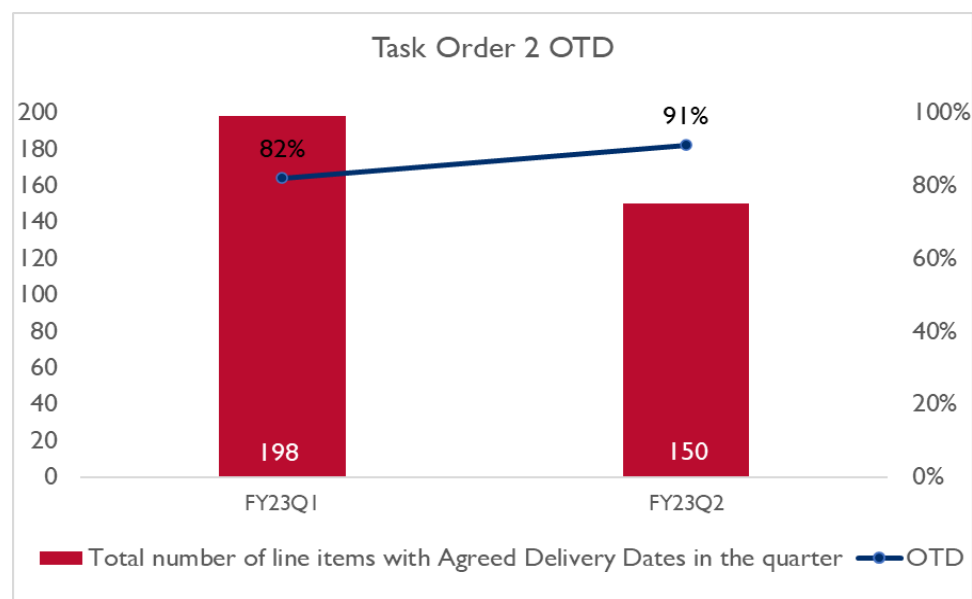
GHSC-PSM achieved an OTD rate of 86 percent in the first half of FY 2023. Quarterly project performance in Q1–Q2 exceeded the target of 80 percent (see Exhibit 4).

Exhibit 4. OTD rates for Q1–Q2 FY 2023

Time period (FY 2023)	OTD (%)
Q1	82
Q2	91
Aggregate Q1–Q2	86

The OTD rate measures the number of line items per quarter that were delivered on time, following agreed delivery dates, out of the total number of line items per quarter with agreed delivery dates in the quarter (Exhibit 5).

Exhibit 5. OTD and volume of deliveries of malaria commodities, Q1–Q2 FY 2023



OTD and on-time in-full delivery (OTIF) for specific malaria product categories are provided in Annex E.

GHSC-PSM's OTIF rate measures the percentage of deliveries during a given period delivered on time and in full. Delivering late orders in a subsequent month and split-shipment deliveries reduce the OTIF rate. For

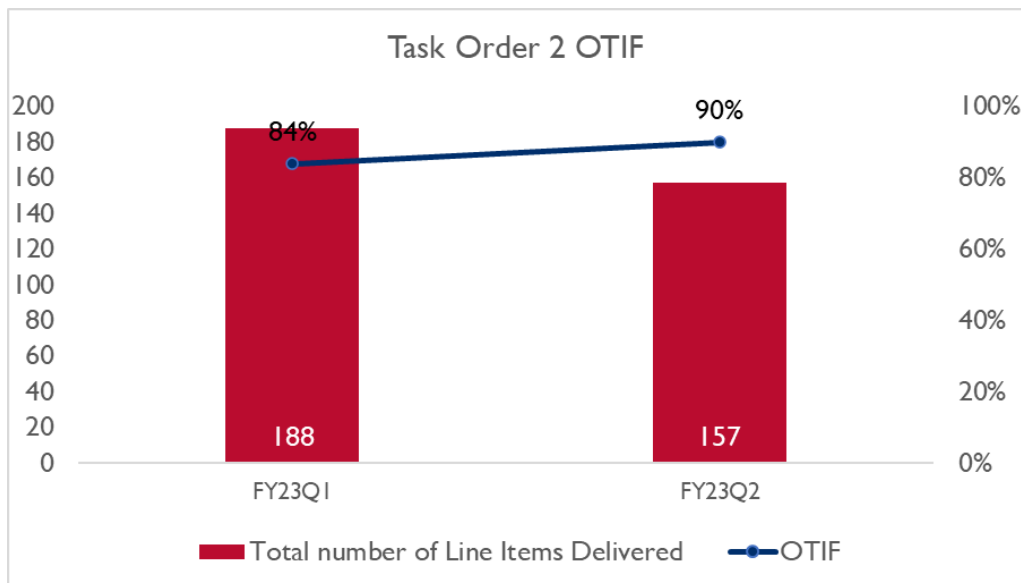
OTIF, project performance continued to exceed the target of 80 percent, reaching 87 percent for the first half of FY 2023 (see Exhibit 6).

Exhibit 6. OTIF rates for Q1–Q2 FY 2023

Time period (FY 2023)	OTIF (%)
Q1	84
Q2	90
Aggregate Q1–Q2	87

In FY 2022, the project’s OTIF rate for malaria commodities maintained strong performance (see Exhibit 7).

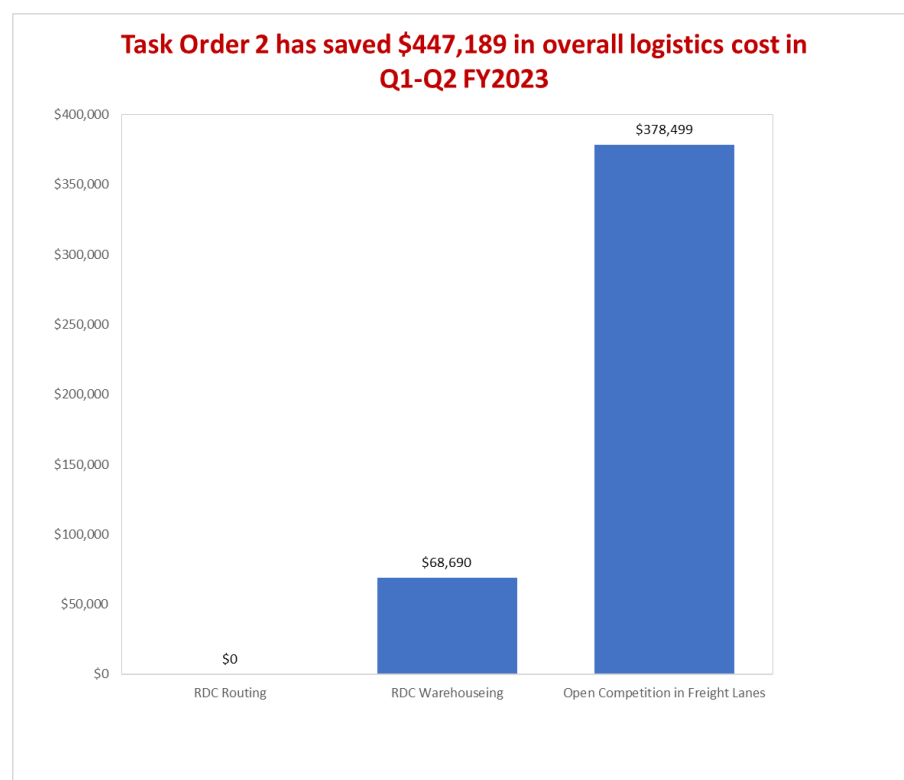
Exhibit 7. OTIF for malaria commodities, Q1–Q2 FY 2023



Cost Savings on Logistics

GHSC-PSM saved \$447,189 on TO2 logistics in the first half of FY 2023 (Exhibit 8) by managing open competition in freight lanes and optimizing the RDC network to the strategically placed RDC in Belgium. The savings tracked are compared to a sole-sourced model with limited competition in freight lanes and using the network of five RDCs that were used at the start of the project.

Exhibit 8. Task Order Malaria logistics cost savings



Open Competition in Freight Lanes

GHSC-PSM manages freight lanes through open competition rather than a sole-sourced 3PL. This improves service and cost savings on shipping rates through scale and competition for shipping lanes. Logistics savings are the difference between the rates awarded to the selected 3PL and the average of the two most expensive 3PLs. This method compares all shipping lanes and simulates the rates that would likely be obtained under a non-competitive 3PL model. Based on this methodology, GHSC-PSM Task Order Malaria has generated \$378,499 in cost savings in Q1–Q2 FY 2023 due to open competition for freight lanes.

Regional Distribution Center Warehousing and Routing

The project saves money on logistics for malaria commodities by optimizing a network of RDCs. In the first half of FY 2023, GHSC-PSM generated savings through the lower costs of warehousing at the Belgium RDC, measured against the costs of the previously used RDC located in the Netherlands, which generated \$68,690 worth of cost savings for malaria commodities in Q1–Q2 FY 2023.

In previous reports, the project has provided information on cost savings derived from lower shipping costs on actual commodities that moved through the Belgium RDC, compared to what shipping would

have been for those commodities under the previous five-warehouse model. There were no cost savings generated in this category for this period.⁵

Logistics and Delivery Indicators

This section presents performance on logistics and delivery-related indicators not shown above. Values for these indicators are in Annex F.

Product Loss

In the first half of FY 2023, the project lost just \$18.25 of AL products due to expiry at the Belgium RDC (this was the loss of one pack left behind from a much earlier order that could not be allocated to another destination). GHSC-PSM also experienced minimal losses of other malaria products under its control. The value of product loss at the Belgium RDC due to theft, damage, or causes other than expiry amounted to \$14.50 in the first half of FY 2023 due to damage to SPAQ products while in transit to the Belgium RDC. There were no RDC expiries of over \$500 USD to report in the first half of FY 2023.

GHSC-PSM manages product shipments to countries, as well as some storage and distribution within countries. Confirmed loss incidents within the global supply chain typically include product damage that occurred in transit to the destination. Most of these losses are typical for a supply chain of this size and represented a minimal proportion of the total value of product delivered in the quarters the losses took place. In the first half of FY 2023, product losses that occurred in project control due to theft, damage, or expiry totaled just over \$29,000 (less than one-half of a percent annual loss). See Annex G for more details.

Cycle Time

Cycle time is the time from order entry to the product's arrival in the destination country. The project considers several factors when assessing cycle time:

- **Anticipated high demand and early order placement.** Typically, countries simultaneously enter a large volume of orders around the PMI annual call for orders, which takes into consideration the next year's funding cycle and serves as a reminder for order placement in preparation for seasonal demand. Orders often have delivery dates in the distant future that do not necessitate the entirety of the time between order placement and delivery to process and fulfill the order. While this provides visibility into demand and allows for effective supply planning, it can also lengthen cycle times.
- **Funding availability.** Due to shifts toward early order entry, the time between order entry and available funding grows larger. Country FY funding obligations lag behind order entry by several months. The project works with countries to spend down remaining pipelines from the previous fiscal year, conduct budget analyses, and prioritize the most urgent orders. The project uses a limited emergency loan fund to process cross-country proactive procurements for critical commodity categories and to issue one-time country-specific loans to mitigate funding delays and

⁵ Cost savings could not be calculated for the single distribution order that occurred this reporting period as the project did not have comparable rates on file for this specific shipping lane.

meet the most urgent needs. All orders subject to available funding must be placed on hold. This happens often and the holds can be lengthy.

- **Validation of specifications.** Complex or uncertain order specifications can increase the time required to prepare the order for procurement, increasing the cycle time. This is most common for laboratory items; orders with scopes of work that are not defined fully at order entry (e.g., last-mile distribution plans for LLINs); and orders for which countries are still determining the type, amount, and required delivery timeline. Clarification discussions are common for malaria commodities and are outside of the project's control but can extend processing times, which increases cycle times.
- **Mode of shipment.** In 2019, the project shifted from a default air shipment preference to ocean shipment, which was more cost-efficient and feasible for all categories other than LLINs that had already defaulted to ocean freight. This strategy increases overall cycle times because ocean shipments are less flexible than air, with fewer options for rapid or expedited delivery. Also, the project aligns many QA and logistics processes with the ocean strategy to reduce logistics cycle times. That notwithstanding, some products are still shipped by air if the need is urgent.
- **Challenging destinations.** GHSC-PSM serves complex destinations such as DRC, which can have up to ten delivery destinations per commodity. This is many times the number of delivery lines for the average country order—all with the same requested delivery date, each requiring individual processing along the same timeline. DRC accounted for nine percent of the malaria shipments delivered in the first half of FY 2023. These orders are labor and time-intensive due to the complexity of this destination. Moreover, the project delivers to some inland destinations; these orders entail longer delivery timelines and skew the malaria commodity average cycle time.
- **Cycle time as a lagging indicator.** Cycle time does not capture improvements in order processing until the orders are delivered.
- **Factors outside the supply chain.** Supplier-specific quality issues, client-requested holds, country-specific import challenges, and in-country quantifications that result in changes after an order is in process can contribute to lengthy cycle times. In Myanmar, circumstances outside of the project's control resulted in lengthy order processing delays; suppliers held goods at their sites due to ongoing import challenges. The project uses hold status fields in the Automated Requisition Tracking Management Information System (ARTMIS) to account for scenarios where an order requires no active processing or fulfillment activity by the project during this hold period. This tracking allows GHSC-PSM to calculate active (i.e., dwell-adjusted) cycle times that reflect precise processing time on orders. This applies to cycle time segments before PO execution, so the cycle time for any country-specific challenges is not adjusted.

The average cycle time for the first half of FY 2023 was 345 days (see Exhibit 9), against a target of 340 days. This was a slight increase of six days over FY 2022, which averaged 339 days. Comparing quarter by quarter, the first half of FY 2023 showed an increase in cycle time for Q1 to 372 days and a dramatic decrease in Q2 to 311 days. The increase in cycle time in Q1 was due mostly to longer wait times for severe malaria medicines, which had been held due to quality control

investigations and required re-sourcing or delayed due to customs clearances. Q2 did not face these issues.

Since FY 2021, the project has reported on dwell-adjusted cycle time. As mentioned above, in the first half of FY 2023, a common reason for these holds were lead time delays due to country quantification exercises. GHSC-PSM analyzes hold usage and dwell-adjusted cycle time to identify insights and opportunities for process improvement to drive gains in global supply chain responsiveness. Starting in FY 2023, GHSC-PSM set a separate target for dwell-adjusted cycle times, at 300 days, which the project met in Q2 with a dwell-adjusted cycle time of 285 days, but not in Q1, with a dwell-adjusted cycle time of 327 days.

Exhibit 9. Task Order 2 cycle times for Q1–Q2 FY 2023

Time period (FY 2023)	Overall average cycle time (days)	Cycle time target (days)	Dwell-adjusted cycle time (days)	Dwell-adjusted cycle time target (days)	Average cycle time without DRC ⁶ (days)
Q1	372	340	327	300	372
Q2	311	340	285	300	296
Q1–Q2 FY 2023	345		308		340

Cross-cutting Process Improvements

The project invests in process improvements to reduce cycle times, including:

- Using the emergency loan fund strategically to execute proactive procurements based on demand data. This contributes to reducing the lead time from requisition order (RO) entry through delivery of goods against the agreed delivery date.
- Implementing standardization protocols and a workflow checklist to streamline the RO approval process.
- Implementing a tool to support rapid and accurate budget scenario planning, allowing faster feedback to countries regarding available budget versus budget needed for orders placed.

⁶ DRC is excluded due to acknowledgment that DRC's historically long cycle times can drive up the overall cycle time, especially in periods where the country may have more line items, which disproportionately inflates the average.

- Using supply planning exercises in-country to create accurate and actionable supply plans, reducing upfront order clarifications.
- Aligning procurement, QA, and logistics processes.
- Implementing management systems to identify and manage orders lagging at any point in the order lifecycle.
- Deploying the Task Order Malaria (TOM) Power BI dashboard, which pulls salient information from various modules, including Quality Assurance Management System and logistics management information system (LMIS) data, along with specific fields available in ARTMIS as a source of truth to provide daily updates to data users.
- Establishing system connections to facilitate the Power BI data flow referenced by the TOM report, thus avoiding redundancy of entering the same data into multiple systems for reporting purposes. This process reduces the chances of data entry errors and the level of effort from users who maintain data across multiple systems.

Managing the Malaria AL Stockpile

In the RDC in Belgium, GHSC-PSM maintains PMI's malaria emergency stockpile of a relatively small cache of ACTs (specifically AL) for rapid allocation to countries based on need. Stockpile quantities are based on historical data and estimated to satisfy emergency orders (defined as orders with 0-4 months between requisition order creation and requested delivery date). The estimation is repeated multiple times per year to create frequent replenishment of orders based on the remaining stock. In the first half of FY 2023, the project delivered four line-items in two inventory orders to the Belgium RDC. GHSC-PSM reviews the information at least quarterly (more frequently if required) to identify any shelf-life issues with the current stock, to match probable use of stocks with risk of expiry to orders that are not normally fulfilled by the RDC, and to determine any new quantities needed for procurement. In the first half of FY 2023, the project received \$278,299 in AL for pre-positioning at the Belgium RDC (Exhibit 10).

Exhibit 10. GHSC-PSM's total AL products received at the RDC in Q1–Q2 FY 2023

Product	Number of treatments delivered to the Belgium RDC
AL 20/120 mg dispersible tablet, 6x1 blister packs	169,440
AL 20/120 mg dispersible tablet, 6x2 blister packs	152,520
AL 20/120 mg tablet, 6x3 blister packs	139,380
AL 20/120 mg tablet, 6x4 blister packs	172,770

GHSC-PSM used the stock available at the RDC to fulfill urgent or emergency orders of AL of two countries (Exhibit 11). Using the quality control (QC)-tested commodities held in the RDC, the project reduced delivery and cycle times and prevented stockouts. The quantities available in the stockpile are larger than the sum of the units received, given that stock was available before the arrival of the shipments listed above.

Exhibit 11. AL deliveries by country from the stockpile in Q1–Q2 FY 2023 (door delivery date in-country)

Recipient country	Product	Number of treatments delivered
Liberia	AL 20/120 mg tablet, 6x4 blister packs	172,770
Madagascar	AL 20/120 mg dispersible tablet, 6x1 blister packs	391,680
Madagascar	AL 20/120 mg tablet, 6x3 blister packs	113,190

Remaining Shelf Life for Warehoused Commodities

GHSC-PSM tracks inventory and shelf life to balance expiry risks while maintaining enough stock to respond to urgent and unforeseeable needs. As shelf life dwindles, the project sends inventory reports to the client and recipient countries to generate awareness of available stock on hand. GHSC-PSM identifies potential recipients through in-country consolidated stock reports. For details on shipments from the RDC, see Section A1.

Over Q1–Q2, GHSC-PSM stockpiled \$177,516 of ACTs, with both quarters over the target of 70 percent of the weighted average in shelf life. In Q1, 85 percent shelf life remained and in Q2, 76 percent shelf life remained. The project has consistently met the shelf life targets quarter-over-quarter, in part due to the frequent stock rotations to fulfill emergency and urgent demand.

Backlogged Line Items

The percentage of undelivered promised line items at the end of the first half of FY 2023 was 3.6 percent. This is below the target of 5 percent.

A.3 Adhering to Quality Assurance Requirements

GHSC-PSM ensures the quality of the malaria commodities delivered through a comprehensive quality assurance/quality control (QA/QC) program.

Strategies and Innovations

In the first half of FY 2023, the project updated the certificate of conformance (CoC) report with the appropriate shelf life and lifespan requirements for LLINs. LLINs are not like pharmaceuticals and mRDTs that have clearly defined expiration dates. GHSC-PSM submitted targeted questions to suppliers in the project's portfolio to understand how they were defining LLIN shelf life and life spans. The project then summarized suppliers' responses and identified variations in their definitions of these attributes. The project then proposed using the Manual of the Food and Agricultural Organization (FAO) and World Health Organization (WHO) specifications for chemical pesticides as the standard for the shelf life of GHSC-PSM-procured nets.⁷ PMI accepted the proposal, and the project updated the CoC template for LLINs accordingly.

Promoting Supply Chain Market Health

GHSC-PSM ensures QC testing efficiency and capacity for key products by expanding the number of testing labs. In the first half of FY 2023, the project completed a method transfer⁸ and method verifications⁹ for eight products (see Exhibit 12).

The project also ensured that third-party laboratories have updated test methods to avoid testing delays for upcoming orders. GHSC-PSM observed test method changes while reviewing a supplier's certificate of analysis for procured batches of AL 20/120 mg and immediately coordinated with a third-party laboratory to perform a method transfer for the updated changes.

⁷ [Manual on the development and use of FAO and WHO specifications for chemical pesticides. Second edition.](#)

⁸ Method transfer is the transfer of analytical test methods from the manufacturer to a GHSC-PSM third-party lab.

⁹ Method verification is a confirmation that an existing standard test method such as United States Pharmacopeia, the Association of Official Agricultural Chemists International, European Pharmacopeia, etc. can be applied.

Exhibit 12. Products that completed method transfer or method verification in Q1–Q2 FY 2023

Product name	Activity type
Artesunate injectable	Method transfer
Artesunate + amodiaquine tablets	Method transfer
Artesunate suppositories	Method transfer
Primaquine 7.5 mg tablets	Method verification
Chloroquine 250 mg tablets	Method verification
AL 20/120 mg dispersible tablets	Method transfer
AL 20/120 mg hard tablets	Method transfer
Quinine tablets	Method verification

Products Reviewed for Eligibility

Quality reviews facilitate the addition of products to the Restricted Commodity Waiver list governed by USAID Automated Directives System 312, making the product eligible for procurement. In the first half of FY 2023, GHSC-PSM reviewed eight products (see Exhibit 13). PMI requested the procurement of topical repellents to prevent malaria. This was the first time the Malaria Task Order procured this commodity category. In Q2, GHSC-PSM generated the technical requirements for the procurement, reviewed the topical repellent request for proposal respondent feedback, and completed the full eligibility review of the winning product.

Exhibit 13. Products reviewed for eligibility

Product category	Product subcategory	Product detail
mRDTs	mRDTs	P.f/P.v (10 tests/kit)
mRDTs	mRDTs	Pf HRP2 (10 and 25 tests/kit)
Pharmaceutical	SP	SP 500/25 mg
Pharmaceutical	ACT	DHA-PPQ (60/480 mg) hard tablet
Pharmaceutical	ACT	DHA-PPQ (30/240 mg) dispersible tablet
mRDTs	mRDTs	Pf HRP2 (10 and 25 tests/kit)
LLINs	LLINs	Single pyrethroid and PBO (new manufacturing site)
Topical repellent	Topical repellent	20% picaridin spray 100 mL

Note: ACT, artemisinin-based combination therapy, dihydroartemisinin-piperaquine (DHA-PPQ), dihydroartemisinin–piperaquine; HRP2, histidine-rich protein 2; LLIN, long-lasting insecticide-treated net; mRDT, malaria rapid diagnostic test; PBO, piperonyl butoxide; Pf, *Plasmodium falciparum*; Pv, *Plasmodium vivax*; SP, sulfadoxine-pyrimethamine.

Fostering Quality Products and a Robust Quality Management System

While no product recalls occurred in Q1 or Q2, GHSC-PSM continued to facilitate more robust QA and quality management systems (QMSs) for the products the project procured through comprehensive investigations and collaborations with external partners and global donors.

Fostering Quality in Pharmaceuticals

In the first half of FY 2023, GHSC-PSM investigated a preliminary out-of-specification (OOS) for AL 20/120 mg from one of its suppliers. Three out of four batches in one order and four out of six in another order were OOS for assay content. The assay results showed that the product was within the shelf-life specification, but was OOS for the product release specifications, which are more stringent than the shelf-life specification. GHSC-PSM performed a hypothesis test and found that limiting the peak markings during the high-performance liquid chromatography run skewed the result. The project incorporated this methodology into the testing protocol for future batches and flagged it for future method transfers. As the OOS did not compromise product safety and efficacy, GHSC-PSM recommended the release of the batches, and PMI concurred.

Fostering Quality in LLINs

In the first half of FY 2023, GHSC-PSM conducted a desk review of a new manufacturing site for one of its LLIN suppliers and found that it met the standard requirements—local registration, ISO 9001 certification, and WHO-approved manufacturing site. GHSC-PSM approved the new site for procurement and added it to the eligibility list.

The project also delivered two PBO net orders to Rwanda. GHSC-PSM collaborated with Rwanda Medical Supply, Rwanda Biomedical Center, and the supplier to conduct a post-shipment inspection. GHSC-PSM used the standing quality agreement to establish the number of samples required for inspection, in alignment with defect categorization and aggregation.

Fostering Quality in mRDTs

In the first half of FY 2023, GHSC-PSM performed enhanced QA/QC activities to ensure that new mRDTs met GHSC-PSM's quality requirements for procurement. These mRDTs that detect parasite lactate dehydrogenase (pLDH) were approved by the Global Fund's expert review panel, but are still undergoing WHO-prequalification (PQ) evaluation. The project performed a batch record review in addition to 100 percent lot testing to confirm that new mRDTs met GHSC-PSM's quality requirements for procurement. The order was for Ethiopia, where histidine-rich protein 2 (hrp2) gene deletion was reported, requiring the use of pLDH mRDTs.

The project investigated high false-positive rate complaints from Malawi regarding a particular brand of mRDTs—the acceptable false-positive rate is equal to or less than 10 percent. In response to PMI's request, GHSC-PSM collected samples from four locations in Malawi and sent them to the supplier and a WHO prequalified lab for further testing. GHSC-PSM documented the storage conditions of the mRDTs as additional data for the investigation. The project is monitoring this complaint while awaiting test results from the laboratory and supplier. GHSC-PSM will make a final recommendation to PMI based on the quality of mRDTs once the test results are reviewed and available.

GHSC-PSM has observed an increase in different issues concerning mRDTs compared to previous years and initiated a root-cause review in Q2 to determine the appropriate corrective and preventive actions (CAPAs) to address them. The project summarized mRDT investigations conducted over the past two years, subcategorized complaints and issues, and aggregated them based on their similarities. The review revealed that end users primarily preferred inverted cups and round lancets to pipettes and blade lancets.

As a CAPA, the project requested that suppliers update their product kit components to include inverted cups and round lancets. The suppliers made the updates and submitted corresponding change requests to the WHO-PQ for approval. The review also showed that end users did not always adhere to a particular brand's instructions for use due to familiarity with a different brand and testing procedure. As a CAPA, the supplier created video instructions and GHSC-PSM reduced the variation in mRDT brand types for recipient countries.

Certificates of Conformance

GHSC-PSM maintained a high level of productivity in the first half of FY 2023, issuing 173 CoCs that ensured compliance with quality requirements and allowed commodities to be released for distribution. The CoCs per commodity type were as follows: 127 for pharmaceuticals, 29 for mRDTs, and 17 for LLINs.

Pharmaceuticals Regulated by a Stringent Regulatory Authority

Malaria pharmaceuticals regulated by a stringent regulatory authority do not require laboratory testing according to PMI policy. GHSC-PSM reviewed the manufacturer's certificate of analysis before shipment. In FY 2023, the project reviewed 23 batches of two ACT products' certificates of analysis and found satisfactory results for all batches, and issued CoCs.

Other Pharmaceuticals

GHSC-PSM uses qualified independent laboratories to inspect, sample, and test other pharmaceuticals—including generic AL, artemether injectables, artesunate injectables, artesunate suppositories, generic artesunate + amodiaquine (ASAQ), SP tablets, SPAQ tablets, and various essential medicines before shipment.

In Q1–Q2 FY 2023, the project reviewed third-party test reports on 338 batches before releasing the orders for distribution. Most batches were tested for QC concurrently with shipment using a risk-based approach for WHO prequalified products to ensure they met delivery timing requirements.

LLINs and mRDTs

In Q1–Q2 FY 2023, the project managed pre-shipment inspections and testing of 37 orders, representing 11.8 million LLINs from seven vendors. The project reviewed all test results before clearing orders for distribution.

GHSC-PSM managed pre-shipment inspections and tested 41 orders representing 3.1 million mRDTs from six vendors. The project reviewed all test results before clearing orders for distribution.

Key Performance Indicators

Throughout the first half of FY 2023, the project met or exceeded the in-target QA lead time key performance indicator (KPI) of 80 percent. The QA lead times achieved during this time period were 100 percent in Q1 and 85 percent in Q2. The deviation in Q2 was due to:

- Testing awaiting method transfer/validation: Due to an abrupt lack of capacity at the primary lab, an urgent method transfer was conducted for AL at the secondary lab while samples awaited testing.
- Lab equipment issue: Caused a delay in the analytical testing of ACT products (ASAQ).
- Lab capacity/overload: Due to laboratory closures in December 2022 and January 2023 for Christmas and Chinese Lunar New Year. In addition, a lab audit impacted the on-time testing of seasonal malaria chemoprevention, SMC (SPAQ), and severe malaria medication (rectal artesunate suppository, RAS) products.

Zero batches of products showed non-conformity in Q1, and one batch showed non-conformity in Q2, resulting in a 0.33 percent non-conformity (the target is less than 1.0 percent).

In the first half of FY 2023, GHSC-PSM finalized 100 percent of OOS reports within 30 days of investigation completion, exceeding the target of 90 percent.

Cost Savings

In the first half of FY 2023, the total cost savings resulting from the risk-based testing approach totaled \$131,963, which was determined by comparing the cost of testing every batch to the cost of the randomized testing.

A.4 Improving Data Visibility

GHSC-PSM increases data visibility at all levels of the supply chain. The project uses several systems to synthesize and improve critical information on order status and priorities, commodity flow, and health commodity management.

ARTMIS

ARTMIS, the project's management information system, provides visibility into GHSC-PSM procurement and delivery. External users, such as PMI, USAID offices, and GHSC-PSM country offices, can create orders and view order updates and performance information through procurement and delivery dashboards. GHSC-PSM continuously works to enhance system efficiency, improve data quality, and increase visibility into its supply chain operations. To that end, the project makes weekly enhancements to improve data visibility, including for life-of-project data. In the first half of FY 2023, GHSC-PSM made the following improvements in ARTMIS:

- Upgraded the lvalua module to improve in-system business processes for supplier management (i.e., risk management, sourcing, and contract management). The new functionality includes certification management for expiration notifications to suppliers and other supplier attributes, such as collaboration plans for control and risk mitigation, satisfaction surveys, and ability to send notifications to specific suppliers. Additional features are under review in collaboration with the broader business team for configuration.
- Completed development of a new order type called "Master Order (XO)." This new order type enables suppliers to manufacture a new product and warehouse it until a quantity is assigned to one or more countries. This new functionality will go live in Q3.

- Revised the Item Type (“Transportation Equipment”) naming conventions for additional clarity and implemented a new algorithm to map temperature requirements to freight/cargo categories. This change will reduce temperature excursions.
- Maintained integration of the Quantification Analytics Tool (QAT) and ARTMIS storefront to review tagged orders in the Report and Analyze modules in ARTMIS. The project supported testing efforts to improve the management of changed or canceled orders.
- Enhanced RO and PO print to include refined terms and conditions.
- Enhanced vital reports for users based on new business needs (i.e. added new fields), including freight estimate versus actual RO history and TOM table.
- Addressed data quality issues and supported the transition of the LMIS to the Infor Nexus platform¹⁰ to provide further details and insight into batches and logistics orders. This platform provides end-to-end visibility and control over supply chain operations, facilitating real-time information sharing and logistics coordination.

TOM Power BI Management View Dashboard

In FY 2022, GHSC-PSM rolled out the TOM Power BI Country View Dashboard, which provides end-users with real-time order status updates on the progress of country orders placed. In the first half of FY 2023, GHSC-PSM used this dashboard as a template to build the TOM Power BI Management View Dashboard, which will be used for different purposes, as it will help to identify order trends and manage exceptions for all active orders under the malaria portfolio. This new dashboard will enable efficient and targeted portfolio management and allow users to identify data quality issues across various systems that feed into the dashboard.

Key components of the TOM Power BI Management View Dashboard include:

1. **Exceptions management:** GHSC-PSM replaced the manual process of flagging orders for the PMI-biweekly review using Power Apps and Power BI. This allows users to enter data on RO, PO, and line level, which are then available for stakeholder review after the daily data refresh.
2. **Portfolio management:** GHSC-PSM included an order progression overview, which allows users to identify orders going off-track and address any issues.
3. **Data quality management:** The dashboard also identifies data quality issues. GHSC-PSM monitors reported issues and takes the necessary steps to ensure data accuracy.

GHSC-PSM plans to roll out the dashboard in Q3. To ensure adoption, the project will follow change management best practices, such as developing a dashboard user guide and conducting hands-on training sessions on the dashboard’s use cases and navigation for relevant stakeholders.

Stockout Risk Dashboards

Stockout risk dashboards help to provide a global view of country stock levels at the central level. The dashboards combine inventory, consumption, and shipment data into one report that predicts stock levels 12 months into the future (Exhibit 14). During periods of market constraints, the dashboards are used to inform allocation strategies and scenario-based planning to prevent stock risks. The main inputs into the tool are PPMRm data and supply plan data. Although some countries face data quality challenges, these

¹⁰ <https://www.infor.com/solutions/scm/infor-nexus>

dashboards have been instrumental in clarifying and validating the demand signals received through both data inputs. Through this validation process, the project can proactively make decisions based on the best available data.

End-Use Verification Surveys

The end-use verification (EUV) survey assesses the stock status of malaria commodities and examines malaria diagnosis and treatment practices at the health facility level. Since 2018, the survey has undergone significant changes to ensure that the methodologies align with improved precision in data used for decision making.

EUV Survey Progress

In the first half of FY 2023, GHSC-PSM provided technical expertise to eight PMI partner countries to conduct the EUV survey (Angola, Burkina Faso, Ghana, Guinea, Liberia, Mali, Nigeria, and Sierra Leone). This was the first EUV conducted in Sierra Leone. Following survey deployment, the project also shared the EUV reports and recommendations with MOHs, National Malaria Control Programs (NMCPs), and other stakeholders to inform decision-making.

Eleven GHSC-PSM countries reported on data collected through the COVID-19 continuity of care module, which was developed in Q4 FY 2020. At the request of PMI-Washington, GHSC-PSM also began developing a Community Health Worker (CHW) module for the EUV survey that will be finalized by the end of FY 2023. Data gathered through the CHW module will be used to inform activities designed to strengthen supply chain functionality at the community/CHW level.

To improve collaboration between GHSC-PSM country teams and technical backstops, the project created an internal EUV landing page on SharePoint during this period. The EUV landing page includes links to country presentations on EUV data use, four of which (Benin, Burkina Faso, Ghana, and Mali) took place during the monthly internal EUV working group meetings in November 2022 and January, February, and March 2023.

Country EUV Examples

In **Guinea**, GHSC-PSM collaborated with the MOH through the NMCP to conduct the EUV survey in Q1. The project engaged select GHSC-PSM-trained pharmacy students as data collectors and trained them in health supply chain management, which gave them the opportunity to gain field experience in the national health supply chain system. The EUV survey was conducted in 63 health facilities (58 health centers and five hospitals), and seven Pharmacie Centrale de Guinée (PCG) depots in 23 health districts in eight regions. The EUV sampling tool was used to calculate the minimum number of districts and the minimum number of health facilities in each district for selection based on specific data parameters. The project's two-stage sampling approach ensures statistical integrity while promoting efficient data collection to obtain results that are reflective of the country context.

In **Burundi**, GHSC-PSM coordinated with the NMCP to validate the EUV 2022 report in a workshop in Q1. A technical committee with representatives from the NMCP, Population Services International (PSI), and Pathfinder International NGO/TUBITEHO project, the Central Medical Store (*Centrale d'Achat des Médicaments Essentiels du Burundi*, CAMEBU), and Burundian Authority for the Regulation of Human

Medicines and Food Products (ABREMA) participated in the workshop. Participants validated the 2022 EUV results and conducted a dissemination workshop with representatives from five health provinces and 14 health districts as well as other stakeholders involved in malaria control, including the national health information system department at the MOH (*Direction du Système National d'Information Sanitaire*, DSNIS), USAID, and PSI. During the validation and dissemination workshops, participants made recommendations to address stockout challenges and improve malaria patient management. Key recommendations included:

- Districts should supply health facilities with sufficient quantities of malaria commodities to enable them to supply CHWs. This will increase CHW contribution to malaria case management and help reduce disease incidence.
- Health facilities should be able to properly treat patients using available AL formulations as substitutes for one or two formulations that are temporarily stocked out.
- Districts should train staff on malaria diagnostics (mRDTs, microscopy) and intermittent preventive treatment in pregnancy.
- CAMEBU should improve communication strategies with health districts so that they can receive orders on time and properly prepare the packages for each district.

In Q1, GHSC-PSM, in collaboration with the MOH in **Niger**, completed the FY 2022 EUV survey. Survey results indicated improvement in data quality compared to the FY 2021 EUV survey. However, not all sampled regions had available data. For example, the PMI-partner regions (Dosso and Tahoua) did not have sufficient data, while non-PMI-partner regions (Diffa and Tillabery) had adequate data. The lack of data could be due to several reasons. First, the partners who manage non-PMI regions resupply the SDPs as soon as they show low stock levels, without necessarily considering their average monthly consumption. On the other hand, most sampled SDPs in the PMI-partner regions were out of stock at the time of the survey. These stockouts occurred because GHSC-PSM's monthly resupply is dependent on the availability of stock at the regional level, and October distributions were delayed because the National Office for Pharmaceutical and Chemical Products did not replenish stock at the regional level on time. To address these challenges, GHSC-PSM worked with the NMCP and Niger Central Medical Store, or ONPPC, to ensure that regions are resupplied at least 10 days before each new allocation period. As a result of this pressure, regional resupplies for the Q2 FY 2023 allocation period were done one time (more than 10 days before the end of December).

EUV Data Consolidation

EUV data were not standardized across all surveys. For example, inconsistent product naming conventions from country to country created challenges in data harmonization, as data from one product could be entered under several different names.

In Q1–Q2 FY 2023, GHSC-PSM developed an indicator dashboard that allows the user to interact with the data to gain insights into trends across time and locations. To develop the indicator dashboard, the project translated the current indicators into a Python script, validated the calculated indicators against the published EUV survey results (to check that the consolidated data pipeline method of calculating the indicators is the same as the existing EUV report process) and generated an interactive dashboard for users to engage with the EUV indicator data.

To ensure the transferability of the consolidated table and indicators within the same data pipeline at the end of the project, GHSC-PSM used Python to generate the consolidated tables and calculate the indicators—such as the stockout and updated stock tool. The advantage of using Python is that when new surveys are added into the consolidated table pipeline, the indicators are automatically calculated and available. Additionally, the indicators are fed into a collection of tables that can be used to generate an interactive dashboard.

The GHSC-PSM team identified some inconsistencies when comparing the consolidated table dashboard indicators with historical EUV survey reports; this was expected due to nuances in certain country surveys. To proactively identify these inconsistencies, GHSC-PSM validated the indicators against the published EUV survey results by using lot quality assurance sampling to assess the indicators and number of sites for consistency with published results. The stockout and updated stock tool indicators passed the validation test with 95 percent confidence. Additionally, if errors are later identified in a consolidated indicator dashboard, then the indicator calculation process can be reviewed and adjusted to resolve the error or document the cause.

Further, GHSC-PSM built the interactive dashboard for the consolidated indicators in Power BI. The dashboard allows users to view EUV indicators from three perspectives. First, as a single survey similar to the existing reports, which allows the user to look at key indicators for all surveys (65) in the EUV consolidated table¹¹; second, within a country, allowing the user to see trends over time (see Exhibit 15); and, third, across country and time (see Exhibit 16). These views provide greater insights into overall trends within and across countries, thus providing increased value and new ways to use the EUV survey data.

Exhibit 15. Example of an EUV indicator presented across time within a country

¹¹ Change in how surveys are added to consolidated tables to reference the representative sampling; for example, in Angola, it is now split between Angola PMI and Angola PMI+.

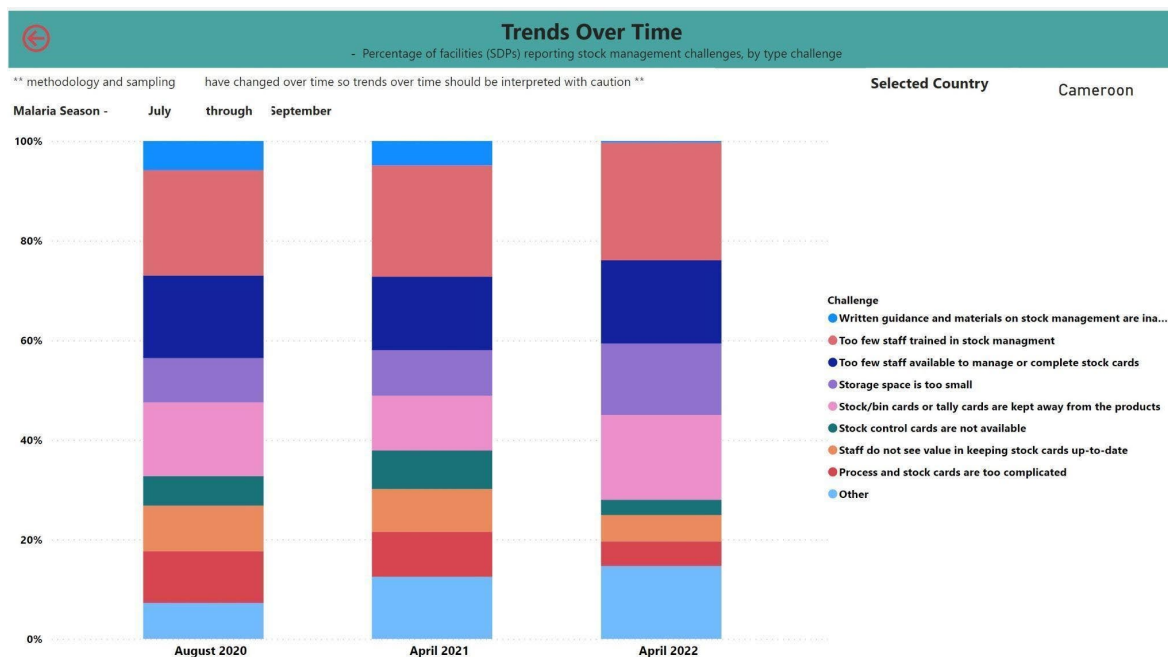
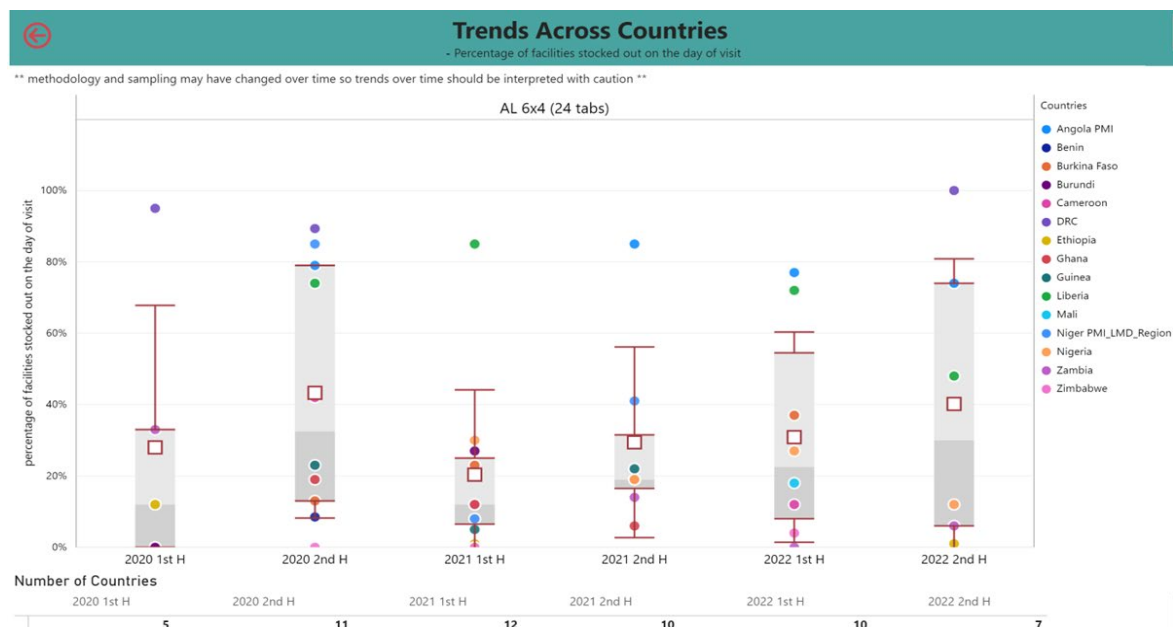


Exhibit I6. Example of an EUV indicator presented across time and countries*

*In this example screenshot the text of the first legend item cut it off with “...” at the end. In the dashboard, when the user mouses over this text the full text appears. This is part of the dynamic functionality of the Power BI to be able to handle different screen resolutions and sizes.



Procurement Planning and Monitoring Report for Malaria

In FY 2023, 29 countries¹² submitted data to the PPMRm. The PPMRm collects and reports information on stock status and host governments' and other donors' shipments. Visibility into this stock status and shipment information enables PMI, the project, and countries to make decisions on prioritizing, expediting, or delaying procurements or shipments, as well as facilitates the review of forecasts and supply plans to optimize procurements.

PPMRm Platform

Since 2008, PMI-partner countries have generated quarterly reports using the PPMRm reporting platform, which was updated in FY 2020 to be more functional and user-friendly. Data providers in the 29 PMI and USAID malaria partner countries enter stock and commodity information into data fields and provide context about commodity-level management. Thus far, the revised platform has generated 11 monthly reports.

In the first half of FY 2023, GHSC-PSM provided routine maintenance and technical support on the platform. The project consolidated the list of PPMRm platform enhancements and began work on finalizing System Requirements & Design and System Operation & Maintenance documents, expected to be completed in Q4 FY 2023.

PPMRm Country Examples

In the first half of FY 2023, GHSC-PSM took the following actions based on PPMRm data at the global or national level:

- Identified and mitigated stockout risks, and recommended or took actions to expedite PMI shipments or advocated to expedite Global Fund shipments, such as:
 - In Q1: **Zambia** (artesunate injectable 60 mg), **Ghana** (artesunate injectable 60 mg).
 - In Q2: **Mali** (AL 20 mg/120 mg 6x4 blisters), **Ghana** (AL 20 mg/120 mg 6x4 blisters), **Zambia** (RAS 100 mg), **Nigeria** (AL 20 mg/120 mg 6x1 blisters).
- Deferred shipments to prevent overstocking:
 - In Q1: **Madagascar** (RAS 100 mg).
 - In Q2: **Guinea** (AL 20 mg/120 mg 6x1 blisters).

Adoption of Standards-based Identification, Barcoding, and Data Sharing

GHSC-PSM requires that suppliers of pharmaceuticals, medical devices, sterile kits, laboratory reagents, and LLINs adopt standardized product identification and labeling and exchange product master data leveraging GSI standards. These supplier requirements include:

¹² Angola, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, Côte d'Ivoire, DRC, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe.

- **Identification:** Assigning Global Trade Item Numbers (GTINs) that identify trade items and Global Location Numbers (GLNs) that identify business entities and locations.
- **Capture:** Labeling specified packaging levels with barcodes encoded with GTIN, batch/lot, expiration date, serial shipping container code, and (for pharmaceuticals and LLINs) serial number.
- **Sharing:** Exchanging product master data through the Global Data Synchronization Network (GDSN).

In Q2, GHSC-PSM implemented identification, barcoding, and data-sharing requirements for procured products, thus creating an enabling environment for data exchange and visibility. In total, for the 205 TO2 items in-scope (subject to requirements, actively procured in past, and available for procurement in future) at the end of Q2, total compliance scores by area were as follows:

- Identify (GTIN/GLN collection): 99 percent.
- Capture (standards-compliant barcoding on labels): 94 percent.
- Share (GDSN data synchronization): 93 percent.

Additional highlights and milestones of these standards in Q2 are included in Section C.

GHSC-PSM supports adopting Global Standards in supply chain processes by providing technical assistance within country programs, as described in Section B.I.

B. Strengthened In-Country Supply Chain Systems

B.I Improved Strategic Planning and Implementation Related to Supply Chain Management and Commodity Security

Forecasting and Supply Planning

GHSC-PSM assists countries in determining malaria commodity funding requirements. The project supports countries in developing and validating forecasts and supply plans, aggregating commodity demand, and evaluating and reconciling seasonal demand with orders. This has resulted in more countries that can independently manage these critical activities and conferred greater confidence in their commodity procurement requests.

Countries use supply plans to analyze commodity quantities to order during a specified timeframe for continuous product availability. Supply plans inform GHSC-PSM order planning decisions, strategic sourcing, and RDC stocking. The project's country offices submit supply plans in PipeLine or QAT.

Forecasting Technology

Following the release and introduction of the supply planning module in FY 2021, GHSC-PSM released the QAT forecasting module in FY 2022, which allows users to design forecasting trees from historical consumption. The forecasting module replaces forecasting tools such as Quantimed and Excel. So far, the project has rolled out the forecasting module in 17 USAID and PMI partner countries,¹³ allowing them to conduct their annual quantification in QAT.

Supply Plan Reviews

GHSC-PSM conducts quarterly supply plan reviews to drive continuous commodity availability and submission in PipeLine or QAT.

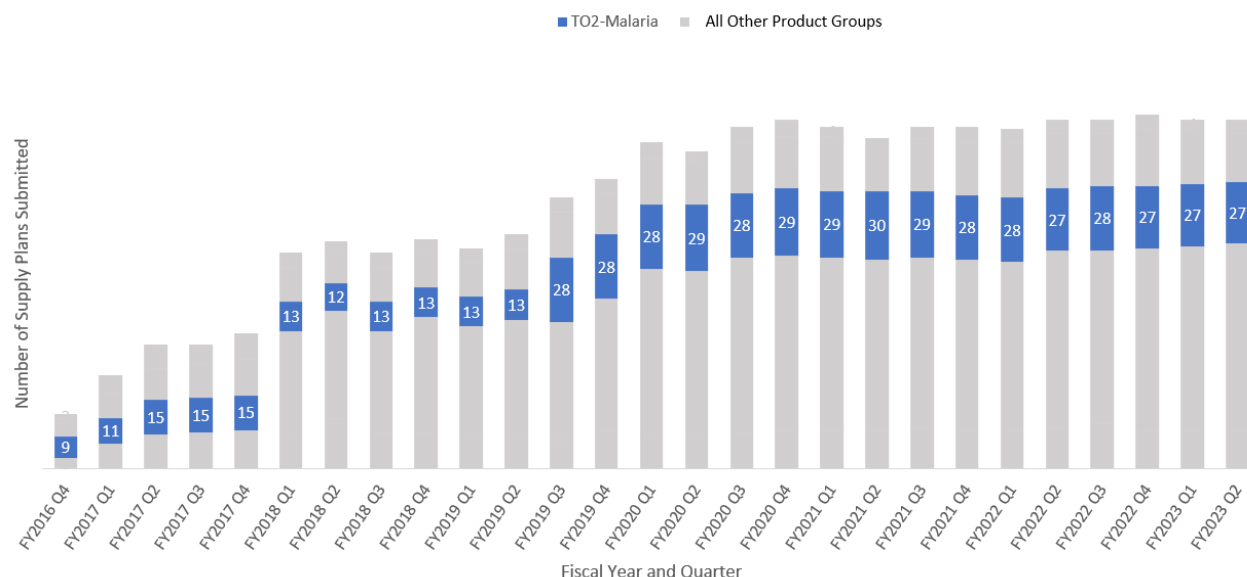
Countries that submit supply plans through PipeLine use the GHSC-PSM-built Supply Plan Automation tool to review and address data quality issues each quarter before submitting them to project headquarters. For QAT-submitted supply plans, the built-in QAT problem list (QPL) enables users to identify data issues and correct them before submitting a supply plan. The QPL allows users and reviewers to leave comments for context and provides visibility into comments during quarterly reviews.

In Q2, GHSC-PSM received malaria supply plans from 29 PMI partner countries¹⁴, achieving 100 percent of the target of 27 (Exhibit 17). Of these, 23 were submitted through QAT.

Exhibit 17. Malaria supply plan submissions and technical reviews over the life of the project

¹³ Angola, Benin, Burkina Faso, Burundi, Cameroon, DRC, Ethiopia, Ghana, Guinea, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Zambia, and Zimbabwe.

¹⁴ Angola, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe are the 27 countries required to submit quarterly supply plans.



Forecasting and Supply Planning Technical Assistance

In the first half of FY 2023, the project assisted more than 15 TO2 countries in forecasting and supply planning (FASP) activities. Examples of technical assistance include:

- In **Angola**, in Q2, GHSC-PSM met with malaria program partners and stakeholders to quantify malaria control program products for the years 2023–2026. During the meeting, participants reviewed available data and confirmed forecast assumptions. The forecast used demographic data recognized by the NMCP, specifically, the report of the National Statistics Institute, including data from the WHO and the official strategy of the MOH (MINSa). The project entered the forecasts into the national QAT supply plan and a PMI-specific QAT supply plan (a subset of the national supply plan that covers only the PMI-partner regions) that will allow MINSa and NMCP to obtain the quantities of commodities required to meet the country's needs from 2023 to 2026.
- In **Guinea**, to improve the availability of health products and the stock management system, GHSC-PSM collaborated with the NMCP (*Program National de Lutte contre le Paludisme*, PNLP) and the *Direction Nationale de la Pharmacie et du Médicament* (DNPM) to hold a quantification workshop in Q2. Participants in the workshop forecasted antimalarial product needs for the next four years (2023–2026). Representatives from the national FASP team of the PNLP¹⁵ attended the workshop. GHSC-PSM confirmed that PNLP and DNPM had gained technical independence in FASP of antimalarial products as compared to previous years when they relied on external expertise to establish the country's procurement needs.
- In Q1 in **Rwanda**, GHSC-PSM, in collaboration with the Malaria and Other Parasitic Diseases Division (MOPDD), conducted the supply plan review and finalized the report. This resulted in a consolidated supply plan inclusive of requirements for malaria commodities. GHSC-PSM submitted

¹⁵ *Program National de Lutte contre le Paludisme* (PNLP), PCG-SA, DNPM, GHSC-PSM, World Food Program (WFP), and Catholic Relief Services (CRS).

the plan to the resource mobilization committee of the Coordinated Procurement and Distribution System (CPDS) for funding and procurement. During the review, the team also identified potential expiration risk for quinine 300-mg tablets (November 2023) and reviewed AL 6x2 and AL 6x3 requirements following the recommendations from the Malaria Technical Working Group (TWG). GHSC-PSM and MOPDD then revised forecasts for quinine tablets and mRDTs to reflect testing and treatment trends observed in the country.

- In **Burkina Faso**, in Q2, GHSC-PSM supported PNLP in the annual quantification of malaria commodities needed for developing the Global Fund 2024–2026 grant proposal. The quantification covered the 2024–2026 requirements for AL, artesunate/pyronaridine, dihydroartemisinin/piperaquine, mRDT, LLIN, SP, artesunate injectable, RAS, and SPAQ. The team updated the supply plan and funding commitment, and identified funding gaps for 2024–2026. GHSC-PSM also supported the malaria commodity quantification committee to review the Q2 FY 2023 quarterly supply plan. The committee used the results to update the procurement plan in QAT.

Logistics Management Information Systems Technical Assistance

GHSC-PSM improves data accuracy and quality for management information system (MIS) implementation in countries. Country-specific examples include:

- In **Burma**, GHSC-PSM trained 97 participants from the U.S. President’s Malaria Initiative Eliminate Malaria (PMI-EM) project in three regions (Sagaing Region, Southern Rakhine State, and Tanintharyi Region) on the mSupply electronic logistics management information system (eLMIS) tablet-module. At the end of Q2, the three regions had implemented the mSupply tablet module and now enter data directly into tablets, thereby increasing visibility of the LMIS data at the township level.
- In **Burkina Faso**, the project provided internet connection to pilot sites for the use of NetSIGL2.0. The platform showed a utilization rate of 58 percent in the health district of Dande and 87 percent in Nanoro District (average utilization rate of 72 percent for the two districts). GHSC-PSM participated in a joint supervision visit with the MOH on the use of NetSIGL 2.0 in the districts of Tengodogo, Koupéla, and Pouytenga in the Centre-East region. The visit helped to strengthen store manager skills in using the application and to improve data entry. GHSC-PSM provided technical support while the Belgian Cooperation Agency (ENABEL) financed the supervision activity. After the technical support, five health facilities out of the 32 in Koupéla District recorded their logistics data for Q1–Q2, while managers of 11 health facilities out of 32 exhibited satisfactory progress in using NetSIGL 2.0. The low utilization and satisfactory progress rates can be attributed to various challenges, including a lack of coordination for the effective startup of data entry in areas supported by ENABEL, resulting in delays of up to one month between the trainings and actual startup of NetSIGL 2.0 use. Continued use of NetSIGL 2.0 was affected by gaps in the provision of funding to users for communication credits.
- In **Sierra Leone**, GHSC-PSM provided technical support to the National Medical Supplies Agency (NMSA) to roll out mSupply warehouse management software in five sites at the district level following concurrence from PMI. These were the last district-level sites to be connected to the national warehouse management network. Rollout of mSupply has improved commodity

visibility, accountability, and monitoring.

Improved Data Use

The project helps countries enhance data quality and use. Country-level activities maximize innovation while ensuring data quality and skills transfer and make the LMIS useful for decision making. Below are specific country examples.

- In **Niger**, GHSC-PSM deployed a dashboard containing logistics analytics in Q2, making it available on demand through WhatsApp using a conversational chatbot. About 450 healthcare professionals and decision makers have been notified of the monthly dashboard updates since February, which has generated an engagement rate of 45 percent. This is an indication that health professionals are interested in logistical analysis to inform health supply chain decision making. The project will continue sharing the dashboards with health care decision makers monthly through a requestable download link, as part of a data-driven decision-making strategy. This approach promotes access to important data and showcases the project's commitment to improving commodity availability through data visibility. The project aims to develop a true community of practice around these dashboards and support decision makers in using the data effectively. Through this community of practice, decision makers can learn from each other, share best practices, and ultimately drive supply chain improvements.
- In **Zimbabwe**, in Q2, GHSC-PSM provided technical support and full funding (with PMI funds) for the data collection component of the case consumption assessment. The major goal of this assessment was to identify the root causes of the disparity between “reported consumption” and the “confirmed malaria cases” as reported through LMIS and HMIS, respectively. The project supported a desk review of consumption data, developed data collection tools, and assisted in sampling, data analysis, and report writing. GHSC-PSM identified six districts with the highest malaria case versus consumption rate and visited 29 facilities in these districts. The project presented the results to stakeholders including the MOH, USAID, and PMI in a meeting convened by the Directorate of Pharmacy Services (DPS), and presented at the NMCP national malaria review meeting.
- In **Mozambique**, GHSC-PSM supported the PMI country team in preparing the PMI SDP Q4 FY 2022 report on malaria commodity stock availability. This report enables malaria commodity data triangulation between ACT consumption and malaria cases, and improves access to the revised data in the Ferramenta Central that is used in the integrated Malaria Information Storage System and surveillance strategy.

Supply Chain Maps and MIS landscapes

GHSC-PSM communicated with 21 PMI partner countries¹⁶ to update their supply chain maps and MIS landscapes. The project shared previous versions of “information map and data” and “MIS landscape” files with countries for reference. As of Q2, 22 out of 38 countries submitted both draft files for headquarters

¹⁶ Angola, Burundi, Burkina Faso, Burma/Myanmar, Cambodia, Cameroon, Ethiopia, Ghana, Guinea, Kenya, Liberia, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Thailand, Zambia, Zimbabwe

and PMI review. GHSC-PSM is targeting review and finalization of files for all 38 countries to be completed in Q3 FY 2023.

Global Standards and Traceability

In the first half of FY 2023, GHSC-PSM provided eight TO2 countries¹⁷ with technical support to adopt GSI standards for product identification, location identification, and data exchange.

- In **Nigeria**, GHSC-PSM is implementing a pilot in Calabar, Cross River State, to capture LLIN campaign data at specific distribution points to verify net authenticity using manufacturer-provided serialized data applied on bags and individual nets. In Q1, the LLIN supplier shared serialized data for the 2.8 million nets procured for Nigeria, which was uploaded into the ITN platform, a GHSC-PSM developed information management systems for ITN mass campaign. This platform is being leveraged for the pilot and was configured to capture and parse out data from barcodes on LLINs. The project also developed a dashboard to display verification results and KPIs. In Q2, the project focused on microplanning, developed a test plan, test cases, and requirement traceability matrix for system integration and user acceptance testing phases of the implementation life cycle. Verification and data collection activities are expected to begin in Q3.
- In **Zimbabwe**, GHSC-PSM worked with the Ministry of Health and Child Care (MOHCC) and NatPharm to assess feasibility and country readiness to deploy an automatic identification and data capture (AIDC) technology solution. During a short-term technical assistance (STTA) trip to Harare, Zimbabwe, in Q2, the project (1) reviewed the current state of product master data housed in NatPharm systems and the MOHCC eLMIS systems, (2) evaluated these systems' capabilities to store and manage GTIN and product-related packaging hierarchies, and (3) visited the national warehouse and two regional warehouses to assess current operational readiness to adopt an AIDC solution.

Through the assessment, GHSC-PSM:

- Worked with NatPharm to collect GTIN data from warehouses to enrich the data needed to develop a national product master data workbook.
- Educated stakeholders on best practices and shared standard operating procedures (SOPs) on barcode data collection.
- Validated with NatPharm's MS NAVISION solution provider and MOHCC's eLMIS experts that these systems are capable of associating product-specific GTINs and packaging hierarchies to these system's internal product codes.
- Identified the warehousing operations suitable for barcode data capture technology solutions.
- Conducted a workshop with all stakeholders including MOHCC, NatPharm, and the Medicines Control Authority of Zimbabwe, to capture inputs on the AIDC roadmap and prepare people, processes, and technology for deployment of a solution.

GHSC-PSM shared a technical report from the STTA with all stakeholders for review.

- In **Uganda**, GHSC-PSM is implementing an AIDC solution to support barcode scanning for warehouse operations of all pharmaceutical products at the Joint Medical Store, including using GTIN as a secondary product identifier, and for non-GTIN product supporting barcode label

¹⁷Burundi, Ghana, Malawi, Nigeria, Rwanda, Uganda, Zambia, and Zimbabwe.

printing upon receipt to enable barcode data collection for subsequent operations. Phase 1 of the project went live in Q1 and has been operating smoothly with Master Data Management and barcode data collection during receiving and stock movements within the warehouse. In Q2, the team focused on validating the design of Phase 2 transactions with an end-to-end¹⁸ design review using existing industrial and financial systems processes to validate the design.

- In **Zambia**, GHSC-PSM worked with the MOH to bolster national traceability objectives by implementing a National Product Catalog (NPC). In Q1, the project began integrating the Product Catalog Management Tool (PCMT) with GDSN and the warehouse management system (WMS). GHSC-PSM worked closely with GSI South Africa and Warehouse Expert (WMS vendor) to design, develop, and configure Phase 1 (manual integration between PCMT and GDSN) and Phase 2 (manual integration between PCMT and Warehouse Expert) of data integrations for the pilot. In parallel, GHSC-PSM provided feedback on draft guideline identification and labeling, thus making progress on policy and regulations to support traceability efforts. In Q2, GHSC-PSM assisted in data harmonization and cleaning processes, including associations with the generic products. In addition, the project developed SOPs for product master data management processes, GDSN, and WMS integrations. At the end of Q1, GHSC-PSM conducted training and user acceptance testing for data stewards from Zambia Medicines and Medical Supplies Agency (ZAMMSA) and MOH. The project supported the deployment of Phase 1 into production, which went live in Q2, and initial product (ZAMMSA store-keeping units and published GTINs through GDSN) data uploads into PCMT.

Stockout Reduction Initiative

Improving the availability of malaria commodities is critical to support PMI's 2021–2026 strategy for reducing malaria mortality and morbidity rates. In FY 2021, GHSC-PSM began implementing PMI's stockout reduction initiative with health facilities in 20 countries.¹⁹ In FY 2022, to support two of the PMI's strategic focuses on "reaching the unreached" and "strengthening community health systems," the project reviewed the stockout reduction initiative master playbook to identify cross-cutting guidance for health facilities and to provide specific guidance for CHWs. In Q1 FY 2023, GHSC-PSM finalized updates and disseminated the playbook to all PMI-partner countries, including Kenya under GHSC-PSM Task Order 5 (Afya Ugavi), and six NFO countries.

Malaria Community Supply Chain Advocacy Paper and Landscape Analysis

GHSC-PSM continued to work with PMI on the draft malaria community supply chain advocacy paper that will be published in Q4. The aim of the paper is to raise awareness of the importance of considering community-level needs in supply chain strategies. It encourages the inclusion of community supply chain practices and highlights some best practices for long-term investment, targeting community health facilities and CHWs.

¹⁸ The end point is the Joint Medical Store and its hubs

¹⁹ Angola, Burkina Faso, Burundi, Cambodia, Cameroon, Ethiopia, Ghana, Guinea, Liberia, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Thailand, Uganda, Zambia, and Zimbabwe.

In addition, in the first half of FY 2023, GHSC-PSM presented the final report of the Malaria Community Supply Chain Landscape Analysis Survey to PMI that was conducted in FY 2022. The survey collected data from 55 key informants across 27 PMI partner countries.

Malaria Commodities Accountability Initiative

PMI and GHSC-PSM recognized that significant discrepancies between malaria service data and logistics data posed concerns about the use and management of malaria commodities related to country best practices or SOPs. In Q2, the project worked to finalize the internal review of a guidebook which leveraged past success to develop a systematic implementation methodology as well as an accompanying data collection and analysis tool.

GHSC-PSM, in collaboration with PMI, will pilot the guidebook and associated tools in selected countries. The project plans to have countries deploy this initiative, including using the tool and guidebook to identify commodity accountability concerns between service data and dispensing data within their product portfolios—the ACT commodity group, in particular, and other malaria commodities. The tool is also expected to help countries determine the root causes for these concerns and proffer relevant interventions. This effort will contribute to PMI’s 2021–2026 Strategy focus areas “innovate and lead” (leveraging this methodology and tool will allow a targeted approach to the identified accountability issues) and “keep malaria service resilient” (enabling country programs to identify and address accountability challenges keeps their services resilient and promotes efficiencies).

Developing a Modeling Tool and Guidance for Inventory Management for Low Malaria Endemicity Settings

Some low malaria-endemic countries are concerned that low consumption of malaria products could result in product expiries and additional expenses incurred from product redistributions between facilities. To address this challenge, GHSC-PSM is developing a modeling tool to analyze and guide malaria strategy and operations in low malaria-endemic countries and optimize supply chain management. Between Q4 FY 2022 and Q1 FY 2023, GHSC-PSM collected malaria supply chain system information from three countries (Thailand, Cambodia, and Ethiopia) that are in malaria elimination and pre-elimination phases. In Q2 FY 2023, the project used the information to develop a model that uses case information as a surrogate for consumption data, as tracking malaria cases is a key function in malaria elimination surveillance activities. The tool shows the number of storage locations for postponement strategy, minimum order quantity, and expiry windows. The tool can be used in any country with any currency to test different scenarios and stocking levels. The project is testing the tool with sample data from Cambodia, and the next step will be to refine the tool and develop guidance for countries to test it.

B.2 Improved In-Country Logistics, Including Effective and Efficient Delivery of Health Commodities to Service Sites

GHSC-PSM supports the effective and efficient delivery of health commodities to SDPs in two ways—first, by providing technical assistance (TA) to host governments in warehousing and distribution and, second, by distributing commodities in some countries, often through contracts with in-country logistics companies.

Warehousing and Distribution Technical Assistance

GHSC-PSM improves countries' warehousing and distribution processes and strengthens their supply chains through technical assistance. The project incorporates private sector best practices into public health supply chains by applying lean methodologies, such as activity-based costing (ABC). The project works with MOH staff, public health staff, non-governmental organizations, the private sector, and others with supply chain responsibilities to measure the velocity (i.e., how long it takes to move a product from one end of the supply chain to the other) and the orchestration (coordination of products) of all activities and service levels. In the first half of FY 2023, the project:

- Conducted a physical inventory of ACTs (ASAQ) in **Angola** that were viable until January 2023. The team managed to save about 91,391 treatments, some of which would have expired in December 2022, by redistributing them to health facilities with high consumption rates to use them before expiration. The products were taken from the three PMI partner provinces (Cuanza Norte, Lunda Sul, and Zaire) and redistributed to Malange and Moxico, while products from Uige Province were internally redistributed in the 12 municipalities.
- Provided virtual technical assistance for implementation of activity-based costing/management (ABC/ABM) at the Ashanti and Eastern Regional Medical Stores (RMS) in **Ghana**. GHSC-PSM held weekly meetings with the RMS finance team and their warehouse and supply managers to discuss their daily planner, monthly labor report, and customization and use of the profit and loss statements. The project also worked with the RMS finance and management teams to review their labor reports to ensure accurate capture of labor data in completing direct and indirect supply chain functions.
- Provided technical assistance to ZAMMSA central medical stores in **Zambia**. The objectives of the TA were to reintroduce ABC/ABM concepts, implement the daily planner, and review the cycle count methodology. The team created a draft daily planner to use for inter-warehouse activity coordination. The tool is directly linked to the WMS and uses PowerBI to track warehouse daily work progress. A profit and loss statement was also drafted for ZAMMSA's operational and financial analysis.
- Conducted reverse logistics in **Cameroon** as part of the last phase of activities for 2022 SMC campaign in North and Far North Regions. Unused SPAQ treatments were collected and taken to the districts, then taken from the districts to the RMSs in the North and Far North. At the RMSs, the commodities were sorted into usable and unusable stock. The unusable stock was quarantined for eventual destruction, while the usable stock was conserved for the 2023 SMC campaign. Usable stock consisted of 116,200 blisters of SPAQ1 and 265,000 blisters of SPAQ2 from the Far North Region and 2,100 blisters of SPAQ1 and 94,250 blisters of SPAQ2 from the North region.

LLIN Distribution

GHSC-PSM collaborates with NMCPs and implementing partners for LLIN distribution in various countries. The project provides support, including procurement and delivery TA. In the first half of FY

2023, the project delivered over 19 million LLINs to 17 countries²⁰ for mass and continuous distribution to protect nearly 40 million people (see Exhibit 18).

Exhibit 18. LLIN deliveries in the first half of FY 2023

Country	Number of LLINs delivered to recipient countries
Benin	557,103
Burundi	128,755
Congo DRC	2,079,400
Ethiopia	2,990,605
Ghana	140,000
Kenya	924,000
Laos	70,000
Liberia	150,000
Malawi	333,150
Myanmar/Burma	150,000
Nigeria	5,159,332
Rwanda	701,700
Tanzania	1,104,668
Thailand	80,300

²⁰ Benin, Burundi, DRC, Ethiopia, Ghana, Kenya, Laos, Liberia, Malawi, Myanmar, Nigeria, Rwanda, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe.

Country	Number of LLINs delivered to recipient countries
Uganda	3,401,516
Zambia	600,000
Zimbabwe	700,000
Grand total	19,270,529

In the first half of FY 2023, the project supported nine countries²¹ in planning for distribution or monitoring activities, including transporting LLINs to designated locations through 3PL service providers, training, and execution, depending on the project's scope in the countries. These initiatives provide communities, particularly areas with high concentrations of malaria cases, with the nets they need before the rainy season.

- In **Ethiopia**, the project procured 2,990,605 LLINs for malaria-affected woredas and delivered them, with the help of 3PLs, from the port to the Ethiopian Pharmaceuticals Supply Service (EPSS) warehouses at Adama in Q2. These 2,990,605 LLINs were delivered to nine EPSS branches in Afar, Gambella, Benishangul-gumuz, and SNNP regions, which were then distributed to 109 woredas within these regions. GHSC-PSM supported the MOH and EPSS in organizing a central-level orientation workshop for distributing the LLINs to selected woredas. Staff from the MOH Malaria Program, Afar, Benshangul-Gumuz, Gambella, and SNNP regional health bureau, EPSS (center and regional hubs), and supporting partners such as USAID-Health Development Activity and USAID Healthy Behaviors Activity attended the workshop. During the workshop, participants prepared LLIN distribution schemes for the four regions and detailed campaign implementation plans.
- In **Ghana**, GHSC-PSM supported the NMEP to transport 1,860 bales of LLINs from the central level to Eastern, Volta, and Western RMSs, as part of the LLIN-LMD integration program. The Eastern and Volta RMSs received 500 and 460 bales of PBO nets, respectively, while the Western Region received 900 bales of dual active ingredient nets. This supply of nets will help protect up to 18,600 persons from malaria. In addition to the distribution, GHSC-PSM participated in a stakeholders' meeting on the 2023 LLIN school-based distribution exercise. Key discussion points during the meeting included updates on LLIN in country stock and pipeline quantities.
- In **Zambia**, GHSC-PSM worked with the National Malaria Elimination Centre (NMEC) and key partners such as Against Malaria Foundation (AMF), Evidence for Health, PAMO Plus, and

²¹ Ethiopia, Ghana, Liberia, Laos, Malawi, Nigeria, Thailand, Uganda, and Zimbabwe.

VectorLink to plan the 2023 mass campaign, with the project leading the supply chain component of the plan. As part of the plan, the role of the project will be to provide warehousing and distribution services for the 2023 mass campaign and to monitor LLIN delivery within the six AMF provinces and three rural districts of Copperbelt Province. GHSC-PSM worked on the RFI to contract a 3PL for LLIN warehousing and distribution for the 2023 mass campaign.

The project also coordinated delivery of the 600,000 PBO LLINs meant for 2022 continuous distribution across four provinces (Muchinga, Luapula, Northern, and parts of Eastern) and verified proof of delivery against the distribution schedule to confirm correct delivery by the 3PL. The project assisted the NMEC in updating the LLIN guidelines, focusing on the supply chain component that included e-reporting for enhanced visibility. The guidelines mandate that all staff at SDPs should report LLIN issues data using the Essential Medicines and Logistics Improvement Program, or EMLIP, system. Using the systems will provide stakeholders with logistics data visibility for the first time.

Global Collaboration for LLIN Distribution

The project collaborated with other global partners in procuring and distributing LLINs in Uganda. See Section C.1 for more details.

B.3 Implementing Strategies to Transfer Skills, Knowledge, and Technology for Improved and Sustained Performance

GHSC-PSM transfers skills, knowledge, and technology through TA in workforce development and training. This section describes work in these areas.

Workforce Development Technical Assistance

GHSC-PSM builds sustainable workforces through professionalization and systematic workforce development approaches, improving countries' ability to sustain programs. Activities include in-service and pre-service training, supportive supervision or mentoring, and promotion of leadership and change management competencies.

Introductory Course on Supply Chain Management

Every year, the project offers USAID personnel the opportunity to participate in an introductory course on supply chain management. In FY 2023, the project applied lessons learned from executing the virtual Q3 2021 course and hybrid Q2 2022 courses. After each offering, the project modified the curricula based on participant feedback to continuously improve the course. Modifications included incorporating foundational information at varying interest levels and experience in the supply chain.

In Q2 FY 2023, GHSC-PSM conducted a hybrid training for 27 USAID staff (including yet-to-be-deployed foreign service officers and local mission staff). The updated course employed self-learning through pre-recorded video lectures, discussion boards, pre-recorded interviews, and eight synchronous live sessions over two weeks. Of the 27 enrolled participants, 22 met the completion criteria of 70 percent of the

required course content in the given timeframe. GHSC-PSM also began to update the in-person Introduction to Supply Chain Management course and the Emerging Trends in Supply Chain Management course scheduled for Q3 FY 2023 for USAID staff.

Workforce Development Qualitative Assessment

In Q2 FY 2023, GHSC-PSM developed a two-phase project plan and timeline for a qualitative assessment of workforce development activities in PMI-funded countries, starting with Malawi in Phase I. The project worked on case definition, protocol design, a qualitative interview guide, and an online survey questionnaire, and submitted them to the Malawi country team for review.

Workforce Development Technical Assistance Country Examples

Additional country examples of workforce development activities include:

- In **Rwanda**, to overcome the challenge of high turnover, GHSC-PSM supported the MOH in training 30 new supply chain personnel based at Rwanda Medical Supply Ltd, Rwanda Biomedical Center, Rwanda Medical Supply, United Nations Population Fund (UNFPA), MOH, and GHSC-PSM. This training aimed to equip the new supply chain workforce with knowledge on effective quantification and to introduce them to the QAT forecasting and supply planning tool. As QAT is a new forecasting and supply planning tool, staff from the GHSC-PSM country team were also included in the training so that they may be prepared to better support MOH staff in the future.
- In **Ethiopia**, in Q2, GHSC-PSM worked with the MOH to train 736 staff from 26 health facilities on auditable pharmaceutical transactions and services (APTS) in Addis Ababa, Amhara, Oromia, Somali, and South-West Ethiopia regions. Participants (488 males and 248 females) included 379 finance professionals and 357 pharmacists. By covering only a portion of the training costs in a cost-sharing scheme, the project was able to promote government ownership and sustainability of the APTS initiative at MOH level.
- In **Zimbabwe**, GHSC-PSM worked with DPS to develop a mentorship curriculum for all levels of the supply chain. A total of 75 mentors selected from 10 provinces were trained in the curriculum who then went on to conduct mentorship visits at 667 health facilities across the country. These visits are expected to be conducted quarterly.

Number of Trainees

In the first half of FY 2023, the project trained in-country specialists in 15 PMI and USAID malaria partner countries²² on the full range of supply chain health systems strengthening areas.

The project trained 2,374 people, either exclusively funded by TO2 or co-funded by TO2 and other health areas. Women made up 24 percent of the trainees, and men made up 76 percent. The countries with the

²² Angola, Burma, Burundi, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, and Zambia.

most TO2-funded training recipients were Nigeria (1,068 individuals), Laos (215 individuals), and Kenya (213 individuals).

B.4 Strengthened Enabling Environments to Improve Supply Chain Performance

GHSC-PSM strengthens enabling environments to improve supply chain performance through technical assistance in leadership and governance. The project supports strategy development and planning to strengthen supply chains. These strategies reflect findings from country-level assessments, including National Supply Chain Assessments (NSCAs) and EUV surveys.

Leadership and Governance

GHSC-PSM's leadership and governance efforts focus on building strong teams with managerial capacity, institutionalized checks and balances, and robust governance oversight, including accountability and transparent financing. Examples of GHSC-PSM's work in leadership and governance in the first half of FY 2023 include the following:

- In **Ghana**, GHSC-PSM provided technical assistance to the Ghana Health Service to conduct a final review of the SOPs for logistics management to ensure alignment with current practices and ongoing reforms in the public health sector supply chain. The new SOPs are part of efforts to enhance technical capacity and sustain implementation of supply chain interventions in the public health sector. The SOPs cover key initiatives such as GHiLMIS reporting system and last-mile distribution and provide guidance on completing logistics management tasks/activities for commodity managers.
- In **Ethiopia**, GHSC-PSM facilitated group and plenary discussions as part of a MOH/Plan, Monitoring and Evaluation Directorate (PMED) workshop to revise the national monitoring and evaluation (M&E) framework. The project co-funded this workshop with the Clinton Health Access Initiative (CHAI). The revised framework outlines MOH/PMED's new role in overseeing the country's overall pharmaceutical sector and contains sections on supply chain, pharmacy service, local manufacturing, medical devices, traditional medicines, and cross-cutting topics. Workshop participants produced a draft M&E framework that will be reviewed by the MOH.
- In **Niger**, GHSC-PSM organized two highly productive regional coordination meetings one in Dosso and one in Tahoua, with stakeholders at the regional level, including central-level MOH directorates, program members, district doctors, and implementing partners working to support the national malaria program. These meetings provided GHSC-PSM with an opportunity to engage directly with the regions, obtain greater insight into the local context, and work collaboratively to find the best solutions to local problems while enabling a better understanding of and appreciation for the project's work. Key takeaways from the meetings were the need for improved data reporting and data quality, and the importance of collaboration between the national and regional levels.

National Supply Chain Assessment

The NSCA is a diagnostic toolkit that identifies strengths, potential bottlenecks, and opportunities for improvement within a health supply chain. Developed in 2012 and now in version 2.0, NSCAs prioritize areas for root-cause analysis and inform the development of strategic and operational plans to strengthen systems. GHSC-PSM hosts the toolkit, provides technical consultations for interested implementers, and promotes the tool within the global health supply chain community. The project supported several countries in the NSCA workstream in the first half of FY 2023:

- In **Burundi**, GHSC-PSM completed a technical scoping trip for an NSCA that will take place in Q3. The trip provided a crucial opportunity to listen directly to MOH stakeholders, such as CAMEBU and ABREMA, on the current priorities, challenges, and areas of focus for the assessment.
- In **DRC**, GHSC-PSM, in collaboration with the GHSC-TA-Francophone Task Order project, completed the NSCA activity. The GHSC-TA Francophone Task Order collected feedback from stakeholders and worked with GHSC-PSM to integrate the comments into the report. GHSC-PSM prepared report dissemination materials for a dissemination workshop tentatively scheduled in Q3, to be implemented by GHSC-TA-Francophone Task Order.
- In **Madagascar**, the project supported the USAID IMPACT project, PMI's flagship global service delivery project, to write IMPACT's NSCA final report. The IMPACT team reviewed and accepted the report, which was subsequently shared with the Ministry of Public Health (MINSANP) for further comment and review. MINSANP, with support from the USAID IMPACT project, also held a dissemination workshop in which GHSC-PSM supported the development of technical materials for presentation.
- In **Rwanda**, GHSC-PSM conducted a dissemination workshop for the recent NSCA implementation. Over 40 individuals from across the stakeholder environment, including MOH, USAID, UNFPA, WHO, East African Community Regional Centre of Excellence for Vaccines, Immunization & Health Supply Chain Management (EAC-RCE-VIHSCM), and others, attended the event. The MOH Permanent Secretary led the event and publicly committed to the creation of a TWG to implement the recommendations from the NSCA report in the coming months.

C. Effective Global Collaboration to Improve Long-Term Availability of Health Commodities

GHSC-PSM's global collaboration activities help to shape global markets for health commodities and share supply chain information with other donors and collaborators as a global good. GHSC-PSM ensures that the project's supply chain stays current with emerging requirements and effectively manages and shares best practices and lessons learned.

C.I Engagement with Global Partners for Strategic Coordination

Due to the scale, scope, and complexity of malaria as a public health challenge, global collaboration—sharing information, resources, activities, and capabilities—is essential. GHSC-PSM collaborates with international stakeholders and subject matter experts to address malaria commodity production, QA, and procurement challenges.

Global Collaboration for Sourcing Malaria Commodities

GHSC-PSM has participated in three malaria global task forces since the onset of COVID-19—the Malaria Pharmaceutical Global Task Force, mRDT Global Task Force, and Vector Control Access Task Force (the former ITN/IRS Global Task Force). Taskforce members are stakeholders in the global malaria community, including donors and non-governmental organizations such as the Global Fund, Bill & Melinda Gates Foundation, and Medicines for Malaria Venture. Task Force meetings are used as a forum to share updates on overall market conditions, particularly related to rising costs, global demand, supply capacity, and other risks. GHSC-PSM provides market intelligence, informs discussions around market health and supply chain risk, and contributes to risk mitigation strategies and interventions.

In Q1, the project updated the Malaria Pharmaceuticals Sub-Working Group on the status of a supplier product quality investigation and plans to mitigate SMC country stockouts in Benin, Burkina Faso, Ghana, Mali, and Nigeria through the use of an alternate supplier. The task force also received updates from WHO-PQ on recently prequalified SPAQ products. In Q2, GHSC-PSM shared with the Malaria Pharmaceutical Global Task Force efforts undertaken to transfer ACT stock from Zimbabwe to Senegal and Zambia to mitigate country stockouts. GHSC-PSM also contributes to a sub-working group of the Malaria Pharmaceutical Task Force that focuses on upstream supply chain challenges with KSM and APIs used in the production of malaria pharmaceutical products.

One discussion in the mRDT Task Force during Q1 focused on complaints received by WHO-PQ, the need to encourage users to report mRDT issues, and whether to add complaint reporting to a mRDT troubleshooting guide. In Q2, the mRDT Task Force received updates on work that the WHO-PQ is undertaking to identify areas where hrp2/3 gene deletions exist and are likely to spread. WHO-PQ is using a risk-based scoring approach based on the presence of deletions and where deletions may emerge, which could be used as a guide to inform areas where switching to non-HRP2 only tests should be a priority.

Global Collaboration for Quality Assurance Activities

GHSC-PSM continues to take a leadership role among global stakeholders in the LLIN market as Chair of the LLIN Quality Assurance Group (LQAG). The LQAG, which includes representatives from GHSC-PSM, PMI, the Global Fund, United Nations Children's Fund (UNICEF), and WHO-PQ, meets monthly and gathers information and brainstorms processes to improve QMSs for LLINs.

In Q1, the project participated in the consultation on the WHO Guideline for Prequalification of Insecticide Treated Nets (ITNs)²³ held in Geneva in October 2022. This meeting gathered stakeholders in

²³ [Consultation - WHO Guideline for Prequalification of Insecticide Treated Nets \(ITNs\) | WHO - Prequalification of Medical Products \(IVDs\), Medicines, Vaccines and Immunization Devices, Vector Control.](#)

the ITN market, including ITN procurers, manufacturers and suppliers, regulatory agencies, laboratories, and researchers. The objective of this meeting was to review and provide feedback on the draft WHO Guideline for Prequalification of ITNs. Participants agreed that manufacturers and procurement agencies are the primary audiences and the goal of the guidelines is to establish data requirements predictive of the field performance of ITNs. In Q2, the project participated in the Innovation to Impact (I2I) steering group meeting to inform Module 7 (Post-Market Information) of the WHO Guideline for Prequalification of ITNs. The steering group discussed data requirements and the data collection process for the module and the process to incorporate the steering committee's input into the guideline. The LQAG and I2I further discussed Module 7 to consider how the LQAG, with its QA expertise, can provide feedback on data collection for post-market information.

Also in Q2, the LQAG met with the chair of the I2I industry group to discuss the non-inferiority of PBO nets and to obtain feedback from global procurers on the basis for requiring these non-inferiority studies to be performed. The outcome of the discussion was that, during the period of transition from WHO Pesticide Evaluation Scheme to WHO-PQ, a gap was found in the data requirements that procurers needed to make procurement decisions, with non-inferiority studies having fulfilled this gap for some global procurers. Global procurers are open to revisiting the discussion once the new WHO Guideline for Prequalification of ITNs is finalized and implemented (expected in this calendar year) and to addressing data requirements.

Global Collaboration at the Country Level

GHSC-PSM works with international collaborators, donors, and stakeholders to share information and resources and coordinate procurement or technical activities. Through these strategic collaborations, GHSC-PSM ensures that the storage, promotion, and delivery of key malaria commodities is responsive to sector best practices while securing the best value, as described in the following illustrative examples:

In **Guinea**, GHSC-PSM is participating in a multi-donor effort to build a prefabricated warehouse whose stakeholders include the MOH, Catholic Relief Services, and the MOH's Program Management and Coordination Support Unit. The project held coordination meetings, and reviewed and evaluated bids to contract a construction monitoring institution.

In **Nigeria**, the project is collaborating with AMF and PMI in executing a LLIN campaign. In FY 2022 AMF procured 3.7 million LLINs, while GHSC-PSM was responsible for QA/QC—inspection, sampling, and testing (at the project's third-party QC laboratories)—and logistics activities, including pick up, shipping, and delivery.

In Q1 FY 2023, the project distributed more than 3.3 million of these nets in Akwa Ibom State. GHSC-PSM also deployed an electronic data tool (Red Rose OneApp) to issue net cards to households and to track redemptions across 328 wards at the end of Q1. A total of 3,593,212 net cards were issued to benefit 7,019,413 family members across 1,152,744 households. The adoption of digital management for the LLIN campaign improved efficiency, visibility, and accountability for the commodities and personnel involved. A net card redemption rate of 93.28 percent was achieved.

In **Mozambique**, since Q1 the project has been coordinating with the Global Fund and PMI to support NMCP and *Central de Medicamentos e Artigos Médicos* (CMAM) in increasing their CHW malaria kit assembly to reach 106,000 kits per year by the end of 2023. To do so, the private company providing

assembly services increased monthly production to 9,000 kits. GHSC-PSM is monitoring this activity and will continue to coordinate with CMAM to assess storage capacity needs, ensure the timely availability of products in the kitting area, and enable uninterrupted assembly and transport to provinces.

Global Collaboration for Global Standards and Traceability

- **International Procurement Agency (IPA) Engagement:** In Q1 FY 2023, GHSC-PSM facilitated six IPA working group meetings, conducted research on standards updates, and revised the Global Standards Technical Implementation Guide for Global Health Commodities²⁴ document to reflect routine updates to standards, lessons learned from implementation to date, and the endorsement of new partners. This version includes updated language on event data sharing and a new requirement for a standardized logistics label expected to enhance efficiencies in recipient country warehouses where GSI barcode scanning is being implemented. USAID, UNFPA, UNDP, and Stop TB endorsed the document again, with new endorsements from UNICEF, Gavi, and the Bill and Melinda Gates Foundation received in Q2. Pending Global Fund endorsement, the document will be published and distributed to suppliers in Q3.
- **GSI Conference:** GHSC-PSM participated in the GSI Global Forum in Brussels, Belgium, in Q2. The project presented strategic engagement approaches to advance national adoption of GSI Standards for pharmaceutical traceability and engagement opportunities with GSI Member Organizations to support national traceability strategies.

C.2 Global Market Dynamics Research and Innovations

As described in Section A.I, GHSC-PSM conducts market analyses of malaria commodity sourcing activities to ensure stronger, healthier, and more sustainable markets in the long run.

Commodity Risk Mitigation

In the first half of FY 2023, numerous challenging circumstances affected the malaria supply chain. GHSC-PSM addressed increased country product registration requirements, delays caused by Chinese Lunar New Year, numerous order requests with limited lead times, and order cancellations that required nimble transition of products within the supply chain.

In Q1–Q2, as part of its Supplier Business Reviews, GHSC-PSM documented product registrations by country and timelines for additional registrations in process. The project assessed the impact of the changing requirements and developed mitigation plans to address possible product availability challenges in various countries within the region.

In Q2, deliveries of artesunate injectable orders were delayed by three weeks due to the Chinese Lunar New Year, but the project was able to secure sailings for all shipments and avoid excessive delays and stockouts. In Q1, GHSC-PSM redirected overstocked artesunate injectables in Nigeria to Senegal to avoid a country stockout. In Q2, the project redirected an overstock of (60 mg) artesunate injectables from Rwanda to avoid a stockout in Niger. In Q1, GHSC-PSM rerouted overstocked AL hard tablets produced

²⁴ Global Standards Technical Implementation Guide for Global Health Commodities.

for Zimbabwe to Senegal and Zambia, who were at risk of stockouts. Also in Q1, Burundi canceled an order for SP and Liberia delayed its order to Q4 FY 2023. GHSC-PSM took the opportunity to redirect the scheduled order from Liberia to Mali and avoided a stockout, and reordered the product for Liberia.

In Q1, agility testing for RAS increased after the project finalized a method transfer for a second testing lab. In Q2, RAS orders were expedited to the DRC to prevent a country-level stockout.

In Q1, a supplier received WHO prequalification for SPAQ, increasing the supply base from two to three eligible suppliers in FY 2023. In Q2, the project qualified two AL suppliers for procurement of hard and dispersible tablets, increasing product availability.

In Q1, GHSC-PSM responded to country preferences for round-tip lancets and inverted cups by engaging suppliers, who then officially submitted three change requests for the RDT accessories to WHO. In Q1, increased external demand caused mRDT orders to be delayed for Niger and Benin. Packaging material delays from one supplier delayed delivery to Angola, Burundi, and Senegal by one month. However, none of the countries experienced stockout risks.

In Q1, GHSC-PSM finalized the LLIN offer evaluations and all in-process orders proceeded as planned to their destinations. In Q2, the project continued to see an increase in requests for dual-active ingredient LLINs versus PBO LLINs and a decline in requests for single-pyrethroid nets, with the trend expected to persist in the future. The project conducted post-shipment activities for a LLIN order with the Rwanda Biomedical Center.

C.3 Awareness and Advocacy to Improve Availability of Essential Health Commodities

International Meetings and Conferences

GHSC-PSM represents the supply chain point of view in key global meetings and conferences to ensure that donors and governments consider the supply chain in program planning.

In Q1 FY 2023, GHSC-PSM's Cameroon and Ethiopia country offices delivered four presentations on malaria and data visibility at the American Society of Tropical Medicine and Hygiene 2022 Annual Meeting:

- Strengthening district capacity on data use to improve malaria product availability in Cameroon's North and Far North Regions.
- Assessment of primaquine utilization in four health facilities of Ethiopia in the context of malaria elimination strategy.
- Patient satisfaction among 26 selected hospitals implementing auditable pharmaceutical transactions and services in Ethiopia.
- Applying effective approaches contributes to waste reduction and better availability of essential medicines in Ethiopia.

Also in Q1 FY 2023, the project delivered six malaria-related presentations and posters at the 2022 Global Health Supply Chain Summit from teams in Ethiopia and Kenya:

- Restoring health supply chain in conflict-affected health facilities through a holistic conventional and emergency supply chain intervention.
- Bottom-up Innovations: System of auditable pharmaceutical transactions, and services for supply chain, proper use of medicines, and delivering health services in Ethiopia.
- Risk evaluation and management involved in supply chain of malaria commodities.
- Using simplified excel spreadsheet for accountability and to advocate for resource allocation: A case study of Kirinyaga county.
- Strengthened supply chain systems through advocacy for establishment of county health products and technologies units.
- The Impact of Routine Supportive Supervision on Management of Health Products and Technologies in Vihiga County, Kenya (2020-2022).

Other Malaria Meetings and Events

- In Q1–Q2 FY 2023, GHSC-PSM participated in bi-monthly meetings of the KSM/API sub-working group²⁵ and Artemisinin Working group of the Malaria Pharmaceutical Task Force.²⁶ Working group topics focused on the implications of significantly reduced vegetal artemisinin prices—weighted average prices dropped precipitously partially due to a successful growing season—making finished product supplier utilization of semisynthetic artemisinin (SSA) less compelling, as SSA remains a more expensive product. Despite improved supply and pricing of vegetal artemisinin, the working group discussed ways to further increase SSA supply through market-based interventions and demand transparency. Conversations centered on the Cost of Goods Sold analysis, the contractual feasibility of the sole supplier commercializing a precursor to SSA, and levers the donor community could pull. A draft proposal to increase SSA supply and demand transparency will be a meeting topic in Q3.
- In Q1, GHSC-PSM attended the CPhI held in Frankfurt, Germany, taking the opportunity to meet with current project suppliers and malaria stakeholders. Conversations revolved around perceptions of the vegetal artemisinin market, progress toward procuring a source of SSA or SSA-based artemether, API updates, product pipelines, and the topic of making commodities available in Africa (Section A.1).

²⁵ KSM/API Working Group members include Clinton Health Access Initiative (CHAI), Bill and Melinda Gates Foundation, GHSC-PSM, The Global Fund, Medicines for All Institute, Medicines for Malaria Venture (MMV), Maisha Meds, PATH, Unitaid, PMI, and WHO.

²⁶ Malaria Pharmaceutical Task Force members include the Asia Pacific Leaders Malaria Alliance Secretariat, CHAI, Bill and Melinda Gates Foundation, GHSC-PSM, the Global Fund, Impact Malaria, the Malaria Consortium, MMV, Médecins Sans Frontières, Pan-American Health Organization, PATH, PMI, UNICEF, and WHO.

- In Q1, the project participated in the consultation on the WHO Guideline for Prequalification of Insecticide Treated Nets (ITNs)²⁷ held in Geneva in October 2022 (Section A.3).
- GHSC-PSM participates in monthly meetings of the Pharma Task Force to discuss market conditions, supplier updates, and in-country updates/challenges. In Q1–Q2, discussions focused on updates on an OOS investigation of an artesunate injectable supplier (which has since been closed), updates on the status of WHO-PQ site inspections that had been previously delayed due to COVID-19, and price volatility in the vegetal artemisinin market.
- The KSM/API Working Group met monthly in Q2 of FY 2023 and members attended two separate meetings during the quarter, specifically focused on the semi-synthetic and vegetal artemisinin markets. KSM/API WG topics centered on improved pyronaridine manufacture, malaria commodity forecasting to inform API procurement volumes and African manufacturing. Artemisinin WG conversations focused on the ongoing analysis of higher yielding artemisinic acid fermentation strains and commercialization opportunities to establish a competitive market.
- GHSC-PSM participates in mRDT Task Force meetings, which as of Q2 were reduced from monthly to quarterly frequency as a result of market stabilization post COVID-19. The taskforce explored the state of the mRDT market based on a market landscape assessment conducted by UNITAID and looked at the increasing country preference for inverted cups versus pipettes as a blood collection device.
- The project also participates in the Vector Control Supply Access Task Force coordination call with key procurers of LLINs and indoor residual sprays who share intelligence regarding market conditions and logistics challenges. The coordination calls also provide a forum for alignment on key strategic initiatives. As operations somewhat normalized since the pandemic, in Q1, members finalized terms of reference for a longer-term structure for the task force, which covered objectives, membership, call structure, and modus operandi. On monthly calls in Q1–Q2, members discussed the status of PBO supply, which in previous quarters faced delays from suppliers, and container availability out of China.

C.4 Coordination and Collaboration within GHSC-PSM

Coordination across Health Areas within the IDIQ

GHSC-PSM promotes collaboration across health areas and other project-funded activities. The project uses its work across multiple health areas to benefit all task orders. Due to the project's economies of scale, significant cost savings relating to infrastructure (e.g., RDCs and contracts with 3PL service providers) are possible. See Section A.2 for additional details on logistics cost savings. Shared funding also allows for specialized support, such as market dynamics, knowledge management and communications, and monitoring and evaluation (M&E). Other examples include:

²⁷ [Consultation - WHO Guideline for Prequalification of Insecticide Treated Nets \(ITNs\) | WHO - Prequalification of Medical Products \(IVDs, Medicines, Vaccines and Immunization Devices, Vector Control\).](#)

- The project designed and delivered ARTMIS, the management information system that enables order and oversight creation and supply chain visibility for each of the health areas. Capabilities include the ability to create new ROs, POs, and inventory order reports and to estimate lead times and freight costs. ARTMIS integrates with partner systems like the Global Family Planning Visibility and Analytics Network and PMI's Malaria Data Integration for Visualization platform (M-DIVE), sharing essential order data for transparency throughout the community. See Section A.4 for additional details.
- GHSC-PSM health areas—malaria, HIV/AIDS, family planning and reproductive health, and maternal, newborn, and child health—co-fund the project's innovations. GHSC-PSM integrates GSI in supply chain processes through technical assistance to country programs. In the first half of FY 2023, GHSC-PSM implemented activities around the newly required serialization requirements, working with USAID to establish expectations for supplier compliance and data collection approaches. See Sections B.1 and C.1 for additional details.
- In the first half of FY 2023, the project continued to advance countries' transitions from FASP tools to QAT. This tool is used for FASP for health commodities across the project's four health areas, which co-funded QAT's development in FY 2021. To date, 32 countries have been trained on the QAT's supply planning module, with 21 of them also being trained on the forecasting module. QAT includes 194 supply plan programs and 186 forecast programs, and the project has trained 1,030 active country users. GHSC-PSM will continue to train more countries on both modules, in addition to providing separate country-led training to more government counterparts. See Section B.1 for additional details.
- GHSC-PSM maximizes synergies across health programs. The project develops approaches and systems that diffuse to other areas, such as the EUV survey. EUV surveys are routine assessments of stock availability and potential causes of stockouts at the SDP level that provide an opportunity to address stock management challenges. Malaria, family planning/reproductive health, and maternal and child health programs continued to implement the revised EUV survey in Q1–Q2 and collaborated to develop the CHW module, which will be piloted in Q4 FY 2023 and rolled out to all countries in FY 2024. For full details on EUV activities in FY 2023, see Section B.4.
- TO2 is conducting a workforce development assessment based on the TO3 funded workforce development activities collected by USAID in 2021, the results of which will provide general understanding on the workforce development activities the project has been contributing to (see Section B.3) and will benefit all health areas.
- Multiple health areas fund most GHSC-PSM country offices. This helps country offices to share the costs of office space, infrastructure, and staff. The health areas also fund or co-fund training, greatly expanding the topics and number of people who benefit. Health areas often share the cost of technical assistance for cross-cutting technical areas, such as FASP, warehousing, distribution, inventory management, and LMIS.

Coordination with Other USAID GHSC-funded Activities

- Separate GHSC contracts—e.g., a Mission-managed task order known as Task Order 5, or Afya Ugavi, in Kenya, and a multi-award GHSC-Technical Assistance (GHSC-TA) contract—provide technical assistance through country offices, including in PMI-partner countries Benin, DRC, Senegal, and Tanzania, and Mission bilateral partnerships in Côte d'Ivoire and Madagascar. USAID Missions in these countries procure health commodities through the GHSC-PSM contract. A project team at the headquarters serves as the point of contact for the NFO countries on order, delivery, and commodity security issues, conveying information and managing data requests.
- The NFO tailors its support based on commodity volume and complexity, import requirements, and in-country programming. To interact effectively with the GHSC-TA contractors, the NFO outlined roles and responsibilities, drafted communication protocols with in-country stakeholders and USAID Missions, and executed and monitored memorandums of understanding with the GHSC-TA contractors. The NFO also coordinates closely with in-country technical assistance projects to manage contracts.
- GHSC-PSM continues to monitor the lingering impacts of COVID-19 and persistent security and adverse weather risks on TO2 commodities in the global supply chain. The project provides regular updates to USAID and GHSC-PSM country directors as needed through various methods, including direct communications with USAID and virtual country director forums.

D. Performance Monitoring

GHSC-PSM monitors and reviews project performance with the objective of continual improvement.

D.1 Indicators

GHSC-PSM has a USAID-approved monitoring and evaluation plan with performance indicators that reflect the project's results framework. Annex A provides the framework, and Annex B, the list of indicators and their definitions. Annex C details the sources of all the commodities the project procures. Annexes D–G provide project performance as detailed by the indicators.

GHSC-PSM's M&E plan includes quarterly, semiannual, and annual indicators. The project collects and cleans performance monitoring data, calculates relevant indicators for each reporting period, and reports these indicators in contractual quarterly and annual reports. GHSC-PSM performs extensive QA of OTD data. Headquarters-based M&E specialists review indicator data provided by country offices that are used to calculate the country-level indicators.

As part of the quarterly reporting process, the project reviews quarterly findings. These reviews identify potential calculation issues and provide context for the quarterly report. They support reflecting on progress and prioritizing areas for improvement.

D.2 TO2 Regular Meetings and Review

GHSC-PSM holds internal standing meetings to review TO2 performance across the project and identify areas for improvement. These meetings include:

- Weekly TO2 management team meetings to discuss activities.
- Daily global supply chain meetings to review pending orders and prioritize actions for malaria order management.
- Three GHSC-PSM program management meetings per month (typically, the first, second, and fourth weeks) on cross-cutting project issues that impact project health areas, including the TO2.

GHSC-PSM standing meetings with USAID/PMI include:

- Weekly GHSC-PSM TO2 meetings with PMI to review pending malaria orders, provide updates on progress in systems-strengthening activities, and present and discuss new sourcing strategies and innovations for PMI approval.
- Biweekly GHSC-PSM TO2 QA and PMI meetings to review progress on QA activities.
- Biweekly GHSC-PSM management team and USAID check-in meetings to review cross-cutting project performance with the USAID Contracting Officer's Representatives.
- Biweekly M&E TWG meetings to develop, review, update, and promote global M&E strategies, processes, and tools for the project; identify and share best practices across countries and other USAID partners; and address technical assistance that has cross-country applicability.
- Biweekly logistics TWG meetings to review Deliver/Return and 3PL metrics and logistical challenges and issues; participant's present customized logistics solutions to improve project performance.
- Monthly ARTMIS change control board meetings with the USAID technical backstops to review proposed ARTMIS changes, such as correcting defects or new functionality.
- Biweekly ARTMIS meetings to provide the technical status (e.g., accomplishments, planned roadmap tasks, and risks) to USAID MIS backstops.
- Monthly FASP TWG meetings to update USAID, GHSC-PSM task order directors, Global Supply Chain, and Commodity Security teams on FASP related activities and discuss QAT tool development and country roll-out progress, successes, challenges, risks, project sustainability, and other project management issues.
- Monthly finance TWG meetings to coordinate and standardize financial management across task orders; provide financial reporting; and deliver financial updates across task orders.
- Bimonthly (every two months) GHSC-PSM and USAID Development Data Library Working Group meetings to review requirements and best practices for data sharing with USAID and other partners.

D.3 Other Monitoring

In accordance with USAID's Environmental Procedures (22 CFR 216), GHSC-PSM implements the Initial Environmental Examination and the Environmental Mitigation and Monitoring Plan. Implementation includes services to staff globally, such as a review of technical documents pertaining to 22 CFR 216, guidance and advisory support, training, capacity strengthening, and direct technical assistance.

In Q2, GHSC-PSM requested and received an extension for submission of the FY 2022 Environmental Mitigation and Monitoring Report. Upon completion, the report will be shared with USAID. During the reporting period, the Environmental Compliance team began drafting and rolling out guidance on waste disposal of expired commodities in preparation for closeout and transition.