

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



GHSC-PSM TASK ORDER 2 (MALARIA)

ANNUAL REPORT FISCAL YEAR 2023

October 1, 2022 — September 31, 2023



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

DISCLAIMER:

The views expressed in this publication do not necessarily reflect the views of the U.S. Agency for International Development or the U.S. Government.

Table of Contents

Table of Contents	1
Acronyms	2
Executive Summary	7
Transition Planning for NextGen	9
A. Improved Availability of Health Commodities	10
A.1 Enhancing Global Health Commodity Procurement	10
A.2 Strengthening Global Logistics Processes	16
A.3 Adhering to Quality Assurance Requirements	26
A.4 Improving Data Visibility	32
B. Strengthened In-Country Supply Chain Systems	39
B.1 Improved Strategic Planning and Implementation Related to Supply Chain Management and Commodity Security	39
B.2 Improved In-Country Logistics, Including Effective and Efficient Delivery of Health Commodities to Service Sites	47
B.3 Implementing Strategies to Transfer Skills, Knowledge, and Technology for Improved and Sustained Performance	51
B.4 Strengthened Enabling Environments to Improve Supply Chain Performance	54
C. Effective Global Collaboration to Improve Long-Term Availability of Health Commodities	56
C.1 Engagement with Global Partners for Strategic Coordination	56
C.2 Awareness and Advocacy to Improve Availability of Essential Health Commodities	60
C.3 Coordination and Collaboration within GHSC-PSM	61
D. Performance Monitoring	63
D.1 Indicators	63
D.2 TO2 Regular Meetings and Review	64
D.3 Other Monitoring	65

Acronyms

3PL	third-party logistics
ABC	activity-based costing
ABC/ABM	activity-based costing/management
ACT	artemisinin-based combination therapy
AL	artemether-lumefantrine
AMF	Against Malaria Foundation
API	active pharmaceutical ingredient
ARTMIS	Automated Requisition Tracking Management Information System
ASAQ	artesunate + amodiaquine
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
CRS	Catholic Relief Services
DHA-PPQ	dihydroartemisinin–piperaquine
DMA	Drug Management Agency
DNPM	Direction Nationale de la Pharmacie et du Médicament

DRC	Democratic Republic of the Congo
eLMIS	electronic logistics management information system
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
GSI	Global Standards I
GTIN	Global Trade Item Number
HEW	health extension worker
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
MEGI	Malaria EUV Global Indicator
MIS	management information system
MOH	Ministry of Health
mRDT	malaria rapid diagnostic test
MMV	Medicines for Malaria Venture
NFO	non-field office
NMP	National Malaria Program
NMEC	National Malaria Elimination Centre
NMEP	National Malaria Elimination Program
NSCA	National Supply Chain Assessment
OOS	out-of-specification
OTD	on-time delivery
OTIF	on-time in-full
OMS	Order Management System
PATH	Program for Appropriate Technology in Health

PBO	piperonyl butoxide
Pf	Plasmodium falciparum
pLDH	parasite lactate dehydrogenase
PMI	U.S. President's Malaria Initiative
PNLP	Program Nationale de Lutte contre le Paludisme
PPMRm	Procurement Planning and Monitoring Report for malaria
PO	purchase order
PQ	prequalification
Pv	Plasmodium vivax
Q	quarter
QA	quality assurance
QAT	Quantification Analytics Tool
QC	quality control
QPL	Quantification Analytics Tool Problem List
RDC	regional distribution center
RMS	Regional Medical Store
RO	requisition order
SDP	service delivery point
SMC	seasonal malaria chemoprevention
SP	sulfadoxine-pyrimethamine

SPAQ	sulfadoxine-pyrimethamine + amodiaquine
SSA	(sole-sourced) semi-synthetic artemisinin
TA	technical assistance
TO2	Task Order 2
TOM	Task Order Malaria
TOT	training of trainers
TWG	technical working group
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VSI	vendor-stored inventory
WHO	World Health Organization
ZAMMSA	Zambia Medicines and Medical Supplies Agency
ZAMRA	Zambia Medicines Regulatory Authority

Executive Summary

This 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 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 programs (NMPs), 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. GHSC-PSM continued to maintain high global supply chain performance in FY 2023, achieving an on-time delivery (OTD) rate of 86 percent, exceeding the 80 percent target in each quarter despite transport challenges related to climate change and extremist activity, and resulting political unrest and economic instability (**Section A.2**).

Over the course of the year, the project collaborated with stakeholders, such as USAID Missions, suppliers, and logistics providers to procure more than \$188 million in malaria commodities for 29 PMI partner countries.¹ GHSC-PSM managed 100 percent of major malaria commodity category procurements (by value) through framework contracts, exceeding the 95 percent target. As of the end of Q4, GHSC-PSM had generated commodity cost savings on core malaria products of \$272 million over the life of the project, including \$61 million in FY 2023. GHSC-PSM also saved \$15.4 million on TO2 logistics in FY 2023 (**Section A.1**).

GHSC-PSM works to strengthen global logistics processes and national supply chains to improve malaria commodity availability. In FY 2023, 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 FY 2023, the project implemented a new vendor-stored inventory (VSI) strategy for first-line malaria treatment that was instrumental in fulfilling urgent orders during the year, proving to be a critical rapid fulfillment mechanism (**Section A.1**).

¹ Angola, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, Democratic Republic of the Congo (DRC), Côte d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe. GHSC-PSM also managed a one-time procurement for Guyana.

GHSC-PSM also held business review meetings with LLIN, mRDT, malaria pharmaceutical, and laboratory suppliers to discuss supplier performance. The project uses metrics to promote supplier performance improvements and inform order allocation decision making (**Section A.1**). Meetings with suppliers were also an opportunity to discuss suppliers' organizational changes, Global Standards I (GSI) compliance, and production capabilities (**Section C.1**).

GHSC-PSM continues to facilitate more robust quality assurance (QA) and quality management systems for the products the project procures. The average QA lead time achieved in FY 2023 was 95 percent. GHSC-PSM maintained a high level of productivity in FY 2023, issuing 173 certificates of conformance (CoCs) that ensured compliance with quality requirements and allowed commodities to be released for distribution. The project also submitted a survey to existing LLIN suppliers to obtain critical information on the correlation between an LLIN's lifespan and its packaging. In addition, the project initiated a risk-based analysis to evaluate whether two artemisinin-based oral products currently in its portfolio can be eligible for further randomized/reduced testing (**Section A.3**).

GHSC-PSM's activities aim to support and accelerate the achievement of the **five focus areas** outlined in **PMI's 2021–2026 strategy** to end malaria faster: reaching the unreached, strengthening community health systems, keeping malaria services resilient, investing locally, and innovating and leading. The tangible progress made in these areas during FY 2023 demonstrates GHSC-PSM and USAID's dedication to this vital mission, as we work toward eliminating malaria and saving lives.

GHSC-PSM supports PMI to achieve, sustain, and tailor deployment and uptake of high-quality, proven interventions focusing on **reaching the unreached**. As an example, during FY 2023, GHSC-PSM worked to procure topical mosquito repellent for the first time under TO2 to fulfill the request from the Kingdom of Cambodia, specifically targeting forest goers (**Section A.1**).

Building on efforts to **strengthen community health systems**, the project achieved a significant milestone by developing and publishing an advocacy paper highlighting lessons learned and the challenges and opportunities that exist in better integrating community health workers (CHWs) into the supply chain. The paper was disseminated to partners, donors, and key host government officials across PMI and USAID partner countries in Q4 (**Section B.1**).

At the request of PMI-Washington, GHSC-PSM developed a CHW module for the end-use verification (EUV) survey that was piloted in Zambia in Q4. This module will inform activities designed to strengthen supply chain functionality at the community/CHW level (**Section A.4**).

To **keep malaria services resilient** and foster PMI's efforts to **invest locally** by engaging local suppliers, the project hosted a regionalization workshop in Q3 that resulted in a modified FY 2024 allocation strategy to emphasize the inclusion of African manufacturers. In Q4, GHSC-PSM began extending sourcing contracts to a wider pool of Africa-based manufacturers and making known its intention to grow its supplier base in Africa, so that suppliers could position themselves to meet the World Health Organization (WHO) prequalification standards. In FY 2023, this effort resulted in the project identifying and bringing onboard one new supplier for antimalarials. In FY 2023, GHSC-PSM developed a modeling tool to analyze and guide malaria strategy and operations in low-malaria-endemic settings and optimize supply chain management. The

project tested it with sample data from Cambodia and agreed to add a scenario/sensitivity analysis to enhance user-friendliness for decision making (**Section B.1**).

GHSC-PSM also aims to support partner-country governments to execute malaria programs successfully, which includes workforce development activities. In FY 2023, GHSC-PSM developed a two-phase project plan and timeline for assessing workforce development activities in PMI partner countries and implemented Phase I in Malawi. In Q4, the project worked with the Zambia office to identify participants for the assessment starting in Q1 FY 2024 (**Section B.3**).

To **innovate and lead**, data plays a pivotal role. In FY 2022, GHSC-PSM launched the updated Procurement Planning and Monitoring Report for malaria (PPMRm) website, improving upon the old platform and facilitating the monthly collection of stock availability information from countries to prioritize deliveries and prevent stockouts. The project also published the Malaria EUV Global Indicator (MEGI) Dashboard, which allows users to interact with EUV data to gain insights into trends across time and locations, comprising information collected across countries from 2020 through the end of Q4 FY 2023. These views provide new ways to use the EUV survey data. GHSC-PSM is using the data to develop an analytical report summarizing key learnings to be shared in FY 2024 (**Section A.4**).

Furthering efforts to support countries in adopting global standards for product and location identification through barcode data capture software, GHSC-PSM produced a technical report on the LLIN Verification pilot in Nigeria, aimed at capturing serialized LLIN campaign distribution data. The report will be published in early FY 2024 after PMI review and approval (**Section B.1**).

In FY 2023, the project took a transformative step by broadly rolling out the Task Order Malaria (TOM) management view dashboard, allowing GHSC-PSM and PMI to track and visualize the status of orders in real time to make informed supply chain decisions and efficiently manage the entire commodity procurement cycle (**Section A.2**).

In FY 2024, GHSC-PSM will continue building on the initiatives highlighted in this report, with a vision of increasing countries' stewardship of their own supply chains, greater private sector engagement, more commodities sourced from Africa, and enhanced use of data to drive decision making at all levels of the supply chain.

Transition Planning for NextGen

GHSC-PSM continues to make progress in deploying transformative supply chain solutions while laying a strong foundation for a successful transition to the USAID Next Generation Global Health Supply Chain (NextGen) projects. Preparing for this transition was a focus area in FY 2023. Activities included conducting after-action reviews with countries that have already completed transition and closeout activities to document lessons learned, assembling a headquarters-level inventory of information assets and convening a Global Supply Chain Transition Working Group with USAID to conduct regular deep dives into transition planning.

In Q3, the project hosted Country Directors in the Chemonics Washington office with 35 country representatives to prepare and discuss transition planning. In Q4, GHSC-PSM introduced templates for FY

2024 country transition plans. The project also developed a model for post-project office support needed to cover headquarters support to countries in the gap between GHSC-PSM country office closures and completion of global procurement activities. The project routinely met with USAID in various transition working groups in which the teams furthered the development of headquarters- and country-level data asset and intellectual property inventories, discussed country warehouse capacity, decentralized procurement, and sourcing transitions, among other topics to coordinate transition planning and risk mitigation.

A. Improved Availability of Health Commodities

GHSC-PSM 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 QA requirements, and improves data visibility. This section highlights activities, achievements, and related performance indicators.

A.1 Enhancing Global Health Commodity Procurement

Under the U.S. President’s Malaria Initiative (PMI)-funded TO2, GHSC-PSM supplies lifesaving malaria prevention and treatment pharmaceuticals, mRDTs, 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 to ensure on-time delivery (OTD), reduce costs incurred by recipient countries, and sustain market health.

Through long-term agreements (LTAs), the project expedites order procurement time—shortening lead times from order to delivery—and reduces complexity throughout the supply chain by standardizing procurement-related decisions. In FY 2023, 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 fulfills essential malaria commodity orders for sulfadoxine-pyrimethamine + amodiaquine (SPAQ) and artemether-lumefantrine (AL) using a regional distribution center (RDC) in Belgium. The project secures manufacturers’ production capacity for large volumes of SPAQ and AL by leveraging a rotating emergency loan fund to place orders early, often in advance of countries placing orders. The RDCs

reduce fulfillment lead times, ensure timely delivery even in constrained markets, hedge against uncertainty and disruption in the markets, and avail favorable market conditions such as pricing.

The RDC stockpile provides GHSC-PSM access to critical commodities when countries need them to avert stockouts. The stockpile strategy is informed by demand data—derived from quarterly country supply plans and the monthly Procurement Planning and Monitoring Report for malaria (PPMRm). The project translates this information into visual dashboards on country stock risks and includes the timing and scope.

In Q3, the project fulfilled a SPAQ order for Cameroon from the RDC stockpile. In the second half of FY 2023, GHSC-PSM fulfilled two emergency orders of AL 20/120 mg hard tablets and dispersible tablets for Niger and Senegal with stock from the RDC.

In Q4, through the RDC stockpile, GHSC-PSM delivered two emergency orders of AL 20/120 mg dispersible tablets and AL 20/120 mg hard tablets to Niger and one emergency order of AL 20/120 mg dispersible tablets and AL 20/120 mg hard tablets to Senegal. To mitigate stockout risks, the project also fulfilled two urgent orders of AL 20/120 mg dispersible tablets and AL 20/120 mg hard tablets for Liberia.

In FY 2023, GHSC-PSM implemented a VSI strategy to mitigate stockout risks by fulfilling urgent country orders that have shorter requested delivery lead times than the project's average lead times. The project initiated the procurement of AL 20/120 mg hard tablets with the two VSI contracted suppliers for Burkina Faso, Côte d'Ivoire, Niger, and Uganda. By the end of Q4, the project had delivered VSI orders to Côte d'Ivoire, Uganda, and Burkina Faso. Delivery of the Niger order was delayed as the borders into Niger closed while the goods were in transit, and is targeted for delivery in Q2 FY 2024.

Supplier Engagement and Vendor Negotiations

In FY 2023, GHSC-PSM engaged with suppliers for all malaria commodities to deepen strategic relationships and support market health:

- **Supplier-specific forecasts.** GHSC-PSM shared quarterly forecasts with malaria commodity suppliers that were allocated volumes throughout the year. 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.** In FY 2023, GHSC-PSM assessed the availability of registered topical mosquito repellent in Cambodia and brought a new supplier under contract through a competitive bidding process. While mosquito repellent had not been procured historically under the Malaria Task Order, the Kingdom of Cambodia, in collaboration with the National Center for Parasitology, Entomology, and Malaria Control, made the request to PMI through GHSC-PSM to provide mosquito repellent to forest goers. The first order was placed in Q4 and will be delivered in early FY 2024.
- **Commodity risk assessments.** GHSC-PSM evaluated the geographical sourcing of commodities, market updates, and supplier-specific ability to meet goods availability dates to assess programmatic impact and update the commodity risk profiles. The project examined suppliers' ability to source KSMs, raw materials, and packaging materials to minimize any near- and long-

term supply disruptions. Based on this information, the project shared its mitigation efforts with PMI.

- **Business reviews.** In FY 2023, GHSC-PSM held more than 30 semi-annual business review meetings with LLIN, mRDT, malaria pharmaceutical, and laboratory suppliers. In these forums, GHSC-PSM reviews each supplier's performance scorecard against five criteria: 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 the scorecard results with the supplier to encourage performance improvements. Supplier conversations in the first half of the year included perceptions of the API and KSM markets, and the global increase in energy prices due to the war in Ukraine and lingering post-pandemic transportation challenges. In Q3 and Q4, GHSC-PSM's conversations with suppliers focused on African manufacturing and the perceived challenges and opportunities for capacity strengthening on the continent.
- **Supplier visits.** In Q1, GHSC-PSM attended the Convention on Pharmaceutical Ingredients, or CPhI, and met with its current suppliers of malaria commodities, three API suppliers, and colleagues from Medicines for Malaria Venture (MMV), Medicines for All Institute, and the United States Pharmacopeia. In addition, GHSC-PSM visited the headquarters of a critical pharmaceutical supplier to finalize the remaining details of a VSI agreement and learn about developments in the supplier's product pipeline.

Strategic Sourcing Activities

In the first half of FY 2023, GHSC-PSM's sourcing focused on structuring the project's FY 2024 approach to LLINs. GHSC-PSM finalized LLIN tender evaluations in Q1 and structured its FY 2024 strategy in Q2. In Q3, the project hosted a regionalization workshop and, as a result, modified FY 2024 allocation strategies to emphasize African manufacturing as a weighted criterion for new supplier evaluation for all malaria commodity categories. In Q3–Q4, the project secured Sourcing Governance Board (consisting of PMI and GHSC-PSM representatives) approvals for FY 2024 allocation strategies for LLINs,² ACTs, mRDTs, severe malaria, sulfadoxine + pyrimethamine (SP), and seasonal malaria chemoprevention (SMC).

Procurement of Malaria Commodities

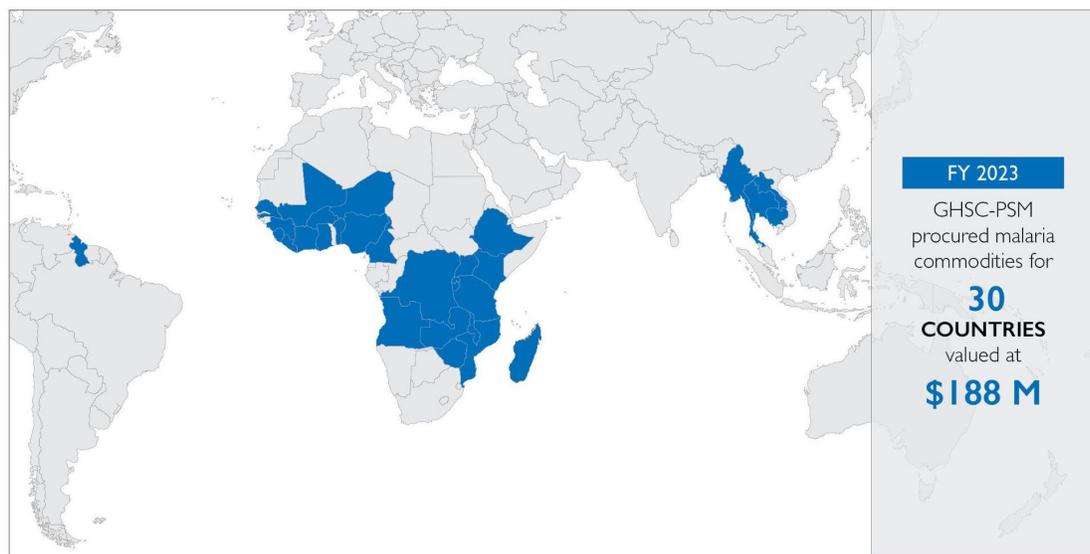
For procurement and end-to-end order management—from receipt through delivery and payment—GHSC-PSM requires planning, open communication, and coordination among a broad group of internal and external supply chain stakeholders. In FY 2023, GHSC-PSM collaborated with stakeholders, such as

² Except for dual-active ingredient nets that continue to be discussed.

USAID Missions, suppliers, and logistics providers, to support the procurement of malaria commodities for 29 PMI-partner countries³ and Guyana⁴, valued at more than \$188 million (see Exhibit I).

Project headquarters staff provided procurement support to six countries (Benin, Côte d'Ivoire, DRC, Madagascar, Senegal, and Tanzania) where GHSC-PSM has no field presence.

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



Commodity Risk Mitigation

During the second half of FY 2023, the project addressed supplier capacity and goods availability issues, delivery dates, and minimum order requirements to fulfill countries' supply needs.

Risks and challenges responded to in Q3–Q4 include:

- Reallocated orders of artesunate injectables for Kenya and Uganda to secondary and tertiary suppliers. This change addressed production limitations from the primary supplier that had resulted in a product shortfall.
- Identified SP stockout risks in Malawi and Mali. In Malawi, the project rescheduled the goods available date (GAD) with the supplier and shipped the order by air to avert a stockout. In Mali, the supplier could not reschedule the GAD, so the project expedited an ocean shipment.
- Negotiated with a supplier to divide an Angola order of SP into two GADs to meet the country's new requested delivery dates of Q1 and Q3 FY 2024, as they were overstocked.
- Adjusted the agreed delivery dates for pyronaridine artesunate with the Burkina Faso Mission to accommodate the shutdown of a supplier due to factory renovations.

³ 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.

⁴ Guyana is not a PMI-partner country.

- Scheduled a supplemental shipment of round-tipped lancets and inverted cups for Cambodia before the expiration date of a stock of mRDTs.
- Contacted additional suppliers for kitted products to respond to the FY 2024 tender for injectable artesunate with syringes for Rwanda. Only one supplier responded with pricing and availability.
- Negotiated supplier terms for rectal artesunate in the FY 2024 tender solicitation to meet minimum production quantities. The project and the Global Fund are attempting to consolidate orders to meet supplier minimum production requirements.
- Expedited delivery of an emergency order of SP by air to Ghana. This order was previously rejected due to a change in waiver and import requirements and a subsequent lack of in-country registration.

Cost Savings on Malaria Commodities

GHSC-PSM's strategic sourcing activities generated significant cost savings on malaria products,⁵ reaching \$272 million over the life of the project, including \$61 million in savings in FY 2023, as shown in Exhibit 2.

In FY 2023, the project amassed cost savings of \$20 million on ACTs, contributing to the life of project cost savings of \$114 million for these products. In the second half of the fiscal year, the project saw the lowest average price yet for AL 6x1 and 6x3 products due to active ingredient cost reductions and the project's redistribution of procurements between higher- and lower-cost providers. The need to fill emergency orders through a higher-priced VSI supplier resulted in a small price increase for AL 6x4 products. The average cost of some artesunate + amodiaquine (ASAQ) products also increased slightly due to the need to bundle orders with a higher-priced supplier to meet contractual order minimums. Despite this increase, commodity cost savings for ASAQs grew in FY 2023 to \$2 million, with a cumulative cost savings of over \$10.5 million over the life of the project.

LLINs also saw continued savings, amassing \$53 million over the life of the project, with \$17 million during FY 2023 alone. These savings were driven almost entirely by piperonyl butoxide (PBO) and dual-active ingredient nets, as most countries are phasing out single pyrethroids. In the second half of FY 2023, the cost of PBO nets decreased due to the project awarding procurements to a lower-cost supplier and the project's strategic diversification of suppliers. The cost for dual-active ingredient net costs decreased due to increased competition, as it is no longer a sole-source market. The savings for the LLIN category are cumulative cost savings across six types of LLINs compared to their original baseline costs. The six types of LLINs are Dual AI 150cm, Dual AI 170cm, PBO 150cm, PBO 170cm, Single Pyrethroid 150cm, and Single Pyrethroid 170cm nets.

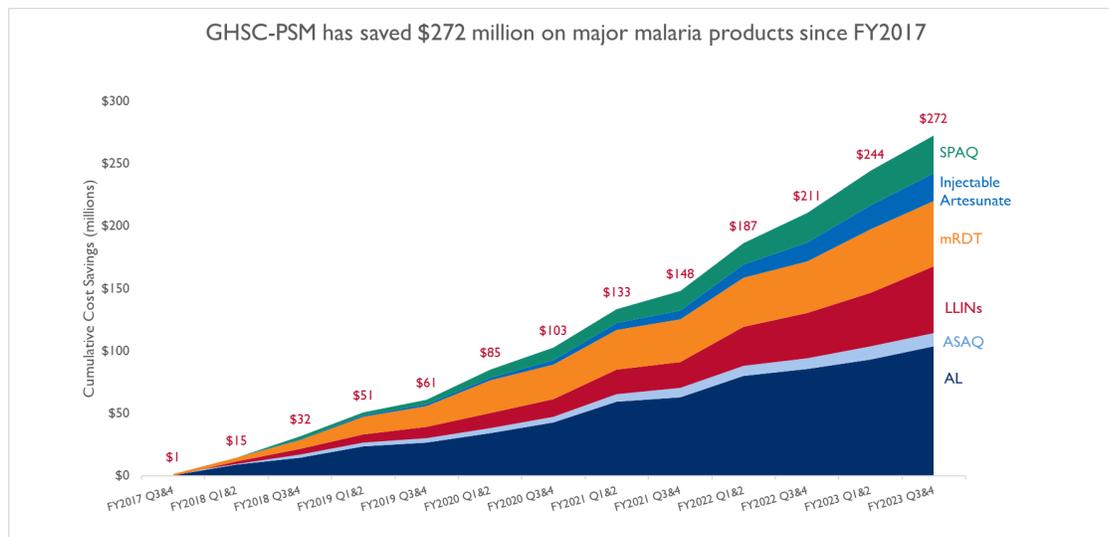
While the cost of mRDTs increased slightly in FY 2023, the project still saw cost savings of \$11 million, contributing to life of project savings of \$52 million.

Injectable artesunate savings remained consistent this year due to increased competition among the supply base with a third vendor entering the market. The project amassed almost \$7 million in savings in FY 2023,

⁵ 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.

and \$22 million over the life of the project. SPAQ saw similarly consistent savings, primarily due to intentional diversification of suppliers, and amassed about \$6.5 million in savings in FY 2023, contributing to the life of project savings of \$30 million.

Exhibit 2. Cumulative cost savings of \$272 million on major malaria products since 2017



Commodity Procurement Indicators

GHSC-PSM procured malaria commodities worth more than \$188 million in FY 2023, including RDC stockpile orders and direct drops to countries, as shown in Exhibit 3.

Exhibit 3. GHSC-PSM procurement totals for FY 2023

Product category	Value
ACTs	\$ 30,366,910
Laboratory supplies	\$ 783,499
LLINs	\$ 104,268,939
Other non-pharmaceutical products	\$ 153,972
Other pharmaceuticals	\$ 219,190
mRDTs	\$ 28,053,719

Severe malaria medicines	\$ 13,035,734
SMC	\$ 8,830,180
SP	\$ 3,234,006
TOTAL	\$ 188,946,148

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

In 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 97 percent of lab procurements. When aggregated across all product categories, the overall framework contracting percentage by commodity value for FY 2023 was 99.9 percent, rounding to 100, 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

In FY 2023, the project applied strategies developed and lessons learned during the COVID-19 pandemic to deal with new challenges that slowed the processing, shipping, and clearance of products for delivery. This included heightened and 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. GHSC-PSM worked with 3PL providers and USAID Missions to mitigate these issues and meet demand across countries to deliver malaria commodities to 30 countries.⁶

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, and stopped tracking and reporting on COVID-19 impacts in Q3.

Transport challenges during FY 2023 centered around war, political unrest, climate change, and economic instability. Overall market conditions stabilized with more reliable schedules for transportation by sea, container availability, and fewer port congestion issues.

- **Origin challenges.** Drought and labor shortages in Europe affected logistics throughout FY 2023. Drought in Europe and across the Panama Canal restricted shipping due to low water levels, in turn increasing the demand for truck services, leading to increased prices. The drought in the Panama Canal also caused historic traffic jams. Labor unrest due to economic

⁶ 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. GHSC-PSM also managed a one-time delivery to Guyana which is not a PMI-partner country.

pressures saw strikes at ports and airports throughout Europe, disrupting carrier schedules.

- **Air freight.** Carrier capacity into Africa remained low—8 percent lower than pre-COVID-19 levels. Airline labor shortages at major hubs of ground staff, baggage handlers, cabin crews, and pilots continued, which affected carrier operations. Higher-than-normal reliance on freight services remained a challenge, with mainly larger commercial markets receiving priority over traditionally underserved markets.
- **Ocean freight.** Demand for shipping was down for most of FY 2023, and carriers adjusted to the limited demand by blanking sailings and aligning schedules with demand. While the fiscal year started out with low carrier reliability, this stabilized in Q3–Q4.
- **Intra-Africa.** Logistics problems during FY 2023 stemmed primarily from conflict and climate change. Extremists active throughout the Sahel Region carried out attacks in Burkina Faso, Mali, Niger, and Nigeria. Militants also continue to launch attacks in Benin, Côte d'Ivoire, and Togo. In Q3, a coup in Niger caused severe shipment delivery delays, higher logistics costs, and very low in-country stock levels due to inability to replenish. Meanwhile, the conflict between the Democratic Republic of the Congo (DRC) and Rwanda continues to escalate.

Severe weather plagued Africa for most 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.

Freight Procurement Activities

In Q4, GHSC-PSM undertook its third semi-yearly rate refresh, which aligned freight costs with market pricing. After the rate refresh, the project adjusted freight forwarder performance evaluation criteria to encourage improved invoicing and electronic data interchange timeliness, on-time performance, and quality of non-conformance reports. GHSC-PSM uses the primary, secondary, and tertiary model for bookings, with a secondary or tertiary 3PL used if the primary is unable to service the freight lane or when opening the lane to spot bidding.

Through this rate refresh, GHSC-PSM secured competitive rates for high-traffic lanes in a mostly less volatile but more expensive market. Potential rate increases are on the horizon, specifically new ocean freight surcharges and new International Maritime Organization regulations on emissions anticipated to come into effect in FY 2024.

For large shipments and new lanes—a new supplier origin or new destination country—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.

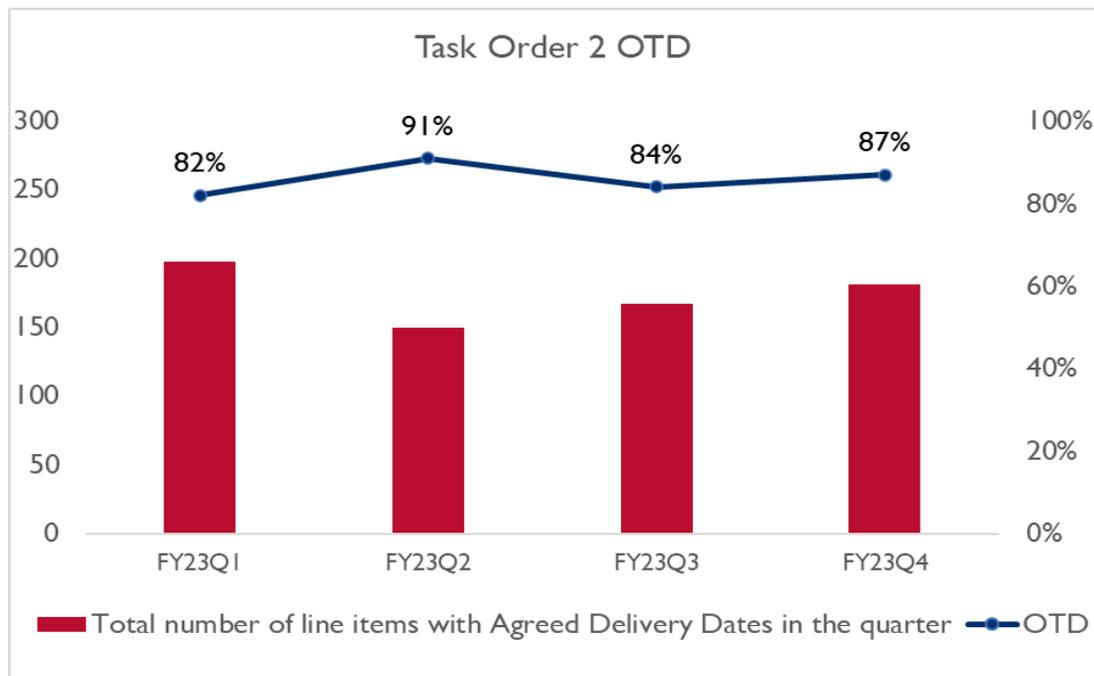
In Q3–Q4, market prices were stable. The project will continue to spot bid large shipments to obtain competitive pricing through its 3PL partners, as they can typically use larger loads to increase their buying power and drive down air and ocean freight costs. In the second half of FY 2023, the project priced lanes not included in the rate refresh and followed the spot-bidding process for large shipments for new destinations.

On-time Delivery and On-time Delivery in Full

GHSC-PSM achieved an OTD rate of 86 percent for malaria commodities in FY 2023. Quarterly project performance in all four quarters exceeded the target of 80 percent.

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 (see Exhibit 4).

Exhibit 4. OTD and volume of deliveries of malaria commodities, FY 2023

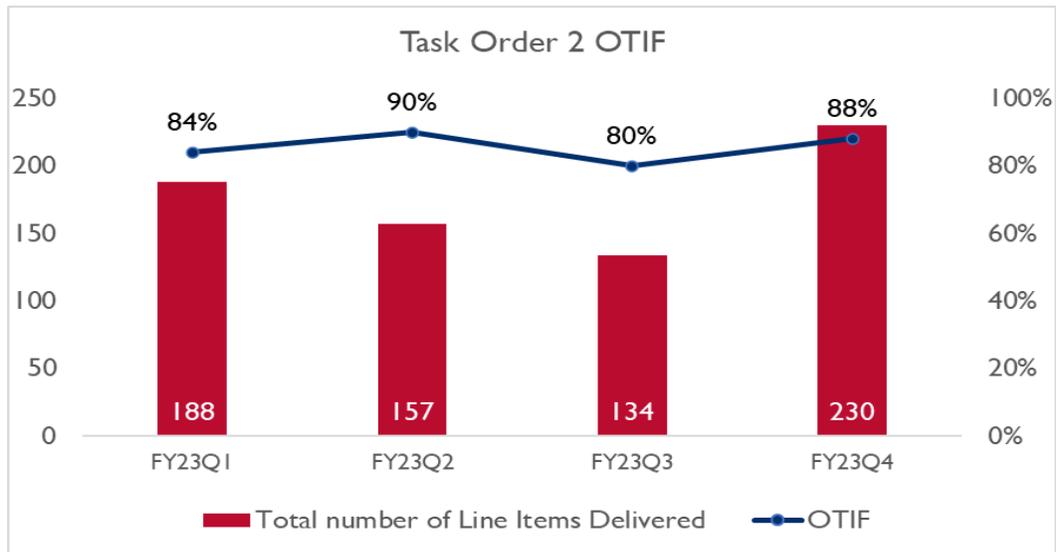


OTD and on-time in-full delivery (OTIF) for specific malaria product categories are provided in Annex E.

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 86 percent for FY 2023.

In FY 2023, the project’s OTIF rate for malaria commodities maintained strong performance (see Exhibit 5).

Exhibit 5. OTIF for malaria commodities, FY 2023

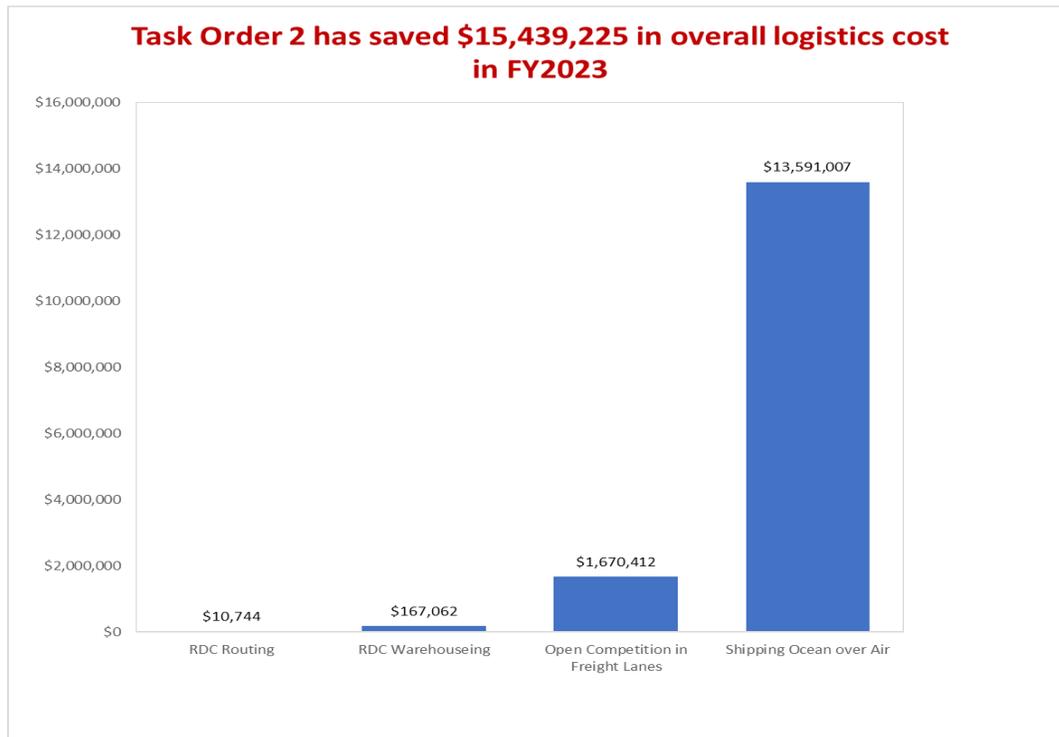


Cost Savings on Logistics

GHSC-PSM saved \$15.4 million on TO2 logistics in FY 2023 (Exhibit 6) through:

- Open competition in freight lanes
- RDC warehousing and routing
- Shipping by ocean over air

Exhibit 6. 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 generated \$1.7 million in cost savings in FY 2023 due to open competition for freight lanes.

RDC 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. This generated \$167,062 in cost savings in FY 2023.

RDC routing cost savings are generated by measuring the average quoted shipping costs from the Belgium RDC compared to the average quoted shipping costs simulated from the previous RDC network. This generated \$10,744 in cost savings in FY 2023.

Shipping by Ocean Over Air

Since FY 2019, the project has tracked cost savings from orders shipped by ocean that would have historically been shipped by air. The methodology for tracking these savings is to compare the selected ocean rates quoted by the awarded 3PL against the cheapest of all 3PL air rates quoted in the annual 3PL rate refresh. GHSC-PSM generated \$13.6 million in cost savings on malaria commodity shipments in FY 2023 by shipping orders by ocean instead of air.

Logistics and Delivery Indicators

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

Product Loss

In FY 2023, the project experienced a loss of \$403 on SMC products that expired at the RDC. GHSC-PSM also experienced minimal losses on other malaria products under its control.

GHSC-PSM manages product shipments to countries and 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. In FY 2023, product losses that occurred in project control due to theft, damage, or expiry totaled just over \$65,000 (less than a one percent annual loss). Most of these losses are typical for a supply chain of this size and represent a minimal proportion of the total value of product delivered in the quarters the losses took place. 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 fiscal year 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 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. However, 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 10 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. 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 FY 2023 was 353 days (see Exhibit 7), against a target of 340 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, and a leveling out of these cycle times to 359 days in Q3 and 362 days in Q4. The increase in cycle time in Q1 was due mostly to longer wait times for severe malaria medicines that had been held due to quality control (QC) investigations and required re-sourcing or delayed due to customs clearances.

Since FY 2021, the project has reported on dwell-adjusted cycle time. In the first half of FY 2023, a common reason for these holds was 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, Q3 with a dwell-adjusted cycle time of 323 days, or Q4 with a dwell-adjusted cycle time of 327 days.

Exhibit 7. Task Order 2 cycle times for 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 ⁷ (days)
Q1	372	340	327	300	372
Q2	311	340	285	300	296
Q3	359	340	323	300	330
Q4	362	340	327	300	313
FY 2023	353	340	317	300	330

Cross-cutting Process Improvements

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

- Using the emergency loan fund to execute proactive procurements based on demand data, which contributes to reducing the lead time from requisition order (RO) entry (see section A.2 for further details).
- Using standardized 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.
- Using supply planning exercises in-country to create accurate and actionable supply plans, reducing upfront order clarifications.

⁷ 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.

- Reviewing procurement, QA, and logistics processes quarterly to further refine processes.
- Implementing management systems to identify and manage orders lagging at any point in the order lifecycle.
- Using 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.
- Deploying the TOM Power BI Management View dashboard, which provides enhanced visibility for portfolio, exceptions, and data quality management.

Managing the Malaria AL Stockpile

GHSC-PSM maintains PMI’s malaria emergency stockpile of a relatively small cache of ACTs (specifically AL) in the Belgium RDC for rapid allocation to countries based on needs. In FY 2023, PMI approved GHSC-PSM changing the methodology used to calculate the quantities necessary for restocking the AL stockpile. This change helps to maintain the flow of products into the RDC in cases when large emergency orders are issued. The change established ideal stock-on-hand values for each AL presentation. To maintain these stock levels, the project will request restocking orders more frequently as required to support urgent demand. In FY 2023, the project delivered eight line items in three inventory orders to the Belgium RDC. GHSC-PSM reviews the information quarterly—more frequently if required—to identify shelf life issues with the 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 FY 2023, the project delivered 1,727,100 treatments of AL for pre-positioning at the Belgium RDC (Exhibit 8).

Exhibit 8. GHSC-PSM’s total AL products received at the RDC in FY 2023

Product	Number of treatments delivered to the Belgium RDC
AL 20/120 mg dispersible tablet, 6x1 blister packs	405,150
AL 20/120 mg dispersible tablet, 6x2 blister packs	544,890
AL 20/120 mg tablet, 6x3 blister packs	243,330
AL 20/120 mg tablet, 6x4 blister packs	533,730

GHSC-PSM used the QC-tested AL stock available at the RDC to fulfill urgent or emergency orders for four countries (see Exhibit 9). By doing so, the project reduced delivery and cycle times and prevented stockouts.

Exhibit 9. AL deliveries by country from the stockpile in FY 2023 (door delivery date in-country)

Recipient country	Product	Number of treatments delivered
Madagascar	AL 20/120 mg dispersible tablet, 6x1 blister packs	391,680
Senegal	AL 20/120 mg dispersible tablet, 6x1 blister packs	90,000
Niger	AL 20/120 mg dispersible tablet 6x2 blister packs	2,520
Senegal	AL 20/120 mg dispersible tablet, 6x2 blister packs	3,600
Madagascar	AL 20/120 mg tablet, 6x3 blister packs	113,190
Senegal	AL 20/120 mg tablet, 6x3 blister packs	90,000
Liberia	AL 20/120 mg tablet, 6x4 blister packs	172,770
Niger	AL 20/120 mg tablet, 6x4 blister packs	360,960

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 needs. As shelf life dwindles, the project sends monthly 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. During each quarter of FY 2023, GHSC-PSM maintained a stockpile of ACTs with a weighted average shelf life over the target of 70 percent. Shelf life remaining in Q1 was 85 percent; in Q2, 78 percent; in Q3, 85 percent; and in Q4, 77 percent. The project has consistently met the shelf life targets quarter-over-quarter, in part due to frequent stock rotations to fulfill emergency and urgent demand.

Backlogged Line Items

The percentage of undelivered promised line items at the end of FY 2023 was 3.2 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 QA/QC program.

Strategies and Innovations

The project contributed QA perspectives on incentivizing regionalization and ensuring safety, efficacy, and quality standards are maintained in a GHSC-PSM-hosted Regionalization Workshop held in Q3 (for more information on the regionalization workshop, see section C.1). As part of the strategy to drive African regional procurement and manufacturing regionally, the project collaborated with other global procurers and QA teams to identify and mitigate potential quality issues related to products the project seeks to procure. To ensure product quality is not compromised, the project proposed enhanced QC measures of testing and documentation review, which PMI approved. GHSC-PSM vetted and allocated procurement to an additional African manufacturer with this quality assurance stipulation in place.

In FY 2023, the project updated the certificate of conformance (CoC) report with LLIN shelf life and life span requirements. Unlike pharmaceuticals and mRDTs, LLINs do not have clearly defined expiration dates. GHSC-PSM surveyed suppliers to understand how they defined LLIN shelf life and life spans. The project summarized suppliers' responses and identified variations in their definitions of shelf life and life span attributes. Because the definitions varied significantly across suppliers, GHSC-PSM proposed using the Manual of the Food and Agricultural Organization (FAO) and the WHO specifications for chemical pesticides as the standard for the shelf life of project-procured nets.⁸ PMI accepted the proposal, and the project updated the CoC template for LLINs accordingly.

Collaboration

QA/QC collaboration activities conducted by the project in FY 2023 included:

- Played a leadership role among global stakeholders in the LLIN QA space as chair of the LLINs Quality Assurance Group (LQAG). The LQAG and Innovation to Impact (I2I) industry group, made up of manufacturers and suppliers, discussed how LQAG could contribute to post-market information using their QA expertise. The LQAG and the I2I industry group also discussed PBO net non-inferiority study findings. The procurers on the LQAG communicated that the non-inferiority studies met their requirements for data needed to determine whether a PBO net was approved for procurement during the period of transition from the WHO Pesticide Evaluation Scheme, or WHOPES, to WHO Prequalification (WHO-PQ). The global procurers indicated that they are open to addressing the data requirements when the new WHO Guideline for Prequalification of Insecticide-Treated Nets (ITNs) is finalized and implemented.
- As part of the LQAG and I2I group, the project participated in discussions on post-market information to inform Module 7 of the draft WHO Guideline for Prequalification of ITNs. This group will meet routinely until the guideline is finalized. The steering group and WHO-PQ team

⁸ Manual on the development and use of FAO and WHO specifications for chemical pesticides, Second edition.

discussed data requirements and data collection processes, as well as integration of the group's feedback into the draft Guideline document. (See section C.I for further information.)

- Discussed the current WHO Listed Authority (WLA) products, the processes for transitioning stringent regulatory authorities (SRAs) and other regulatory authority products to WLA, and considerations for the use of WLA as part of the eligibility requirements for global procurers of pharmaceutical and medical device products with PMI, and the Global Fund Quality Assurance. The global procurers provided feedback on developing the WLA list, but had no immediate plan to transition to or use WLA for product eligibility.
- Visited a third-party testing laboratory in Belgium that tests pharmaceutical products procured by the project to discuss testing lead time delays, which were primarily due to staffing issues. GHSC-PSM walked through the laboratory to understand its processes, handling of GHSC-PSM test orders, and how the laboratory manages notifications. The laboratory had implemented aggressive hiring practices to restaff and retain its workforce, resulting in improved performance and lead times that align with project expectations.

Promoting Supply Chain Market Health

GHSC-PSM ensures QC testing efficiency and capacity for key products by expanding the number of testing labs. In FY 2023, the project completed a method transfer⁹ and method verifications¹⁰ for eight products (see Exhibit 10).

In FY 2023, the project ensured that third-party laboratories had updated test methods to avoid delays. GHSC-PSM observed test method changes while reviewing a supplier's certificate of analysis for procured batches of AL 20/120 mg and coordinated with a third-party laboratory to perform a method transfer for the updated changes.

Also, as part of the Sourcing Governance Boards, the project provided a QA perspective on products, suppliers, and support for the allocation strategy for LLINS, mRDT, and pharmaceutical commodities. This included reviewing the new product dossier, reports, and certification documents and initiating eight analytical method transfers/verifications to make the project eligible for procurement in accordance with the allocation strategy (see Exhibit 10).

⁹ Method transfer is the transfer of analytical test methods from the manufacturer to a GHSC-PSM third-party lab.

¹⁰ Method verification is a confirmation that an existing standard test method, such as United States Pharmacopeia, the Association of Official Agricultural Chemist International, European Pharmacopoeia, etc., can be applied.

Exhibit 10. Products completing a method transfer or method verifications in 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 products eligible for procurement. In FY 2023, GHSC-PSM conducted 12 reviews (see Exhibit 11), including topical repellents to prevent malaria for Cambodia. This was the first time the Malaria Task Order procured this commodity category. In FY 2023, GHSC-PSM generated the technical requirements for procurement, reviewed the topical repellent request for proposal responses, and completed a full eligibility review of the winning product.

Exhibit II. Products reviewed for eligibility.

Product category	Product subcategory	Product detail*
mRDT	mRDT	P.f/P.v (10 tests/kit)
mRDT	mRDT	Pf HRP2 (10 and 25 tests/kit)
Pharmaceutical	SP	Sulfadoxine-pyrimethamine 500/25 mg
Pharmaceutical	ACT	DHA-PPQ (60/480 mg) hard tablet
Pharmaceutical	ACT	DHA-PPQ (30/240 mg) dispersible tablet
mRDT	mRDT	Pf HRP2 (10 and 25 tests/kit)
LLIN	LLIN	Single pyrethroid and PBO (new manufacturing site)
Topical repellent	Topical repellent	20% picaridin spray 100 mL
LLIN	LLIN	Dual-active ingredient
Pharmaceutical	SP	Sulfadoxine-pyrimethamine SP 500/25 mg
Pharmaceutical	ACT	Artemether-lumefantrine 20/120 mg tablets
Pharmaceutical	Severe malaria / Artesunate injection	Artesunate for injection (60 mg)

* Note: ACT, artemisinin-based combination therapy; 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 FY 2023, GHSC-PSM continued facilitating more robust QA and quality management systems 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. The assay results showed that the product was within the shelf-life specification but was OOS for the product release specification, which is a more stringent 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 and flagged it for future batches and method transfers. As the OOS did not compromise product safety and efficacy, GHSC-PSM recommended the release of the batches, and PMI concurred.

In FY 2023, as part of the project's quality monitoring system, the annual testing for an SRA AL product exempt from routine testing was performed per the project's protocol requirement for annual testing. In the second half of FY 2023, the project initiated a risk-based analysis review using the failure modes and effect analysis, or FMEA, tool to evaluate if two artemisinin-based oral pharmaceutical products in its portfolio were eligible for further randomized/reduced testing. GHSC-PSM procures selected products in high volumes that GHSC-PSM anticipates will continue in FY 2024, thus giving this strategic activity the potential to save QA/QC costs and resources. The project will complete the analysis in FY 2024 and share it with PMI for concurrence to proceed with additional risk-based randomization.

Fostering Quality in LLINs

In FY 2023, GHSC-PSM conducted a desk review of a new manufacturing site for one of its LLIN suppliers. The supplier met the project's standard requirements.¹¹ GHSC-PSM approved the new site for procurement and added it to the eligibility list.

In FY 2023, the project delivered two orders of PBO nets to Rwanda and collaborated with Rwanda Medical Supply, Rwanda Biomedical Center, and the supplier to conduct a post-shipment inspection. GHSC-PSM applied the standing quality agreement to establish the number of samples required for an inspection in alignment with defect categorization and aggregation.

In FY 2023, GHSC-PSM surveyed existing net suppliers to obtain critical information on the relationship between shelf life (how long a new net can last) and packaging. GHSC-PSM will share a sample of the suppliers' responses with PMI in FY 2024.

¹¹ Having a local registration, ISO 9001 certification, and being a WHO-approved manufacturing site.

Fostering Quality in mRDTs

In Ethiopia, reports of histidine-rich protein 2 (HRP2) gene deletion require the project to procure mRDTs that detect parasite lactate dehydrogenase (pLDH). In FY 2023, GHSC-PSM performed enhanced QA/QC activities to ensure that new pLDH mRDTs met GHSC-PSM's procurement quality requirements. While the Global Fund's expert review panel approved these mRDTs, they are still undergoing WHO-PQ evaluation. To confirm that the new mRDTs met GHSC-PSM's quality requirements for procurement, the project performed a batch record review in addition to 100 percent lot testing.

In Q1 FY 2023, Malawi reported high false-positive rates in connection to a particular brand of mRDTs. GHSC-PSM collected samples from four locations and sent them to the supplier and a WHO-prequalified lab for further testing. GHSC-PSM documented the storage conditions of the mRDTs 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 in FY 2024.

GHSC-PSM has observed an increase in issues related to mRDTs compared to previous years and initiated a root-cause review in Q2 to determine the appropriate corrective and preventive actions (CAPAs). The project summarized mRDT investigations conducted over the past two years and aggregated complaints and issues based on their similarities.

The review revealed that end users 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 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.

In FY 2023, GHSC-PSM met with the WHO Incidents and Substandard/Falsified Medical Products, or ISF, team for mRDTs to align with the WHO process for handling product complaints. The project initiated reporting complaints and quality issues to WHO to enhance collaboration and streamline customer complaint reporting.

Certificates of Conformance

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

Pharmaceuticals Regulated by a Stringent Regulatory Authority

Malaria pharmaceuticals regulated by a SRA do not require laboratory testing according to PMI policy. GHSC-PSM reviews the manufacturer's certificate of analysis before shipment. In FY 2023, the project reviewed 23 batches of two ACT products' certificates of analysis, 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 ASAQ, SP tablets, SPAQ tablets, and various essential medicines—before shipment.

In 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 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 FY 2023, the project exceeded the in-target QA lead time key performance indicator (KPI) of 80 percent. The QA lead times achieved during this period were 100 percent in Q1, 85 percent in Q2, 96 percent in Q3, and 99 percent in Q4.

Zero batches of products showed non-conformity in Q1, Q3, or Q4, 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 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 FY 2023, the total cost savings resulting from the risk-based testing approach totaled \$161,925. The project determined this metric 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. The system allows external users, such as PMI, USAID, and GHSC-PSM country offices, to create orders and view updates and performance information through procurement and delivery dashboards.

GHSC-PSM upgrades system efficiency, improves data quality, and increases visibility through weekly enhancements, including life-of-project data. In the second half of FY 2023, GHSC-PSM made the following improvements in ARTMIS:

- Automated selection of Supplier Pickup Address Locations to process POs in the Order Management System (OMS). A procurement specialist can now select an address from the pre-validated list based on the supplier in the PO. The project also updated the Ivalua sourcing module to integrate new addresses or updates to an existing address into the OMS, improving overall address data accuracy.
- Enhanced the Malaria Data Integration for Visualization (M-DIVE) data feed to include item, order, contract, and shipment information to increase data analytic points for decision making.

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 country orders.

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 identifies order trends and manages exceptions for all active orders under the malaria portfolio. This new dashboard enables targeted portfolio management and allows users to identify data quality issues across 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 rolled out the dashboard in Q3. To ensure adoption, the project applied change management best practices by developing a dashboard user guide and conducting several hands-on training sessions on the dashboard's use cases and navigation for relevant stakeholders. The dashboard (see Exhibit I2) is now used to facilitate PMI-biweekly touchpoints.

Exhibit 12. Screenshot of TOM management view dashboard

The screenshot displays the TOM (Management View) dashboard. At the top, there are summary statistics: Total ROs: 324, Total POs: 275, and Total Order Lines: 748. Below these is a 'Country View - Tabular View' table. The table has several filter tabs at the top: Recipient Country (All), Tracer Category (All), and Transit Mode (All). The table columns include Recipient Country, Recipient City, Country Action Required (Yes/No), Req Form #, RO Line #, PO #, Tracer Category, Funding Decision, MOP Year, and User. The data rows show various entries for Angola and Luanda, with different funding decisions and MOP years.

Recipient Country	Recipient City	Country Action Required (Yes/No)	Req Form #	RO Line #	PO #	Tracer Category	Funding Decision	MOP Year	User
Angola	Luanda	No	RO10157143	1	PO10025626	ACTs	Committed Emergency Funding	MP22	No
Angola	Luanda	No	RO10157143	1	PO10025676	ACTs	Committed Emergency Funding	MP22	No
Angola	Luanda	No	RO10157143	2	PO10025496	ACTs	Committed Emergency Funding	MP22	No
Angola	Luanda	No	RO10157148	1	PO10025559	SP	Committed Emergency Funding	MP22	No
Angola	Luanda	No	RO10178124	1	PO10026060	Laboratory	Committed Country Funding	MP22	No
Angola	Luanda	No	RO10178169	1	PO10025908	ACTs	Committed Country Funding	MP22	No
Angola	Luanda	No	RO10179105	1	PO10025909	ACTs	Committed Country Funding	MP22	No
Angola	Luanda	No	RO10179106	1	PO10026029	Severe Malaria Meds	Committed Country Funding	MP22	No
Angola	Luanda	No	RO10179492	1		mRDts	Country Funding	MP23	No
Angola	Luanda	No	RO10179495	1	PO10026808	ACTs	Committed Country Funding	MP23	No
Angola	Luanda	No	RO10179496	1	PO10026806	ACTs	Committed Country Funding	MP23	No
Angola	Luanda	No	RO10179497	1	PO10026805	ACTs	Committed Country Funding	MP23	No
Angola	Luanda	No	RO10179498	1		mRDts	Country Funding	MP23	No
Angola	Luanda	No	RO10179500	1	PO10026807	ACTs	Committed Country Funding	MP23	No
Angola	Luanda	No	RO10179501	1	PO10026811	ACTs	Committed Country Funding	MP23	No

Stockout Risk Dashboards

Stockout risk dashboards provide a global view of countries' central-level stock. The dashboards combine inventory, consumption, and shipment data into one report that predicts 12 months of stock levels. The dashboards inform allocation strategies and assist in planning to prevent stock risks. The main inputs into the tool are PPMRm data and supply plan data. These dashboards have been instrumental in clarifying and validating the demand signals received through data inputs. Through this validation process, the project can proactively make decisions based on the best available data. GHSC-PSM shares these reports with PMI every two months.

End-Use Verification (EUV) Surveys

The 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 improve the quality and precision of the data for decision making.

EUV Survey Progress

In the first half of FY 2023, GHSC-PSM implemented the EUV survey in eight PMI partner countries¹². This was the first EUV conducted in Sierra Leone.

In the second half of FY 2023, GHSC-PSM implemented the EUV survey in 13 PMI partner countries.¹³ The project shared the EUV reports and recommendations with Ministries of Health (MOHs), NMPs, and other stakeholders to inform decision making.

¹² Angola, Burkina Faso, Ghana, Guinea, Liberia, Mali, Nigeria, and Sierra Leone.

¹³ Angola, Burkina Faso, Burundi, Cameroon, Ethiopia, Ghana, Guinea, Mali, Niger, Nigeria, Sierra Leone, Zambia, and Zimbabwe.

A total of 14 GHSC-PSM countries reported on data collected through the COVID-19 Continuity of Care module developed in Q4 FY 2020 and discontinued in Q3 FY 2023.

In Q4, GHSC-PSM completed the development of a CHW module for the EUV survey as requested by PMI-Washington. The project piloted the module in Zambia in Q4, and plans to roll it out in FY 2024. Data gathered through the CHW module will inform activities designed to strengthen supply chain functionality at the community/CHW level.

Benin, Burkina Faso, Ghana, Mali, Niger, Nigeria, and Sierra Leone presented on EUV data use during the monthly internal EUV working group meetings in FY 2023. The project created an internal EUV landing page on SharePoint with links to these presentations.

Country EUV Examples

In Q3 in **Guinea**, GHSC-PSM collaborated with the Ministry of Health and Sanitation to conduct the EUV survey. This activity provided an opportunity for students trained by the project in health supply chain management at the Kofi Annan University of Guinea (UKAG) to develop field experience in the national health supply chain system. The activity was carried out in 70 health facilities and seven Pharmacie Centrale de Guinée, or PCG, depots in 24 health districts of eight health regions in the country.¹⁴ Health regions were selected based on weighted random sampling using the SurveyCTO evaluation tool to prioritize the selection of health regions based on population. For nationally representative results, the project sampled sites using a two-staged approach. The EUV survey in Q3 FY 2023 showed a decrease in stockout rates for key drugs such as AL 6x4 from 24 percent to 18 percent. The facilities with malaria treatment guides increased to 96 percent, up from 79 percent.

In Q4 in **Cameroon**, the project completed data collection for its seventh EUV survey in the PMI-focused regions. GHSC-PSM observed major improvements in stockout rates for the AL presentations when compared to previous EUV exercises. Stakeholders undertook interventions informed by analysis of data in the Demographic Health Information System 2 (DHIS 2) through Power BI that generated these improvements. The analysis showed that health facilities stocked out within two months of distribution were facilities that were not included in allocation plans due to late reporting. The analysis also identified a group of health facilities where malaria commodities were incorrectly shown in the LMIS as having available stock when they were stocked out. These commodities were not being resupplied because their data showed the commodity was stocked according to plan. Allocation plans for this set of health facilities were updated resulting in reduced stockouts.

In FY 2023, in **Burundi**, GHSC-PSM coordinated with the NMCP to conduct the annual EUV survey. In Q4, the project collected data, validated the EUV survey protocol and questionnaire, and trained data collectors and supervisors on how to use the SurveyCTO mobile platform to collect and validate the survey data. The project analyzed the survey data and drafted a report to be submitted to PMI and in-country stakeholders in early FY 2024. Commodity availability indicator results are summarized below:

- Stockout rates for AL presentations in surveyed health facilities on the day of the visit were 0 percent for AL 6x1, 3 percent for AL 6x2, 1 percent for AL 6x3, and 2 percent for AL 6x4.

¹⁴ Conakry, Faranah, Labe, Kindia, Mamou, Nzerekore, Boke, and Kankan.

- One hundred percent of health facilities had at least one presentation of AL available.
- Stockout of mRDTs was observed in 3 percent of health facilities on the day of the visit.
- Average number of days stocked out in the last three months was 0.2 for AL 6x1, 1.2 for AL 6x2, 0.9 for AL 6x3, 1.2 for AL 6x4, and zero for mRDTs.

According to the respondents, the main reasons for commodity shortages were unavailability of the product at the resupply point, rationed product, items not ordered given low or no demand at the facility, as well as products delivered late. Other reasons mentioned were unanticipated increase in consumption, lack of transport, products ordered but not received in the requested quantity, and incorrect orders.

EUV Data Consolidation and Malaria EUV Global Indicator (MEGI) Dashboard

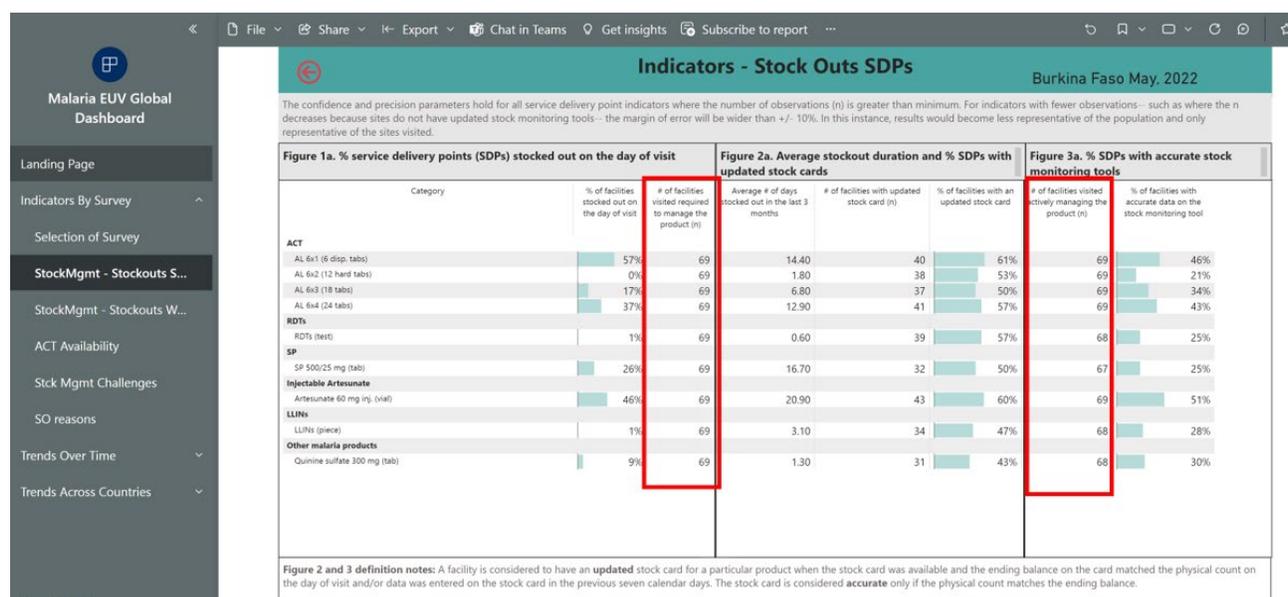
In FY 2023, GHSC-PSM developed the MEGI Dashboard, allowing users to interact with the data and gain insights into trends across time and countries. The project built the dashboard using Python scripts to consolidate and streamline data across all country and survey instances, calculated standard indicators matching those in the individual EUV survey reports, and validated the calculated indicators against the published EUV survey results to ensure consistency. The dashboard was completed, deployed, and shared with select users within PMI during Q3–Q4.

During Q3–Q4, GHSC-PSM made several other enhancements to the data flow in Python and the MEGI Dashboard:

- **Loading new data.** Continuously adding new surveys to the dashboard as they become available and monitoring for any inconsistencies that require exception handling.
- **Incorporating facility list files into the data pipeline.** This allowed for the systematic management of country-specific cases where multiple survey sample frames are executed. For example, in Angola the project is able to report results on the MEGI Dashboard separately for PMI-focus (PMI) and non-focus (PMI+) facilities, in line with the analysis in the standard EUV reports.
- **Incorporating product list files into the data pipeline.** This allows identification of a product as standard or non-standard¹⁵, which made it possible to add columns to the stockouts indicator table for “number of facilities visited required to manage the product” (based on standard products) and “number of facilities visited actively managing the product” (based on both standard and non-standard managed products), as shown in Exhibit 13.
- **Incorporated “Power BI Text Boxes” files into the data pipeline.** Where available, these files indicate data edit logs and additional data points, such as the min/max data required to calculate Indicator 6. This work is ongoing and will be finalized in FY 2024.

¹⁵ Meaning whether it is a product required at a given facility type by the country’s treatment guidelines (standard) or if it is not required but there is a compelling reason to collect data on the product (non-standard).

Exhibit 13. Two new columns added to the stockouts indicators table



Procurement Planning and Monitoring Report for Malaria

In FY 2023, 29 countries¹⁶ 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, while also facilitating 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. Data providers in the 29 PMI and/or USAID malaria partner countries enter stock and commodity information into data fields and provide context about commodity-level management. In FY 2022, a new PPMRm platform was deployed. To date, the revised platform has generated 17 monthly reports (12 monthly reports in FY 2023).

In FY 2023, GHSC-PSM provided the platform's routine maintenance and technical support. In Q4, the project carried out minor PPMRm platform enhancements and finalized the System Requirements & Design document. Finalization of the PPMRm system operation and maintenance document and the archiving of PPMRm version source codes are deferred to Q1 FY 2025 to align with the project's projected end.

¹⁶ Angola, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, DRC, Côte d'Ivoire, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe.

PPMRm Country Examples

During the second 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:
 - Q3: In **Madagascar**, the project expedited PMI's shipment of Artesunate suppository 100 mg.
 - Q3: In **Zimbabwe**, the project expedited PMI's shipments of AL 20 mg/120 mg 6x1 and 6x2 tablets and advocated for expediting GF shipments of Sulphadoxine-Pyrimethamine tablets and Artesunate injectable 60 mg.
- Deferred shipments to prevent overstocking:
 - Q3: In **Madagascar**, the project deferred PMI's shipment of Primaquine 7.5 mg tablets.
 - Q3: In **Zimbabwe**, the project deferred part of PMI's shipment of AL 20 mg/120 mg 6x3 tablets.
 - Q4: In **Madagascar**, the project advocated for deferring of GF shipment of ASAQ 50 mg/135 mg.

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

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

- **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 the second half of FY 2023, GHSC-PSM continued implementing identification, barcoding, and data-sharing requirements for procured products, thus creating an enabling environment for data exchange and visibility. For the 226 TO2 items in-scope by the end of Q4, total compliance scores by area were as follows:

- Identify (GTIN/GLN collection): 100 percent.
- Capture (standards-compliant barcoding on labels): 94 percent.
- Share (GDSN data synchronization): 94 percent.

For highlights and milestones of adopting global standards in in-country supply chain systems, see Section B. For highlights and milestones in global collaboration, see Section C.

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 support has resulted in more countries that can independently manage these critical activities and confer 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.

Forecasting Technology

In FY 2021, GHSC-PSM introduced the Quantification Analytics Tool (QAT) supply planning module. In FY 2022, the project released the QAT forecasting module, allowing users to design forecasting trees from historical consumption and replacing tools such as Quantimed and Excel. As of Q4 FY 2023, the project has rolled out the forecasting module in 24 USAID and PMI partner countries,¹⁷ allowing them to conduct their annual quantification in QAT. In FY 2023, 13 of the 24 countries started using QAT for forecasting.

Supply Plan Reviews

GHSC-PSM conducts quarterly supply plan reviews to drive continuous commodity availability. The project's country offices submit supply plans in PipeLine or QAT.

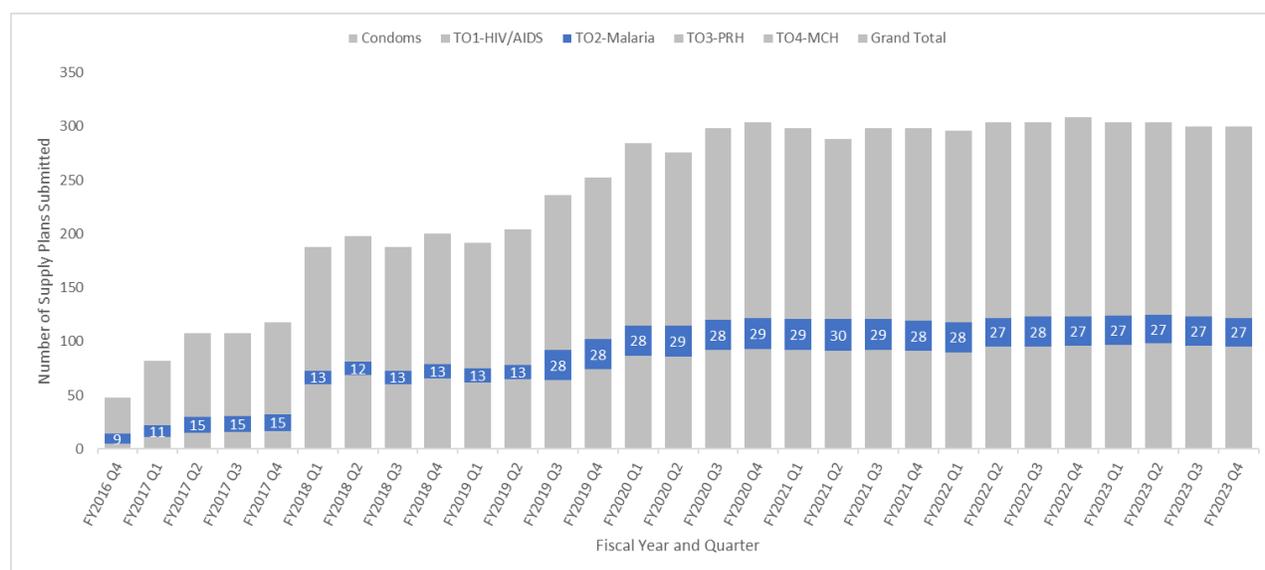
Countries that submit supply plans through PipeLine use the GHSC-PSM Supply Plan Automation tool to review and address data quality issues before submission. For QAT-submitted supply plans, the built-in QAT Problem List (QPL) enables users to identify and correct data issues before submission. The QPL allows users and reviewers to leave comments for context and provides visibility into comments during quarterly reviews.

In Q4, GHSC-PSM received malaria supply plans from 27 PMI partner countries,¹⁸ achieving 100 percent of the target (Exhibit I4). Of these, 23 countries submitted through QAT. The countries submitted 32 malaria supply plans, with some submitting multiple plans (e.g., Angola Ministério da Saúde and Angola PMI).

¹⁷ Angola, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, DRC, eSwatini, Ethiopia, Ghana, Guinea, Haiti, Kenya, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Thailand, Uganda, Zambia, and Zimbabwe.

¹⁸ Angola, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, Côte d'Ivoire, DRC, 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.

Exhibit 14. Malaria supply plan submissions and technical reviews over the life of the project



Forecasting and Supply Planning Technical Assistance

In FY 2023, the project assisted more than 20 PMI partner countries in forecasting and supply planning (FASP) activities. Q4 country examples of technical assistance include:

- In **Niger**, GHSC-PSM trained 19 participants from the Ministère de la Santé Publique de la Population et des Affaires Sociales (MSP/P/AS), including two from the national malaria control program (Programme National de Lutte contre le Paludisme, PNLP) and three from the National Agency for the Regulation of the Pharmaceutical Sector (ANRP) on the QAT Supply Planning module in Dosso. In this training, only 31.6 percent (six out of 19) initially achieved the 70 percent pass rate in the post-test. However, subsequently all participants passed the post-test, indicating that the training strengthened their supply planning skills.
- GHSC-PSM conducted another QAT training focusing on the forecasting module in Dosso with 21 participants from MSP/P/AS, including two from PNLP and four from ANRP. 57 percent (12 out of 21) passed the 70 percent threshold in the post-test at the first attempt, while the rest passed on the second or third attempt. Similarly, this indicated that the training strengthened forecasting capacity and highlighted the continued need for improvement.
- In **Rwanda**, GHSC-PSM and the MOH reviewed the malaria commodity supply plan through the Coordinated Procurement and Distribution System (CPDS) to maintain the stock between the minimum and maximum levels.¹⁹ This exercise compared the forecasted consumption of malaria commodities with the actual consumption from Q2–Q3 2023. The forecasted consumption was higher than the actual consumption, with an average of 41 percent forecast error. As a result,

¹⁹ 9–14 months of stock (MOS)

the quantification team revised the forecast for July 2023–June 2024 to match the actual malaria consumption trend. The revised forecast helped identify an increased risk of expiry for AL 6x1 (5 MOS: April 2024/ 5 MOS: May 2024), AL 6x2 (1 MOS: May 2024), and mRDTs (6 MOS: November 2023) due to the reduction of malaria cases over time. To mitigate the risk of expiries, GHSC-PSM is re-assessing the stock level of malaria commodities and will propose a distribution plan in FY 2024. Service delivery points (SDPs) prioritize using mRDT batches at risk of expiry.

- In **Ghana**, GHSC-PSM and the National Malaria Elimination Program (NMEP) held a workshop to review malaria commodity forecasts and supply plans from the malaria quantification exercise. Key workshop observations include:
 - Sub-optimal stock levels of malaria commodities due to procurement and customs clearance delays.
 - Between Q2 and Q3, actual consumption of mRDT kits increased by 11 percent compared to the forecast. As a result, the half-year forecast for the period July to December 2023 was adjusted by 5 percent based on actual consumption.
 - An 8 percent upward adjustment was applied to ACTs based on expert opinion and an increase in malaria cases between January and June 2023.
- In **Burundi**, GHSC-PSM and the NMCP conducted a two-day meeting for the quantification sub-committee to review the malaria commodity supply plan. Before the meeting, GHSC-PSM worked with the NMCP to identify and collect the required data for the supply plan review.²⁰ During the meeting, participants analyzed and corrected data discrepancies and updated the supply plan. By the end of the meeting, together, they had updated the 2023–2025 supply plan to reflect stock on hand as of the beginning of Q4 at the central and district levels and included pending orders for antimalarial commodities. Seven participants representing the NMCP, United Nations Development Programme (UNDP), Population Services International, and GHSC-PSM attended the meeting, validated stock data for malaria control products and distribution/consumption data to update the supply plan, entered consumption/distribution data, inventory data and pending orders into QAT, analyzed the supply plan 2023–2024, and made recommendations to ensure uninterrupted availability of malaria commodities.

Key challenges and recommendations identified during the meeting were:

- District pharmacies had not reported logistic data in the District Health Information System 2 (DHIS2) since the beginning of Q2 because the related form had not been configured. Participants recommended advocacy with the Directorate of the National Health Information System, or DSNIS, to set up the reporting form for logistics data at the district pharmacy level.
- Product counting units, especially for mRDTs and SP, were not harmonized. Some districts reported kits for mRDTs and packs of 100 tablets of SP, whereas the recommendation is to report logistics information using the smallest unit dispensed to patients. Participants recommended that

²⁰ Stock on hand at district and central levels, distributed quantities from districts to health centers from May to July 2023, status of pending shipments, and an update on estimated delivery dates

the National Integrated Malaria Control Programme (PNILP) and GHSC-PSM continue sensitizing district pharmacy managers on the importance of harmonizing reporting units in compliance with the LMIS standard operating procedures.

Logistics Management Information Systems Technical Assistance

GHSC-PSM improves data accuracy and quality for management information system (MIS) implementation in countries. Q4 country-specific examples include:

- In **Ethiopia**, GHSC-PSM technical support to the Ethiopian Pharmaceuticals Supply Service (EPSS) and the Pharmaceuticals and Medical Equipment Lead Executive Office (PME LEO) of the MOH to revise and print 5,300 report and requisition form (RRF) pads to enable reporting on newly added medicines and address data quality issues. RRF pads are used to collect and present logistics information to inform decision making on when the EPSS branches need to resupply health facility medicines, including antimalarial commodities. Each RRF pad covers up to 10 bi-monthly reporting periods. By the end of Q4, EPSS facilities had distributed 50 percent of the RRF pads to facilities. In addition, facilities received semi-automated Excel versions of the RRFs in soft copy.
- In **Guinea**, GHSC-PSM, the National Directorate of Pharmacy and Medicine (DNPM), and Catholic Relief Services (CRS) organized a training of supply managers to scale up the electronic logistics management information system (eLMIS) in the Kankan Region—an area supported by the Global Fund. DNPM facilitated the training reflecting the technical capacity of the DNPM to implement this activity. Following the training, the project deployed the eLMIS in 81 additional SDPs and 179 supply chain managers learned how to use the eLMIS. By Q4, 448 out of 554 national health facilities—an increase of 81 percent—were using the logistics management tool.
- In **Malawi**, GHSC-PSM conducted an OpenLMIS refresher training for 333 participants across the country, supporting the MOH. The training strengthened system knowledge, introduced new features, and refreshed participants on best practices for pharmacy commodity management. This training contributes to improving reporting and data quality. The project also supported the MOH in integrating the National Product Catalog with the interoperability layer and user training for 15 participants. This allows downstream system access to the Product Catalog Management Tool, or PCMT, data once the integration passes the user acceptance tests.

Improved Data Use

The project helps countries enhance data quality and use. Country-level activities maximize innovation while ensuring data are useful for decision-making. Specific country examples from Q4 include:

- In **Ethiopia**, GHSC-PSM and the NMEP organized a forum to discuss the findings of joint supportive supervision in selected regions to assess the malaria situation, and prevention and control activities, which include commodity distribution and management. A point of discussion

was that stockouts of malaria commodities at HFs were common despite complaints from EPSS that facilities repeatedly request excess quantities, including for emergency requests. GHSC-PSM, the NMEP, EPSS, and other stakeholders agreed to conduct audit-based supervision (to be conducted in Q1 FY 2024) to compare the malaria commodities consumed with the malaria cases treated and to understand the reasons for discrepancies. The stakeholders proposed the involvement of the Ethiopian Food and Drug Authority (EFDA) which is a regulatory body on the premise that involvement of the EFDA will facilitate better understanding of the malaria commodities accountability challenges.

- In **Malawi**, the project provided financial and technical support to NMCP in conducting commodity accountability and performance tracking (CAPeT) in 30 targeted health facilities in 16 districts. The proportion of health facility data that matched facility data in electronic systems was 70 percent for LMIS and 76 percent for HMIS data. The deviation from actual quantities reported by the facility was high for LMIS data at 11.8 percent, while HMIS data was 5.5 percent. These results were primarily due to incomplete or erroneous data entry in the electronic systems. GHSC-PSM assisted the facilities of concern in developing and sharing action plans with the district level for follow-up during routine supervision. The project will continue to work with NMCP to promote reporting in OpenLMIS and DHIS2 by facilities to ensure accountability of malaria health commodities.
- In **Nigeria**, as part of the ongoing updates to the Nigeria Health Logistics Management Information System (NHLMIS) platform, the project completed deployment of the following features:
 - Malaria Stockout Rate calculation based on days out of stock: This feature categorizes malaria services into treatment, prevention, severe malaria, and consumables, which aids the malaria program in viewing the stockout rate for each service based on days out of stock.
 - Optimized Malaria Reporting Service in treatment, severe malaria, prevention, and consumables in the stock reporting form on the NHLMIS platform.
 - Updated Malaria Program Master Facility List to include the new service categories deployed.

Supply Chain Maps and MIS Landscapes

GHSC-PSM communicated with 21 PMI partner countries²¹ to update their supply chain maps and MIS landscapes. The project shared previous versions of the information map and data and MIS landscape files with countries for reference. As of Q3, 22 of 38 countries submitted drafts for PMI review. PMI suggested adding an information map for the Expanded Program on Immunization (EPI) as a required enhancement, and in Q4, the project began incorporating the additional data.

²¹ Angola, Burundi, Burkina Faso, Burma/Myanmar, Cambodia, Cameroon, Ethiopia, Ghana, Guinea, Kenya, Liberia, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Thailand, Zambia, and Zimbabwe.

Global Standards and Traceability

In the second half of FY 2023, GHSC-PSM provided eight PMI partner countries²² with technical support to adopt GSI standards for product identification, location identification, and data exchange.

- In **Nigeria**, GHSC-PSM drafted a technical report on the results of the LLIN Verification Pilot, capturing serialized LLIN campaign distribution data in Calabar Municipality, a local government area (LGA) of Cross River State. The LLIN campaign distributed 149,994 LLINs to this LGA. The campaign scanned, captured, and verified 110,445 LLIN serials (73.6 percent) across 65 distribution points, representing 4 percent of the campaign distribution. The campaign distributed 2,511,738 LLINs (97 percent) across the 18 LGAs in Cross River State. Based on the pilot findings, the project recommends reconvening the TraceNet Group, comprising global health and technical experts focused on LLIN supply chain standards, to review the lessons and update the GSI-related guidelines. Furthermore, ongoing supplier engagement and capacity-strengthening efforts should prioritize the report's observations, particularly the automated methods for exchanging transaction and event data to enhance traceability.
- In **Uganda**, GHSC-PSM is implementing an automatic identification and data capture solution to support barcode scanning for warehouse operations management of all pharmaceutical products at the Joint Medical Store (JMS)—including using GTIN as a secondary product identifier and supporting barcode label printing upon receipt for non-GTIN products. In Q1, phase 1 of the project went live and has operated smoothly. In the second half of FY 2023, the project continued developing the end-to-end design for Phase 2 transactions (shipping transactions, pick and pack, stock taking) using an industrial and financial systems application. Phase 2 will start after JMS replaces or upgrades its enterprise resource planning (ERP) system.
- In **Zambia**, GHSC-PSM worked with the Zambia Medicines Regulatory Authority (ZAMRA) to publish national traceability guidelines, an enforceable statutory instrument that mandates GSI-based identification and data capture for pharmaceutical products distributed on the Zambian Market. The guidelines enforce 2D DataMatrix as the secondary and tertiary trade item with GTIN, batch/expiry, and lot by 2025 for imported goods with a serialization requirement for 2028. Simultaneously, GHSC-PSM continued implementing the National Product Catalog and downstream integrations, including system configuration for automatic identification and data capture, or AIDC. In Q4, the project facilitated a workshop in collaboration with GSI South Africa, to design Zambia's national pharmaceutical traceability model and roadmap.

Additional updates on GSI implementation in USAID supported countries can be found in Section C.2.

Stockout Reduction Initiative

Improving the availability of malaria commodities is critical to support PMI's 2021–2026 strategy to reduce malaria mortality and morbidity rates. In FY 2021, GHSC-PSM began implementing PMI's stockout reduction initiative in 20 countries.²³ In FY 2022, to support the achievement of PMI's strategic objectives

²² Burundi, Ghana, Malawi, Nigeria, Rwanda, Uganda, Zambia, and Zimbabwe.

²³ Angola, Burkina Faso, Burundi, Cambodia, Cameroon, Ethiopia, Ghana, Guinea, Liberia, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Thailand, Uganda, Zambia, and Zimbabwe.

of “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 and disseminated the playbook to all PMI-partner countries, including Kenya under GHSC-PSM Task Order 5 (Afya Ugavi), and six non-field office (NFO) countries. During Q3 and Q4, the project emphasized that country offices should include key activities and results from implementing the stockout reduction strategy in their FY 2024 reports.

Malaria Community Supply Chain Advocacy Paper and Landscape Analysis

Building on efforts to strengthen community health systems, in Q4, the project achieved a significant milestone, publishing an advocacy paper, “[Effective Community-Level Supply Chains for iCCM and Malaria](#),” jointly developed with PMI on the GHSC website. The paper raises awareness on the importance of community-level needs in supply chain strategies and encourages the inclusion of community supply chain best practices in long-term investments targeting community health facilities and CHWs. The project promoted the paper through social media, and made it available to the project’s country offices for widespread dissemination and sharing with key program partners. GHSC-PSM and PMI are planning a webinar to promote the paper further in FY 2024.

Malaria Community Health Supply Chain

In FY 2023, GHSC-PSM, aligning with the increasing focus on community health supply chains as a critical component of national health programs, worked with countries to support their community health supply chain activities. Examples of this work include:

In **Sierra Leone**, GHSC-PSM had previously supported the NMCP and the CHW Hub in promoting visibility into CHW stock data by revising CHW reporting tools (both paper- and electronic-based) to incorporate fields for capturing data to inform quantification and distribution decisions. The project also supported the inclusion of community health demand planning in the annual malaria commodities forecast led by the Malaria Quantification Technical Working Group.

In FY 2023, GHSC-PSM expanded use of the distribution matrix templates—already used at the central, district, and health facility levels—to the CHWs. This separates the central-level allocations from the CHW supplies.

In Q4, the project and the MOH conducted a baseline assessment of the community health supply chain to improve supply chain visibility. Assessment results revealed a 44 to 56 percent stockout of CHW malaria commodities (stockpiled) at the health facilities on the day of the visit. However, the report also revealed that the district stores held about 13 to 44 percent of CHWs’ stock without replenishing the health facilities.

In **Zambia**, GHSC-PSM concluded EUV data collection from 126 sites across all 10 provinces. Data collected included the CHW module, the first pilot conducted globally by GHSC-PSM. Insights from this exercise will inform supply chain decisions and shape the way forward. The project expects to complete the EUV report in FY 2024.

Malaria Commodities Accountability Initiative

PMI and GHSC-PSM recognized that significant discrepancies between malaria service data and logistics data pose concerns about the use and management of malaria commodities. In Q4, in accordance with the FY 2023 work plan, GHSC-PSM finalized the Malaria Commodity Accountability Guidebook and associated tools to help country stakeholders identify discrepancies between the total number of malaria products consumed according to the LMIS and the number of malaria services reported in DHIS2 during reporting periods. While the guidebook lays out the principles for each country to follow, the associated tools help the countries identify where discrepancies actually exist. Together, the tools and the guidebook leverage past successes and lessons learned to promote a systematic implementation methodology, as well as an accompanying data collection and analysis tool.

In Q4, the project, and PMI, engaged with the Malawi and Nigeria FOs to plan for separate pilots for the Accountability Guidebook and Tools, to be implemented in both countries in Q1 FY 2024. As part of the pilot, GHSC-PSM will aim to engage with key stakeholders in the countries, such as the NMCP, in deploying the tool and guidebook to identify discrepancies between service data and dispensing data within their product portfolios. The project expects to roll out updated versions of the tool and guidebook after the pilot. The accountability initiative, guidebook, and tools will help countries identify the root causes for the discrepancies and develop action plans for corrective actions. This contributes to PMI's 2021–2026 strategy objectives to “innovate and lead” as leveraging this methodology and tool will allow a targeted approach to the identified accountability issues. It also contributes to PMI's goal to “keep malaria service resilient” by enabling country programs to identify and address accountability challenges, keep their services resilient, and promote efficiencies.

Developing a Modeling Tool and Guidance for Inventory Management for Low-Malaria-Endemic 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 and optimize supply chain management in low-malaria-endemic countries. Between Q4 FY 2022 and Q1 FY 2023, GHSC-PSM collected malaria supply chain information from Ethiopia, Cambodia, and Thailand; these countries are in malaria elimination and pre-elimination phases. In Q2 FY 2023, the project used this information to develop a modeling tool that uses case information as a surrogate for consumption data, as tracking malaria cases is a key function in malaria elimination surveillance activities.

The modeling tool shows the number of storage locations for stockpile 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. GHSC-PSM tested the tool with sample data from Cambodia in Q2 and provided an orientation to Cambodia, Laos, and Thailand country offices in Q3. Based on their feedback, in Q4, the project agreed to add a scenario/sensitivity analysis to enhance user-friendliness for decision making. GHSC-PSM expects to present the updated modeling tool to country offices in Cambodia, Thailand, and Laos in Q1 FY 2024.

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 to host governments in warehousing and distribution and, second, by distributing commodities in some countries, often through contracts with in-country 3PLs.

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.

QAT Module Provides Insight into Inventory Turns for Better Commodity Management

In FY 2023, the project improved upon the existing inventory turns report within QAT, which allows users at the central level and countries to view inventory turns data per country, supply plan, commodity category, and product. At the country level, this enhanced version of the inventory turns report provides visibility across all supply plans and products within those supply plans. At the project level, GHSC-PSM can review inventory turns data across all countries, supply plans, and product categories. These data provide insight into the speed at which commodities are moving through the warehouse. This information can help to determine if the inventory is turning slower, faster, or at the levels within the planned minimum-maximum inventory control levels. If the actual inventory turnover is lower than planned, then the inventory is moving slowly and sitting at the warehouse, taking up valuable storage space—increasing insurance costs, and posing a higher risk of overstock and expiries. However, if the actual inventory turnover is higher than planned, the stock is moving faster than planned, with a lower total value of commodities stored in the warehouse than projected, then there is a lower demand for storage space but a higher risk of stockouts.

Activity-Based Costing (ABC)/Activity-Based Management (ABM)

GHSC-PSM implements private sector approaches, such as ABC/ABM. The project recognizes that warehousing and distribution are part of a larger strategy requiring integrated procurement, transportation, storage, picking and packing, delivery, and other activities to increase velocity, improve orchestration and performance, and lower the risk of expiry and warehouse operational costs.

In FY 2023, GHSC-PSM provided virtual technical assistance to Ghana, Uganda, and Zambia—who are all in various stages of ABC/ABM implementation:

- In **Ghana**, provided virtual technical assistance to the Ashanti and Eastern regional medical stores (RMSs). GHSC-PSM holds 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

profit and loss (P&L) statements. In FY 2023, the project conducted quarterly P&L statement reviews with Ashanti and Eastern RMSs. The project's goal is to train each finance and operations team to conduct these quarterly reviews on their own. GHSC-PSM developed an outbound audit tracking template that provides insight into pickers' order accuracy and the time/labor used.

- In **Uganda**, conducted quarterly reviews of P&L results with JMS. The P&L statements provide JMS with detailed visibility into their own expenses to better manage operating costs and improve performance. The project has supported JMS ABC/ABM implementation since 2021. This has resulted in decreased operating costs and improved performance. Since the implementation of ABC in mid-2021, JMS has shown an average decrease in costs of approximately 0.75 percent, which equates to approximately \$200,000 per quarter, with the latest quarterly trends showing double the savings.
- In **Zambia**, provided in-person technical assistance to the Zambia Medicines and Medical Supplies Agency (ZAMMSA) central medical stores to re-introduce the ABC/ABM concept, implement the daily planner, and review the cycle count methodology. The project worked with consultants and the ZAMMSA team to set up a Power BI dashboard that synchronizes hourly to display data in real time.

Other warehousing and distribution-related technical assistance undertaken by GHSC-PSM in the latter half of FY 2023 included:

- In **Rwanda**, GHSC-PSM supported the MOH in its annual Quality Management Improvement Approach (QMIA), a supervisory activity at RMS branches, SDPs, and district hospitals in 30 districts. This activity covers performance monitoring and measurement for health facilities, on-the-job mentorship for performance improvement, and planning to implement improvements in several supply chain areas, including warehousing and inventory control, re-supply, storage, waste management, data management, and record-keeping (e-LMIS). The main goal of this activity was to ensure continuous performance, improvement, and prevention of supply chain issues at district RMS branches and SDPs that may result in wastage. The measurements were based on supply chain KPIs and technical support areas and include:
 1. Identifying key performance gaps
 2. Providing capacity building to district RMS branches in supply chain management of health commodities
 3. Monitoring progress toward actions taken to address gaps during the previous site visits
 4. Ensuring the correct use of medicine management tools, including the eLMIS
- In **Ghana**, GHSC-PSM supported the NMEP to transport 2,900,150 SPAQ treatments in Q3 and 1,118,550 additional SPAQ treatments in Q4 from the central level to seven target regions (Upper East, Upper West, Northern, Northeast, Savannah, Oti, and Bono East) as part of preparations for the 2023 SMC campaign.
- In **Guinea**, GHSC-PSM:
 - Provided technical support to the central medical store to conduct a quarterly inventory of health products, including malaria commodities.

- Assisted in physically counting health products in all regional depots and the central warehouse, and monitored stock levels of all malaria products.
- Ensured that the central medical store entered the data into the system to facilitate informed procurement planning and replenishment of depots with the required quantities of health commodities before the next distribution cycle.
- Estimated the needs for the six regional depots according to the maximum level of six months of available stock for each product. The project's estimates are based on the stock available in the depots and the consumption of the districts covered by the depot.
- Aggregated, analyzed, and adjusted the estimates in collaboration with regional supply chain managers before transmission to the NMCP.

LLIN Distribution

GHSC-PSM collaborates with NMPs and implementing partners for LLIN distribution in various countries. The project provides support, including procurement and delivery technical assistance. In FY 2023, the project delivered more than 38 million LLINs to 23 countries²⁴ for mass and continuous distribution to protect more than 76 million people (see Exhibit 15).

Exhibit 15. LLIN deliveries in FY 2023

Country	Number of LLINs delivered to recipient countries
Angola	734,050
Benin	1,157,103
Burkina Faso	520,000
Burundi	1,085,868
Cameroon	300,000
Congo DRC	2,594,100
Côte d'Ivoire	172,304
Ethiopia	2,990,605
Ghana	800,000
Kenya	2,561,000
Laos	70,000

²⁴ Angola, Benin, Burkina Faso, Burundi, Cameroon, DRC, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Laos, Liberia, Malawi, Mali, Myanmar, Nigeria, Rwanda, Senegal, Tanzania, Thailand, Uganda, Zambia, and Zimbabwe.

Liberia	300,400
Malawi	1,533,150
Mali	1,180,000
Myanmar/Burma	150,000
Nigeria	7,884,582
Rwanda	1,571,700
Senegal	400,000
Tanzania	6,188,682
Thailand	80,300
Uganda	3,999,516
Zambia	600,000
Zimbabwe	1,200,000
Total	38,073,360

In FY 2023, the project supported 13 countries²⁵ 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 with the necessary nets before the rainy season, particularly in areas with high concentrations of malaria cases.

- In **Ethiopia**, GHSC-PSM supported LLIN orientations in five newly structured woredas of the Afar region to enhance the capacity of campaign actors at all levels. In Q4, 151 people received the orientation. In Afar regional states, the project provided an orientation to and travel expenses for 32 health post-level supervisors assigned to furnish on-site support to health extension workers (HEWs) during net distribution. The supervisors assisted the HEWs in properly filling out the distribution pads used to log proof of receipt of the LLINs and distributing nets to households based on family size. The supervisors also aggregated data on the daily distributions to households and submitted reports to woreda distribution coordinators.

GHSC-PSM supported the five newly structured Afar woredas on operational visibility and traceability through KPI monitoring, coding the bales, marking the nets while distributing to

²⁵ Angola, Burundi, Ethiopia, Guinea, Laos, Malawi, Mali, Nigeria, Rwanda, Sierra Leone, Thailand, Uganda, and Zambia.

households, reporting daily on distribution status, assigning one supervisor to each health post, returning the bale covers to the woredas during post-distribution, and using a checklist in three stages (pre-, during-, and post-campaign). As of the end of Q4, 27 health posts had completed the campaign within the allotted 10 days and reported on their distribution progress daily.

- In **Rwanda**, a joint effort that included the Rwanda Medical Supply Limited and Société Générale de Surveillance (SGS, representing GHSC-PSM) inspected 870,000 LLINs procured under three separate purchase orders and sampled for major and minor defects. Out of 500 LLINs sampled and inspected for major defects, eight showed major defects, while out of 315 inspected for minor defects, three showed minor defects. The inspector accepted the inspected consignment as it complied with the acceptance quality limits. The Malaria and Other Parasitic Disease Division will develop a distribution plan to avail the LLINs to the population.
- In **Uganda**, GHSC-PSM began implementing the Universal Coverage Campaign 2023–2024 to reach over 46.7 million people with 28.4 million nets. The target is one net for every two persons in the household. The campaign is funded by the Global Fund, Against Malaria Foundation (AMF), and PMI with support from the Government of Uganda.

The National Medical Stores (NMS) are in charge of warehousing and distributing all of the campaign's LLINs in five waves, each reaching an average of 24 districts. Distributions will be completed in Q2 FY 2024.

By the end of Q4 FY 2023, the campaign had reached 56 districts, distributing 10,965,400 LLINs to protect more than 20 million people.

Global Collaboration for LLIN Distribution

The project collaborated with other global partners in procuring and distributing LLINs in Zambia. 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 technical assistance 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, 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 and hybrid Q2 2022 courses. After each offering, the project modified the curricula based on participants' feedback. Modifications included incorporating foundational information at varying interest levels and experience in the supply chain.

In Q3, GHSC-PSM conducted the first face-to-face training since the COVID-19 pandemic on the Introduction to Supply Chain Management and the Emerging Trends in Supply Chain Management. While the introductory course had 22 USAID and two GHSC-PSM staff, the emerging trends course had 23 USAID staff. The courses used simulation exercises, lectures, and panel discussions to deliver 17 and 16 introductory and emerging trends sessions through external and internal lecturers. The internal lecturers were drawn from USAID and PSM staff. External lecturers were from VillageReach, Project Last Mile, Open Contracting, Management Science for Health, and Salient Advisory. Both courses received positive daily feedback from participants.

Workforce Development Qualitative Assessment

In FY 2021, USAID funded country data collection to understand the scope of its financial investments in workforce development (WFD) between FY 2017 and FY 2020. USAID would like to use these data to identify the WFD methods that achieved the most success and faced the most challenges and recommend which methods or activities to prioritize, expand, or adapt. In Q2 and Q3 FY 2023, GHSC-PSM used these data to assess WFD activities in Malawi through online surveys, one-on-one interviews, and a focus group discussion. In Q4, the project drafted a report and plans to submit it to PMI in FY 2024. Participants' recommendations included prioritizing supportive supervision, mentorship and coaching, in-person and hands-on training; integrating monitoring, evaluation, and follow-up visits; and recruiting competent and experienced trainers for future considerations.

The Zambia country office has also expressed interest and participated in the assessment. In Q4, the project worked with the Zambia office to identify assessment participants. The online survey and focus group discussion activities in Zambia, funded by TO2 Core, will start in Q1 FY 2024.

Workforce Development Technical Assistance Country Examples

Additional country examples of workforce development activities in the second half of FY 2023 include:

- In **Ghana**, GHSC-PSM and GHS organized a workshop for regional supply chain actors on standardized approaches for logistics performance monitoring and supervision. This workshop seeks to improve public health commodity supply management. In total, 28 participants from five regions benefited from the program.
- In **Guinea**, GHSC-PSM worked with regional and district health authorities to train supply chain managers in data analysis and monitoring of supply chain indicators. In total, 132 supply chain managers participated and took advantage of the integration mechanism that allows the DHIS2 to be a source of the logistic data collected through the eLMIS and validated by the DNPM. Having DHIS2 and eLMIS data in the same environment allows the national supply chain system

to compare data sources through triangulation. This provides a mechanism for data validation from eLMIS and DHIS2, testing the consistency of findings from the two platforms and improving data accountability.

- In **Sierra Leone**, GHSC-PSM conducted a training of trainers (TOT) using the curriculum developed for selected central- and district-level staff who will cascade the training to peripheral health units (PHUs) and hospital staff. The project trained and tested 44 participants to capture PHU data and use of reporting tools through a competency test. Of them, 37 (84 percent) passed and were further assigned to facilitate training sessions. A total of 36 trainers facilitated training sessions using the adult learning technique. All 44 participants conducted a mock supportive supervision session at Masuba Community Health Post and a debriefing session with the management of the health post.
- In **Zambia**, GHSC-PSM and the MOH organized eight in-service training sessions for 201 MOH staff members working at SDPs. These trainings were focused on the Standard Operating Procedures Manual for the Management of Essential Medicines and Medical Supplies, including malaria commodities, and the job aids to perform the tasks necessary to manage the logistics system and deliver high-quality health care services. Out of the 201 participants, 93 percent (187) obtained competency certificates (see Exhibit 16).

Exhibit 16: Group of certified trainers: Sierra Leone Integrated Health Logistics Management System TOT conducted by GHSC-PSM.



GHSC-PSM and the MOH also organized four CHW logistics system training of trainers (TOT) sessions. These TOT sessions prepared the CHWs to teach logistics concepts to other CHWs and to use job aids to enter information into the Commodity Ordering and Tracking Tool. A total of 108 CHWs participated in these sessions, and 97 participants (90 percent) earned competency certificates.

A total of 309 individuals, including MOH SDP-based staff and CHWs, received comprehensive training. This collective effort is an example of the commitment of Zambia and its partners to fortify the healthcare system, enhance the competency of healthcare professionals, and broaden the availability of essential medicines and healthcare services.

Number of Trainees

In FY 2023, the project trained in-country specialists in 21 PMI and USAID malaria partner countries²⁶ on the full range of supply chain health systems strengthening areas.

The project trained 4,943 people, either exclusively funded by TO2 or co-funded by TO2 and other health areas. Women made up 30 percent of the trainees, and men made up 70 percent. The countries with the most TO2-funded training recipients were Nigeria (1,162 individuals), Burkina Faso (914 individuals), and Angola (597 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).

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 second half of FY 2023 include:

- In **Angola**, GHSC-PSM continued to support the development of the national supply chain strategy by drafting an implementation plan to cover the first several years of the strategy. Support for the overall strategy from the leadership at the central medical stores (CECOMA) remains strong; however, further development awaits approval higher up within the MOH. The draft will be finalized in Q1 FY 2024.
- In **Ghana**, in Q3, GHSC-PSM assisted NMEP in developing a guideline for implementing SMC. The guideline covers key areas such as procurement, transportation, storage and inventory management, training of commodity managers, product quality, product recalls, and reporting.
- In **Niger**, in Q4, GHSC-PSM collaborated with other stakeholders to complete development of

²⁶ Angola, Burkina Faso, Burma, Burundi, Cameroon, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Thailand, Zambia, and Zimbabwe.

the National Quantification Guidelines. These guidelines provide detailed guidance to quantify commodity needs for various health sectors. This is the culmination of efforts that began in FY 2022, in which stakeholders diligently documented every step, data source, and assumption used for the FY 2022 malaria commodity quantification, all of which formed the foundation for these guidelines that now encompass all health areas. To ensure widespread dissemination, GHSC-PSM, on behalf of PMI, has committed to fund the printing of the guidelines for dissemination to targeted stakeholders within the MOH and related agencies in FY 2024.

- In **Nigeria**, in Q4, in preparation for implementing the State Drug Management Agency (DMA) and a robust operational guideline in Ebonyi State, GHSC-PSM, with funding from USAID, supported the Ebonyi State MOH to embark on a study tour to Kano State on operationalizing the Drugs and Medical Consumables Supply Agency (DMCSA). The tour included a stopover at Abuja Premier Medical Warehouse (APMW) to understand the makeup of a pharma-grade warehouse. The tour was aimed at equipping policymakers and the MOH implementers with an understanding of the operational procedures and management processes required to manage the DMA.

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 FY 2023. GHSC-PSM, in collaboration with the GHSC-TA-Francophone Task Order project, completed the **DRC** NSCA activity. In **Madagascar**, the project supported the USAID IMPACT project in drafting IMPACT's NSCA final report. The IMPACT team reviewed and accepted the report, which was subsequently shared with the Ministry of Public Health, or MINSANP, for further comment and review. In **Rwanda**, GHSC-PSM conducted a dissemination workshop for the NSCA implementation.

The project also supported several countries in the NSCA workstream in the second half of FY 2023, but just one with TO2 funding. In **Burundi**, the project completed all implementation components of the NSCA and produced a report documenting the capability, functionality, and performance of supply chain functions at all levels of the public health supply chain system (warehouses, hospitals, and health centers). The 2023 NSCA provides the most verifiable cross-sectional information about the capability, functionality, and performance of the country's public health supply system since the previous assessment in 2014 and measures the progress of implementation of its current supply chain strategy (PNSCA 2021–2025). The performance gaps documented through this NSCA set the priorities for the Government of Burundi and the MOH toward achieving the country's vision of universal health care. The report will be disseminated in early FY 2024.

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.1 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

In line with the FY 2023 work plan, GHSC-PSM worked to bolster global collaboration and USAID's localization strategy. In Q3, the project hosted a Regionalization Workshop with USAID that subsequently informed the FY 2024 malaria commodity sourcing strategies to emphasize African manufacturing as a weighted supplier evaluation criterion. Throughout FY 2023, GHSC-PSM hosted in-person and virtual meetings with suppliers of mRDTs, LLINs, and pharmaceutical products (including ACTs and severe malaria products) addressing such topics as suppliers' organizational changes, GSI compliance, and production capabilities.

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, the Clinton Health Access Initiative (CHAI), and MMV. 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 from a procurement perspective.

GHSC-PSM took part in **Malaria Pharmaceutical Global Task Force** monthly meetings throughout FY 2023 to discuss market conditions, supplier updates, and in-country updates/challenges. The group generally discussed stock levels of various countries to ensure availability and awareness of order placement by donors. 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. The conversation in Q4 focused on Niger given the ongoing coup d'etat and border closures. Members shared updates on efforts to reduce the price of semi-synthetic artemisinin (SSA) and pyronaridine, two important antimalarial APIs. The group also discussed progress toward prequalification of African-based malaria pharma manufacturers for AL, SP, and SPAQ. By Q4, two new injectable artesunate products (one higher strength and one single solvent) manufactured by existing

suppliers were prequalified, raising the questions around country transitions to either formulation/presentation. CHAI informed the group about their progress in updating short- and long-term forecasts, which is reliant on data from global procurers. These forecasts were available on RBM Global Malaria Dashboard by Q4.

GHSC-PSM also contributes to two sub-working groups of the Malaria Pharmaceutical Task Force, one focused on KSM/API and the other on artemisinin. The **KSM/API sub-working group**,²⁷ which focuses on upstream supply chain challenges with KSM and APIs used in the production of malaria pharmaceutical products, shifted to a monthly meeting cadence in FY 2023. In Q3 and Q4, Medicines4All alerted the working group that an Expression of Interest was circulating, targeting API manufacturers interested in improving pyronaridine synthesis. The intention of the Expression of Interest is to increase not only the number of prequalified pyronaridine API sources, but also finished product offerings beyond the current single offerors, and ultimately improve finished product cost. This is a noteworthy development, as the finished product artesunate pyronaridine is considered an appropriate alternative antimalarial for countries with increasing drug resistance. Additional KSM/API Working Group topics centered on malaria commodity forecasting to inform API procurement volumes and African manufacturing.

Various members attended extraordinary **Artemisinin Working Group**²⁸ meetings, specifically focused on Program for Appropriate Technology in Health (PATH) and Bill & Melinda Gates Foundation's work related to SSA and vegetal artemisinin markets. Working group topics included the implications of significantly reduced vegetal artemisinin prices entering FY 2023 and progress toward increasing SSA supply through market-based interventions and demand transparency. By Q4, the cost of goods sold analysis performed at the SSA supplier's facility in Italy was completed, with the KSM/API supplier signaling renewed interest in supporting global procurers in incorporating SSA into their procurement strategies. Meanwhile, Malaria Task Force procurement members began exploring the most beneficial coordination mechanism to move the initiative forward in tandem.

GHSC-PSM is a member of the **mRDT Task Force**, which as of Q2 began to meet quarterly instead of monthly as a result of market stabilization post COVID-19. In Q1, the mRDT Task Force discussed 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 the work of WHO Prequalification (WHO-PQ) and partners 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 tests should be a priority. The task force also 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. GHSC-PSM did not attend task force meetings in the latter half of FY 2023.

²⁷ 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.

²⁸ 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.

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 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. In Q4, the LLIN Global Donor Collaboration call focused on aligning on PBO and dual-active ingredient LLIN production capacity to ensure global access to supply. In addition, donors worked to align requirements regarding the packaging of LLINs in individual bags and the impact of individual packaging on shelf life and downstream sustainability. The project contributed to topics related to environmental and social sustainability in support of the United Nations Children’s Fund (UNICEF) sourcing strategy for LLINs. Participants also discussed logistics bottlenecks and issues relating to new pricing and other procurement processes.

Global Collaboration for Quality Assurance Activities

In FY 2023, the project continued to play a leadership role among global stakeholders in the LLIN QA space as chair of the LQAG. The LQAG and I2I industry group discussed how LQAG can contribute to post-market information using their expertise in quality assurance, as well as non-inferiority for PBO nets. The global procurers indicated that they are open to addressing the data requirements when the new WHO Guideline for Prequalification of ITNs is finalized and implemented. (See section A.3 for further information.)

The LQAG and I2I held further discussions on post-market information to inform the draft [WHO Guideline for Prequalification of Insecticide-Treated Nets \(ITNs\)](#). The steering group and WHO-PQ team discussed data requirements and data collection processes, as well as the integration of the group’s feedback into the guideline. (See section A.3 for further information.)

In FY 2023, GHSC-PSM discussed the current WLA products, the processes for transitioning SRAs and other regulatory authority products to WLA, and considerations for the use of WLA as part eligibility requirements for global procurers with PMI and Global Fund Quality Assurance. The global procurers provided feedback on developing the WLA list. (See section A.3 for further information.)

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 from FY 2023:

In **Guinea**, GHSC-PSM is participating in a multi-donor effort to build a prefabricated warehouse. Stakeholders include the MOH, CRS, 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 **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.

In **Nigeria**, the project coordinated with AMF and PMI to support the delivery of 2,998,650 Chlorfenapyr Dual-AI LLINs for the 2023 Plateau State distribution campaign. In order to support the deployment of the most efficacious net based on entomological data in the state, PSM, PMI, and AMF entered into a co-payment agreement with the supplier. This agreement entailed PSM and AMF splitting the commodity cost of the products.

In **Zambia**, GHSC-PSM worked with the National Malaria Elimination Centre (NMEC) and other key partners, such as AMF, Evidence for Health (E4H), PAMO Plus, PMI Evolve, the Global Fund, and the Churches Health Association of Zambia (CHAZ) to prepare for the calendar year 2023 mass campaign. The project is responsible for providing warehousing and distribution services for the mass campaign to six of the 10 provinces (Eastern, Luapula, Muchinga, Northern, Northwestern, and Western). By the end of FY 2023, GHSC-PSM had provided warehousing services for over 4.2 million LLINs.

GHSC-PSM also identified three 3PLs to conduct the last-mile delivery of the LLINs for the 2023 mass campaign. Delivery of the LLINs was delayed because the project has not yet received the official allotments from NMEC and AMF. GHSC-PSM is working with NMEC, AMF, and other key stakeholders to confirm allotments and begin delivery. LLIN deliveries will be phased at provincial and district levels, depending on household registration (HHR) data availability and clearance by all involved parties. So far, HHR for Luapula and Eastern Provinces are complete and are awaiting clearance from AMF. GHSC-PSM worked with NMEC to complete and confirm the allotments for 2023 continuous distribution to three provinces (Eastern, Luapula, and Northern Provinces). NMEC directed the facilities to store these LLINs separately from the 2023 mass campaign LLINs to avoid mixed use while the mass campaign is ongoing. A total 600,000 LLINs are expected to arrive in Zambia and be distributed to health facilities at the beginning of Q1 FY 2024.

Global Collaboration for Global Standards and Traceability

- **International Procurement Agency (IPA) Engagement:** In FY 2023, USAID, United Nations Population Fund (UNFPA), UNDP, and Stop TB again endorsed the [Global Standards Technical Implementation Guide for Global Health Commodities](#), which also received new endorsements from UNICEF, Gavi, and Bill & Melinda Gates Foundation. Publication of the document follows six IPA working group meetings facilitated by GHSC-PSM accompanied by desk research to inform updates and revise the 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. GHSC-PSM distributed the document to suppliers following its publication.
- **2023 Global Visioning Workshop:** GHSC-PSM facilitated the 2023 Global Visioning Workshop held in Q4 in Geneva, Switzerland. The workshop brought together 51 diverse stakeholders

including donors, country representatives, implementing partners, and GSI Global to advance the vision for global traceability. USAID was represented by all program areas including participation from PMI. The interactive workshop included a series of co-creation working sessions that resulted in the prioritizing six traceability use cases, including: Visibility into where a product is in the global supply chain, data sharing compliance, programmatic accountability, theft and diversion, avoiding substandard and falsified medicines reaching patients, and recall management. These use cases informed the identification of traceability architecture approaches comprising data and process workflows to enable intended business goals.

GHSC-PSM facilitated a USAID-specific visioning meeting before the workshop to support USAID in thinking through priority use cases for serialization and categorizing them between global use cases and USAID health area-specific use cases. Outputs from this workshop informed discussions in Geneva.

C.2 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 include supply chain considerations 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 by 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).

In Q1 FY 2023, the project delivered two malaria-related presentations and five cross-cutting presentation posters at the People That Deliver Global Indaba 2022:

- Human capacity development for maximizing health supply chain performance in Guinea: training of potential supply chain managers at higher institutions of learning.
- Human resource capacity development in the Angolan health supply chain.
- Strengthening Malawi Ministry of Health supply chain management: service delivery and data management.
- Capacity building for improved stock management in Northern Cameroon.
- Zambia's journey to supply chain management technical independence through institutionalization in nursing, biomedical sciences and pharmacy colleges and universities.
- A comprehensive approach to address the health supply chain workforce capacity in Ethiopia.
- Pharmaceutical workforce development based on the auditable pharmaceutical transaction and service system in Ethiopia.

In Q4 FY 2023, six abstracts were submitted and accepted for poster presentation at the American Society of Tropical Medicine and Hygiene 2023 Annual Meeting held in Q1 FY 2024. Five project offices submitted the abstracts: Ghana, Kenya, Nigeria, and Zambia submitted one abstract each, while Malawi submitted two abstracts.

Also, in Q4, one TO2 and two cross-cutting abstracts were submitted for presentation at the Global Health Supply Chain Summit 2023 that will take place in Q1 FY 2024.

C.3 Coordination and Collaboration within GHSC-PSM

Coordination across Health Areas within the Indefinite Delivery Indefinite Quantity Contract

GHSC-PSM promotes collaboration across health areas and other project-funded activities and leverages 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 in areas such as market dynamics, knowledge management and communications, and monitoring and evaluation (M&E). Other examples include:

- 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 M-DIVE platform, sharing essential order data for transparency throughout the community. In the second half of FY 2023, the project updated

ARTMIS with the insurance policy, automated the selection of Supplier Pickup Address Locations to process purchase orders in the OMS, and enhanced the M-DIVE data feed to include item, order, contract, and shipment information. 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 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, facilitated the 2023 Global Visioning Workshop held in Q4 in Geneva (Switzerland), and provided technical support to eight TO2 countries in adopting GSI standards. See Sections B.1 and C.1 for additional details.
- In 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. As of Q4, stakeholders in 40 countries had been trained on the QAT’s supply planning module, with stakeholders in 27 countries also trained on the forecasting module. QAT includes 248 health program supply plans and 266 health program forecasts, and the project has trained 1,300 active country users. GHSC-PSM will continue to train additional countries on both modules, in addition to providing separate country-led trainings to 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 was piloted in Zambia at the end of Q4. For full details on EUV activities in FY 2023, see Section A.4.
- TO2 is conducting a workforce development assessment based on the TO3-funded workforce development activities collected by USAID in 2021. In FY 2023, the project completed the assessment in Malawi and drafted a report for PMI review. In Q4, the project started to prepare to conduct the assessment in Zambia in FY 2024 Q1. Results of these studies will provide a general understanding of 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.
- GHSC-PSM continues to monitor the 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 such as weekly GHSC-PSM/PMI meetings including presenting the TOM dashboard every other week and Commodity Risk Profiles every other month, bi-weekly (every other week) GHSC-PSM/USAID meetings, and virtual country director forums every three weeks.

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. The NFO Project Management Unit (PMU) 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 PMU 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 PMU 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 PMU also coordinates closely with in-country technical assistance projects to manage contracts.
- The NFO PMU supports several TO2-related activities for six countries: Benin, Côte d'Ivoire, DRC, Madagascar, Senegal, and Tanzania. During FY 2023, the NFO PMU worked with GHSC-PSM HSS and USAID Missions to organize QAT training for Tanzania, Madagascar, and Côte d'Ivoire (to be implemented in FY 2024), to strengthen capacity in supply planning and forecasting and ensure that the tool is well-adopted and integrated into the local supply planning process.
- The NFO PMU works closely with Tanzania and Côte d'Ivoire Missions and implementing partners to ensure successful LLIN delivery for campaign implementation. In FY 2023 Q4, the NFO PMU coordinated the successful delivery of LLINs to Tanzania for its school, routine, and reproductive child health (RCH) campaigns in 13 regions. For Côte d'Ivoire, the work to deliver the campaign nets began in FY 2023 with completion due in FY 2024.

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 M&E 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 technical working group (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; participants 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.
- Quarterly 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 Assets and Inventories Working Group meetings.
- Monthly GHSC-PSM and USAID Transition Planning Discussions to ensure the project and USAID are preparing a smooth transition to the USAID Next Generation Global Health Supply Chain projects.

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 Q4, GHSC-PSM submitted the final draft of the FY 2022 Environmental Mitigation and Monitoring Report and received approval from 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.

Cover Photo credits: GHSC-PSM

GLOBAL HEALTH SUPPLY CHAIN PROGRAM

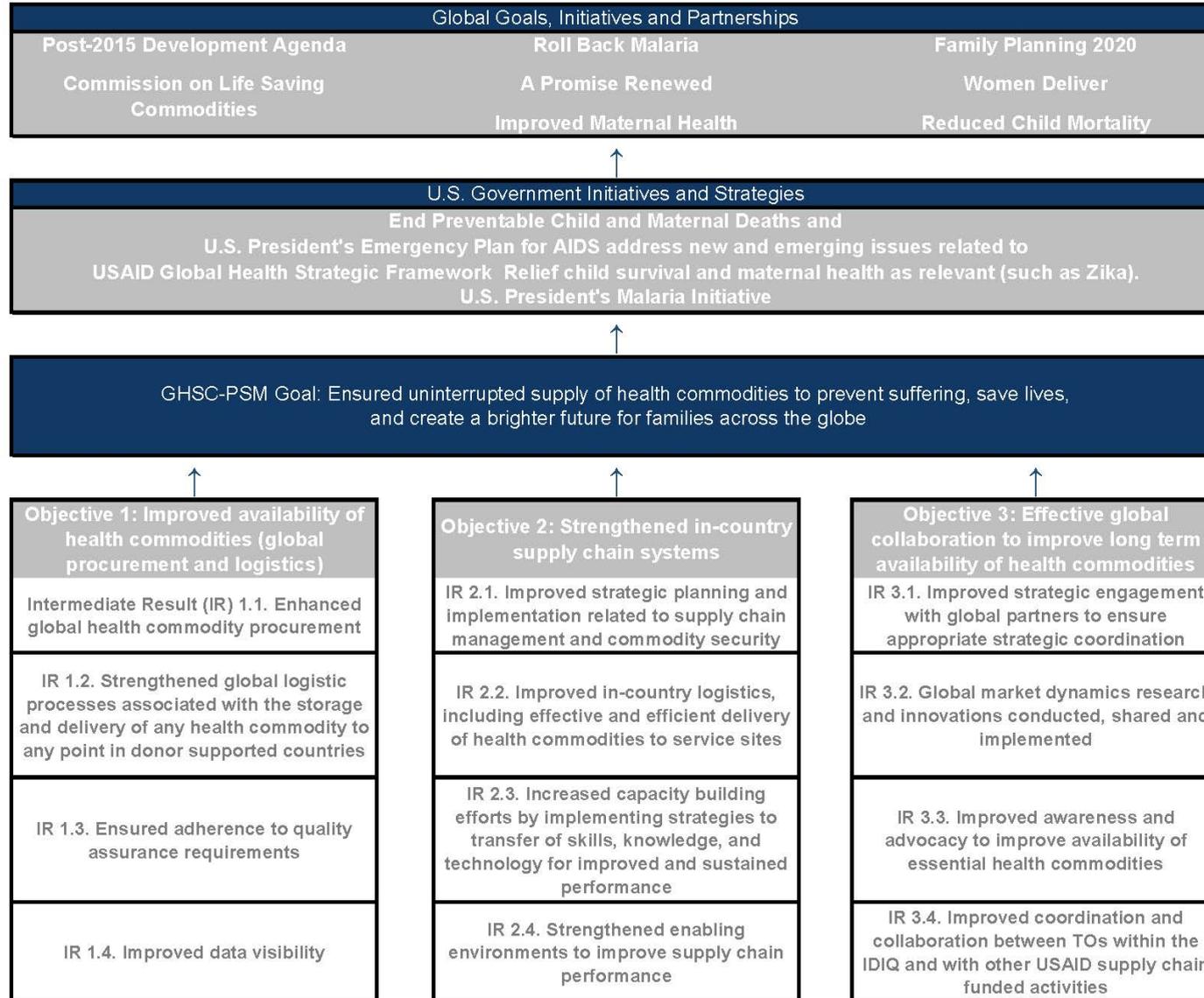
Procurement and Supply Management

GHSC-PSM Task Order 2 (Malaria)

Annual Report External Annex FY2023
(October 2022 – September 2023)



Annex A. GHSC-PSM Results Framework



Annex B. Indicator Details

Check out the [GHSC-PSM IDIQ M&E Plan](#) for complete details on all our indicators.

GHSC-PSM Global Supply Chain Indicators

Indicator Code	Name	Numerator	Denominator	Data Source(s)	Reporting frequency	Other Info
A01a	On Time, In Full Delivery (OTIF) - Percentage of line items delivered on time and in full, within the minimum delivery window (within -14/+7 calendar days of the agreed delivery date (ADD))	Number of line items delivered to the recipient on time and in full during the quarter	Total number of line items delivered to the recipient during the quarter	ARTMIS	Quarterly	Lines items are considered on-time and in-full if the full ordered quantity of the line item is delivered to the recipient within the -14/+7 day delivery window. If the line item is partially delivered within the window, it may be considered on-time but not in-full.
A01b	On Time Delivery (OTD) — Percentage of line items delivered on time, within the minimum delivery window (within -14/+7 calendar days of the agreed delivery date (ADD))	Number of line items with an ADD during the quarter that were delivered to the recipient on time	Total number of line items with an ADD during the quarter	ARTMIS	Quarterly	
A02	Percentage of QA processes completed within the total estimated QA lead times (on-time completion rate for QA processes)	Number of consignments complying with the pre-established QA lead times during the quarter	Total number of consignments requiring QA processes that were cleared for shipment during the quarter	QA Database	Quarterly	Consignment is defined as a shipment of commodities, including one or more line items. QA process transactions are managed at the consignment level, regardless of the number of line items in the consignment.
A03a	Cycle time (average)	Sum of cycle time for all line items delivered during the quarter	Count of all line items delivered during the quarter	ARTMIS	Quarterly	Overall cycle time is defined as the number of days between when a customer order is submitted to when the shipment is actually delivered to the customer, inclusive of the start/end days and all holds or other dwell times.
A03b	Dwell-adjusted cycle time (average)	Sum of cycle time for all line items delivered during the quarter, excluding all defined inactive dwell periods from the overall cycle time	The count of all line items delivered during the quarter	ARTMIS	Quarterly	Dwell-adjusted cycle time is defined as the overall cycle time minus the sum of all dwell durations for all holds placed on the line item during its fulfillment.
A04	Inventory turns (average number of times inventory cycles through GHSC-PSM controlled global facilities)	Total ex-works cost of goods distributed from GHSC-PSM-controlled global inventory stocks (in USD) within the fiscal year	Average monthly inventory balance (in USD)	Inventory extract	Annual	
A05	Total Landed Cost (as a percentage of total value of commodities delivered to recipients)	Sum of all freight and logistics costs (in USD) paid by GHSC-PSM during the reporting period	Sum of the value of all commodities delivered to recipients during the	ARTMIS, Monthly Financial Statement	Semiannual	The project will also report a variant of this indicator that includes all HQ supply chain operations costs in the numerator. Quality assurance costs will be excluded from all task orders, as QA costs are not paid by GHSC-PSM for all task orders. A version of the

Annex B. Indicator Details

Check out the [GHSC-PSM IDIQ M&E Plan](#) for complete details on all our indicators.

GHSC-PSM Global Supply Chain Indicators

Indicator Code	Name	Numerator	Denominator	Data Source(s)	Reporting frequency	Other Info
A06a	Absolute percent supply plan error, with variants annual absolute percent error and supply plan bias	Absolute value of the differences between the actual quantities with requested delivery dates during the quarter minus the quantities planned for delivery according to country supply plans	Sum of the actual quantities with requested delivery dates during the quarter	ARTMIS, Country Supply Plans	Quarterly	Supply plan error is currently calculated for adult and pediatric ARVs, HIV lab products, ACTs, and malaria rapid diagnostic tests. Planned quantities are drawn from an aggregation of country supply plans submitted in the prior quarter, including only the quantities that are forecasted to be procured through GHSC-PSM. Actual quantities are derived based on the requested delivery dates for products included in customer ROs submitted to ARTMIS.
A07	Percentage of line items imported using a temporary registration waiver (temporary waiver percentage)	Number of line items that were imported using a temporary registration waiver	Total number of line items delivered to the recipient during the quarter	Supplier registration bidding documentation	Quarterly	
A08	Average percentage of shelf life remaining for warehoused commodities, weighted by the value of each commodity's stock (product at risk percentage)	Percentage of shelf life remaining at the end of the quarter, weighted by value of commodities, summed across all products	Total value of commodities, summed across all products, at the end of the quarter	Inventory extract	Quarterly	Shelf life requirements vary by country and by product.
A10	Percentage of product procured using a framework contract (framework contract percentage)	Value of product purchased through framework contracts during the quarter	Total value of commodities purchased during the quarter	ARTMIS	Quarterly	
A13	Percentage of batches of product for which the final result is showing nonconformity (out of specification percentage)	Total number of batches of product showing nonconformity during the quarter	Total number of batches tested during the quarter	QA Database	Quarterly	

Annex B. Indicator Details

Check out the [GHSC-PSM IDIQ M&E Plan](#) for complete details on all our indicators.

GHSC-PSM Global Supply Chain Indicators

Indicator Code	Name	Numerator	Denominator	Data Source(s)	Reporting frequency	Other Info
A14a	Average vendor rating score - Commodity suppliers	Sum of all key vendor ratings	Number of key vendors from whom GHSC-PSM procured products/commodities during the quarter	ARTMIS	Quarterly	Scorecards are compiled on one-month lag, i.e. Q1 data represents vendor performance from Sept-Nov. Supplier OTIF is currently reported for high value and/or high risk suppliers. Only suppliers for which one or more order line items were fulfilled in this reporting period were included. All vendors are equally weighted in the overall score, regardless of procurement volume from each vendor.
A14b	Average vendor rating score - QA lab services	Sum of all key vendor ratings.	Number of key vendors from whom GHSC-PSM procured lab testing services during the quarter	QA scorecard	Quarterly	All vendors are equally weighted in the overall score, regardless of procurement volume from each vendor.
A14c	Average vendor rating score - Freight forwarders	Sum of all key vendor ratings	Number of key vendors from whom GHSC-PSM procured freight forwarding services during the quarter	3PL scorecard	Quarterly	To allow complete data collection, freight forwarder scorecards are conducted on a one-month lag (i.e. Q1 data represents performance from Sept-Nov, rather than Oct-Dec). Overall score is weighted by delivery volume, such that vendors who deliver a greater number of shipments will have a relatively greater impact on the result.
A15	Percentage of quality assurance Investigation reports submitted within 30 calendar days of outcome determination (QA investigation report submission)	Number of QA investigation reports submitted to PMI within 30 days of outcome determination	Total number of QA investigation reports due during the reporting period	QA Database, email submissions	Semiannual	
A16	Percentage of backlogged line items	Number of line items with an ADD on or before the reporting period end date, within a rolling 12-month period, that have not been cancelled or put on hold and that are currently undelivered and late	Total number of line items with an ADD on or before the reporting period end date, within a rolling 12-month period, that have not been cancelled or put on hold	ARTMIS	Quarterly	

Annex B. Indicator Details

Check out the [GHSC-PSM IDIQ M&E Plan](#) for complete details on all our indicators.

GHSC-PSM Country Level Indicators

Indicator Code	Name	Numerator	Denominator	Data Source(s)	Reporting frequency	Other Info
B01	Stockout rate at SDPs	Number of SDPs that were stocked out of a specific tracer product according to the ending balance of the most recent logistics report (or on the day of site visit)	Total number of SDPs that reported/were visited in GHSC-PSM-supported countries that offer the tracer product	LMIS reports, End User Verification surveys, other country-specific stock data sources	Quarterly	Stockout rates are provide for all tracer products for which data is available, regardless of whether GHSC-PSM procures or delivers the product. Data is provided for the ending balance of the middle month of each quarter for most countries. "Composite stockouts" are presented for select malaria and family planning commodities, indicating where SDPs are stocked out of all products they offer within the same product type or contraceptive method. At the task order level, aggregated stockout rates are calculated based on all SDP stock observations summed across all tracer products for that TO. TO-level denominators will therefore be greater than the number of SDPs that reported in that health area.
B02	Percentage of stock status observations in storage sites, where commodities are stocked according to plan, by level in supply system	Number of stock status observations for a tracer product that are within the designated minimum and maximum quantities at storage sites	Total number of stock status observations for a tracer product at storage sites	Warehouse management information systems, partner stock reports	Quarterly	Stocked according to plan rates are provided for all tracer products for which data is available, regardless of whether GHSC-PSM procures, delivers, or manages inventory for the product. Stock "observations" are typically based on inventory reports and will include as many observations (monthly, quarterly) from as many storage locations as are available at the time of reporting.
B03	SDP reporting rate to the LMIS	Number of SDPs whose LMIS report(s) or order form(s) were received at the central level within 30 days of the specified in-country deadline	The total number of SDPs in country that are required to report	LMIS reports, other country-specific stock data sources	Quarterly	All sites that have submitted reports within 30 days of the country-specified deadline are considered "reporting" for this indicator. Some countries have limited access to SDP-level data and are reporting rates from a small number of sites. Number of sites reporting for each country is listed on the "Complete Results" page for each country.
B04	Average rating of in-country data confidence at the central, subnational, and SDP levels (data availability, accuracy and timeliness)	Sum of all rating scores (0-9 points each) for all sites reporting	Total number of sites reporting	Data quality assessments	Annual	GHSC-PSM collects data for this indicator via data quality assessments conducted at health facilities and warehouses. Sites are scored based on the availability, accuracy, and timeliness of relevant supply chain data points. The selection methodology and number of sites visited varies between countries depending on available resources and other country-specific factors.
B05	Percentage of required annual forecasts conducted	Number of required annual forecasts conducted	Total number of required annual forecasts	Annual forecast documents	Annual	Annual forecast requirements for each country mirror their supply plan requirements.
B06	Percentage of required supply plans submitted to GHSC-PSM during the quarter	Number of required supply plans that were submitted to GHSC-PSM in the quarter	Total number of required supply plans	Country supply plans, FASP tracker	Quarterly	Supply plan submission expectations are determined in consultation with USAID, headquarters FASP team, and field office technical leads. Submission rates are only calculated for prioritized submissions. Additional supply plans beyond the requirements are often submitted to GHSC-PSM headquarters.

Annex B. Indicator Details

GHSC-PSM Country Level Indicators

Check out the [GHSC-PSM IDIQ M&E Plan](#) for complete details on all our indicators.

Indicator Code	Name	Numerator	Denominator	Data Source(s)	Reporting frequency	Other Info
B07	Percentage of total spent or budgeted on procurement of commodities for public sector services by the government, USG, the Global Fund, or other sources	Total budgeted/spent on health care commodities by a specific stakeholder in a country	Total budgeted/spent on health care commodities in a specific country	Supply plans, budgets, warehouse receipts, etc.	Annual	Data for this indicator may represent actual spending or budgeted amounts, depending on data availability. Data may represent U.S. government fiscal year, host government fiscal year, or other relevant annual period depending on data availability.
B08	Percentage of targeted supply chain activities in which the host country entity has achieved technical independence with GHSC-PSM technical assistance.	Total number of targeted supply chain activities for which the relevant host country entity has achieved technical independence with GHSC-PSM technical assistance.	Total number of targeted supply chain activities	GHSC Supply Chain Technical Independence Scorecard; document reviews; key informant interviews	Annual (reported Q3)	This indicator is measured for a defined set of targeted supply chain activities within each country that are expected to become technically independent by the end of the project, with GHSC-PSM technical assistance. The targeted activities are selected jointly between the USAID mission and the GHSC-PSM field office. The host country entities responsible for carrying out the targeted activities are then assessed on key capacity elements and their role in the implementation of the activity.
B09	Supply chain technical staff turnover rate	Number of supply chain technical staff who left the active health labor force in the last year	Total number of supply chain technical staff at the beginning of last year	Supply chain agency HR data	Annual	Data collection for this indicator focuses on technical employees of the primary supply chain agency in each country. It includes mainly central-level staff, with some countries including subnational levels if relevant and if data is available. It does not include all members of the health workforce who do supply chain tasks, such as SDP staff who keep and report consumption and stock records.
B10	Percentage of GHSC-PSM-supported countries that have a functional logistics coordination mechanism in place	Total number of countries with a functional logistics coordination mechanism in place as determined by a qualitative assessment	Total number of countries supported by GHSC-PSM for technical assistance	Key informant interviews	Annual	Logistics coordination mechanisms are scored against six criteria, each with a point value. The maximum score is 11. Any mechanism that scores 8 or more is considered functional. More detail is available in the project M&E plan.
B11	Percentage of leadership positions in supply chain management that are held by women (in countries where GHSC-PSM is providing technical assistance related to workforce development)	Number of leadership positions in supply chain management that were held by women in a specified time in countries where GHSC-PSM is providing technical assistance related to workforce development	Total number of leadership positions held in a specified time, in countries where GHSC-PSM is providing technical assistance related to workforce development	Supply chain agency HR data	Annual	
B12	Absolute percent consumption forecast error, with forecast bias variant	Absolute value of the difference between the actual quantities of products consumed at service delivery points during the year minus the forecasted consumption for the year	Sum of the actual quantities of products consumed during the year	Annual forecasts; Consumption or issues data from LMIS or WMS	Annual	

Annex B. Indicator Details

Check out the [GHSC-PSM IDIQ M&E Plan](#) for complete details on all our indicators.

GHSC-PSM C-Level Indicators

Indicator Code	Name	Numerator	Denominator	Data Source(s)	Reporting frequency	Other Info
C01	Number of innovations (including operations research studies) that were developed, implemented, or introduced and are related to the health commodity market or supply chain best practices	Number of innovations (including operations research studies) that were developed, implemented, or introduced and are related to the health commodity market or supply chain best practices	NA	Field office reports, work plans	Quarterly	Innovations are reported in the quarter in which they are launched. Activities are considered innovations if they represent a significant advancement for the country. Similar activities may be reported from multiple countries.
C02	Number of people trained	Number of people trained. "People trained" refers to any type of participant, student, or learner in a training event, regardless of its duration	NA	Registration forms, attendance sheets	Quarterly	Training of USAID and GHSC-PSM personnel is excluded from this indicator. Participants may be counted more than once if they attend multiple discrete training activities.
C07a	Percentage of product lost due to expiry while under GHSC-PSM control (product loss percentage)	Total value of product lost due to expiry during the quarter	Average inventory balance (in USD) during the quarter	Inventory reports	Quarterly	Expiries from the Regional Distribution Centers (RDCS) are presented in the GSC section of this report. Expiries that occur in warehouses that GHSC-PSM manages in countries are reported in the country-specific sections of this report.
C07b	Percentage of product lost due to theft, damage, or other causes, while under GHSC-PSM control (product loss percentage)	Total value of product lost due to theft, damage, or other causes during the quarter	For losses in transit: Total value (in USD) of product delivered during the quarter For losses in storage: Average inventory balance (in USD) during the quarter	GHSC-PSM Continual Improvement system reports	Quarterly	Product losses due to incidents are reported only after the actual value of the loss has been determined, which may be later than the quarter in which the incident took place or was first reported to GHSC-PSM Continual Improvement.

Annex C. Commodity Sources

Eligible RDT Manufacturers			
Manufacturer	Test Name	Target Antigen	Species
Abbott Diagnostics Korea, Inc.	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 25 tests (Bulk + POCT)	HRP2	Pf
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf) Cassette, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/PAN) Cassette, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf/PAN
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/Pv) Cassette, 10 Tests, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf/Pv
Access Bio, Inc.	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 25 test (Bulk + POCT)	HRP2	Pf
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf) Cassette, 25 Tests (Bulk)	HRP2/pLDH	Pf
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/PAN) Cassette, 25, 30 Tests (Bulk)	HRP2/pLDH	Pf/PAN
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/Pv) Cassette, 25 Tests (Bulk)	HRP2/pLDH	Pf/PV
Advy Chemical Pvt. LTD.	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 25 test (Bulk)	HRP2	Pf
Arkray Healthcare Pvt. Ltd.	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 10, 25 test (Bulk)	HRP2	Pf
Meril Diagnostics Pvt. Ltd.	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/Pv) Cassette, 25, 30, 50 Tests (Bulk)	HRP2/pLDH	Pf/Pv
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/PAN) Cassette, 30 Tests (Bulk)	HRP2/pLDH	Pf/PAN
Premier Medical Corporation Ltd.	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 25 tests (Bulk + POCT)	HRP2	Pf
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/PAN) Cassette, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf/PAN
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/Pv) Cassette, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf/Pv
RapiGen Inc.	Malaria Rapid Diagnostic test (RDT) pLDH (Pf) Cassette, 25 test (Bulk)	pLDH	Pf
	Malaria Rapid Diagnostic test (RDT) HRP2/pLDH (Pf) Cassette, 25 test (Bulk)	HRP2/pLDH	Pf
	Malaria Rapid Diagnostic Test (RDT) pLDH/pLDH (Pf/Pv) Cassette, 25 Tests (Bulk)	pLDH/pLDH	Pf/Pv
SD Biosensor, Inc	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 25 tests (Bulk)	HRP2	Pf
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/PAN) Cassette, 25 Tests (Bulk)	HRP2/pLDH	Pf/PAN
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/Pv) Cassette, 25 Tests (Bulk)	HRP2/pLDH	Pf/Pv
Tulip Diagnostics [P] Ltd.	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 10, 25 tests (Bulk + POCT)	HRP2	Pf
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/PAN) Cassette, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf/PAN
	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/Pv) Cassette, 10, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf/Pv

Annex C. Commodity Sources

Eligible LLIN Manufacturers			
Manufacturer	Brand	Material	Pesticide
A to Z Textile Mills Ltd.	Olyset®	Polyethylene	Permethrin
A to Z Textile Mills Ltd.	Olyset Plus®	Polyethylene	Permethrin + PBO
BASF	Interceptor®	Polyester	Alpha-cypermethrin
BASF	Interceptor G2®	Polyester	Alpha-cypermethrin + Chlorfenapyr
Disease Control Technologies	Royal Sentry 2.0®	Polyethylene	Alpha-cypermethrin
Disease Control Technologies	Royal Guard®	Polyethylene	Alpha-cypermethrin + Pyriproxyfen
Fujian Yamei Industry & Trade Co.	Yahe®	Polyester	Deltamethrin
Mainpol GmbH	SafeNet®	Polyester	Alpha-cypermethrin
Shobikaa Impex Private Ltd.	DuraNet®	Polyethylene	Alpha-cypermethrin
Shobikaa Impex Private Ltd.	DuranNet Plus®	Polyethylene	Alpha-cypermethrin + PBO
Sumitomo Chemical Co. Ltd.	Olyset®	Polyethylene	Permethrin
Sumitomo Chemical Co. Ltd.	Olyset Plus®	Polyethylene	Permethrin + PBO
Vestergaard SA	PermaNet 2.0®	Polyester	Deltamethrin
Vestergaard SA	PermaNet 3.0®	Polyester	Deltamethrin + PBO
Vestergaard SA	PermaNet Dual	Polyester	Deltamethrin + Chlorfenapyr
V.K.A. Polymers Pvt. Ltd.	MagNet®	Polyethylene	Alpha-cypermethrin
V.K.A. Polymers Pvt. Ltd.	Veeralin®	Polyethylene	Alpha-cypermethrin + PBO
Eligible ACT Manufacturers			
Manufacturer	Product	Details	
Ajanta	ALU	20 mg artemether/120 mg lumefantrine 6x1 DT, 6x2 DT, 6x1, 6x2, 6x3, 6x4	
		80 mg artemether/480 mg lumefantrine 6x1	
	ASAQ	25 mg artesunate/67.5 mg amodiaquine 1x3	
		50 mg artesunate/135 mg amodiaquine 1x3	
Alfasigma	DHA-PPQ	100 mg artesunate/270 mg amodiaquine 1x3, 1x6	
		20 mg Dihydroartemisinin/160 mg Piperaquine	
Cipla	ALU	40 mg Dihydroartemisinin/320 mg Piperaquine	
		20 mg artemether/120 mg lumefantrine 6x1 DT, 6x2 DT, 6x1, 6x2, 6x3, 6x4	
	ASAQ	25 mg artesunate/67.5 mg amodiaquine 1x3	
		50 mg artesunate/135 mg amodiaquine 1x3	
Cipla Quality Chemical Industries Limited	ALU	100 mg artesunate/270 mg amodiaquine 1x3, 1x6	
		20 mg artemether/120 mg lumefantrine 6x1, 6x2, 6x3, 6x4	
Ipca	ALU	20 mg artemether/120 mg lumefantrine 6x1 DT, 6x2 DT, 6x1, 6x2, 6x3, 6x4	
		25 mg artesunate/67.5 mg amodiaquine 1x3	
	ASAQ	50 mg artesunate/135 mg amodiaquine 1x3	
		100 mg artesunate/270 mg amodiaquine 1x3, 1x6	
Novartis	ALU	20 mg artemether/120 mg lumefantrine 6x1 DT, 6x2 DT, 6x1, 6x2, 6x3, 6x4	
		80 mg artemether/480 mg lumefantrine 6x1	
Macleods	ALU	20 mg artemether/120 mg lumefantrine 6x1 DT, 6x2 DT, 6x1, 6x2, 6x3, 6x4	
		25 mg artesunate/67.5 mg amodiaquine 1x3	
	ASAQ	50 mg artesunate/135 mg amodiaquine 1x3	
		100 mg artesunate/270 mg amodiaquine 1x3, 1x6	
Guilin	ASAQ	25 mg artesunate/67.5 mg amodiaquine 1x3	
		50 mg artesunate/135 mg amodiaquine 1x3	
		100 mg artesunate/270 mg amodiaquine 1x3, 1x6	
	DHA-PPQ	20 mg Dihydroartemisinin/160 mg Piperaquine DT	
		40 mg Dihydroartemisinin/320 mg Piperaquine DT	
		40 mg Dihydroartemisinin/320 mg Piperaquine	
		80 mg Dihydroartemisinin/640 mg Piperaquine	

Annex C. Commodity Sources

Eligible ACT Manufacturers		
Manufacturer	Product	Details
Sanofi	ASAQ	25 mg artesunate/67.5 mg amodiaquine 1x3
		50 mg artesunate/135 mg amodiaquine 1x3
		100 mg artesunate/270 mg amodiaquine 1x3, 1x6
Shin Poong	Artesunate/Pyronaridine	20 mg Artesunate / 60 mg Pyronaridine granules
		60 mg Artesunate / 180 mg Pyronaridine tablets
Strides	ALU	20 mg artemether/120 mg lumefantrine 6x1 DT, 6x2 DT, 6x1, 6x2, 6x3, 6x4
Universal Corporation Limited	ALU	20 mg artemether/120 mg lumefantrine 6x1 DT, 6x2 DT, 6x3, 6x4
Eligible Severe Malaria Medication Manufacturers		
Manufacturer	Product	Details
Bliss	Artesunate Suppositories	50mg artesunate suppository, 2 pack
		200mg artesunate suppository, 2 pack
Cipla	Artesunate Suppositories	100mg artesunate suppository, 2 pack
Guilin	Injectable Artesunate	Artesunate (w/ 1 Amp NaHCO3 5% + 1 Amp NaCl 09%) 60 mg Vial, 1 Set
		Artesunate (w/ 1 Amp NaHCO3 5% + 1 Amp NaCl 09% + 2 x 10 mL Syringe) 60 mg Vial, 1 Set
		Artesunate (w/ 1 Amp NaHCO3 5% + 1 Amp NaCl 09%) 30 mg Vial, 1 Set
Ipca	Injectable Artesunate	Artesunate (w/ 1 Amp NaHCO3 5% + 1 Amp NaCl 09%) 60 mg Vial, 1 Set
Macleods	Injectable Artesunate	Artesunate (w/ 1 Amp NaHCO3 5% + 1 Amp NaCl 09%) 60 mg Vial, 1 Set
Strides	Artesunate Suppositories	100mg artesunate suppository, 2 pack
Eligible SPAQ Manufacturers		
Manufacturer	Product	Details
Guilin	SPAQ	Amodiaquine 76.5 mg + Sulfadoxine/Pyrimethamine 250/12.5 mg Dispersible Tablets, 50 x 1 SP + 3 AQ Co-Blister Tablets
		Amodiaquine 153 mg + Sulfadoxine/Pyrimethamine 500/25 mg Dispersible Tablets, 50 x 1 SP + 3 AQ Co-Blister Tablets
S Kant	SPAQ	Amodiaquine 75 mg + Sulfadoxine/Pyrimethamine 250/12.5 mg Dispersible Tablets, 50 x 1 SP + 3 AQ Co-Blister Tablets
		Amodiaquine 150 mg + Sulfadoxine/Pyrimethamine 500/25 mg Dispersible Tablets, 50 x 1 SP + 3 AQ Co-Blister Tablets
Eligible SP Manufacturers		
Manufacturer	Product	Details
Emzor	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 50x3, 100, 1000
Guilin	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 50x3, 100, 1000
Jiangsu Pengyao	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 50x3, 100, 1000
Medopharm	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 50x3, 100, 1000
Micro Labs	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 50x3, 100, 1000
Remedica	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 100, 1000
Universal Corporation Limited	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 50x3

Annex D. Malaria Commodities Procured

Country	ACTs	Laboratory	LLINs	mRDTs	Other Non-Pharma	Other Pharma	Severe Malaria Meds	SP
Angola	4,860,100	743,000	734,050	3,296,000	800,000		1,192,765	853,000
Belgium	2,846,970							
Benin			835,000	2,000,000			18,000	
Burkina Faso	9,403,520		520,000	7,500,000			1,000,000	
Burundi	962,730		1,605,086	904,075				
Cambodia	221,260							
Cameroon	1,197,750		360,000	1,795,115			468,580	518,800
Congo DRC	6,626,250		3,216,515	10,584,025			232,852	
Côte d'Ivoire	1,279,320		3,999,527	6,164,600				
Ethiopia		5,769	50,000	1,156,000		7,300,000	612,643	
Ghana			4,500,000				373,865	1,800,000
Guinea		2,355,410			1,451,200		1,150,042	
Guyana			3,000					
Kenya	319,920		2	4,864,254			300,000	
Laos			30,000			150,000		
Liberia	397,770		352,000	1,050,000			5,500	
Madagascar	971,250	4,404		2,502,200		20,000	44,000	
Malawi	450,000		2,069,721	7,329,250			28,000	3,922,667
Mali	4,576,050	84,599	1,830,000	2,500,000	4,480		340,800	1,936,667
Mozambique	7,527,390			18,168,825				2,133,333
Myanmar	35,040		100,000			1,750,000		
Niger	3,513,450		100,000	4,831,200			948,374	1,360,000
Nigeria	11,902,620	3,851,009	10,254,650	21,413,450			101,789	
Rwanda			870,000					
Senegal	925,353		1,532,986	4,092,500			279,643	
Sierra Leone	2,000,010			900,000			520,000	
Tanzania	13,500	13,456	6,345,959				1,410,000	
Thailand				118,750		150,000	11,500	
Uganda	1,670,880		1,103,729	3,118,525			438,840	
Zambia	4,482,300		600,000	7,203,600			387,000	2,083,333
Zimbabwe	1,176,930		900,000				71,522	
Total	67,360,363	7,057,649	46,776,477	106,628,115	2,255,680	9,370,000	9,935,715	14,607,800

Notes: Table includes commodities procured for countries. Orders for the emergency stockpile and regional distribution center are excluded. The laboratory category includes a mix of reagents, consumables, and other products, which have varying units. Severe malaria medicines units may be either vials or suppositories depending on the product. The unit for all other commodities is the treatment quantity (including SP, where the treatment uses 3 tablets). Commodities "procured" includes all line items with a purchase order or distribution order released during the fiscal year.

Annex D. Malaria Commodities Delivered

Country	ACTs	Laboratory	LLINs	mRDTs	Other Non-Pharma	Other Pharma	Severe Malaria Meds	SMC	SP
Angola	2,467,025	743,000	734,050	9,396,000	800,000		534,921		1,136,000
Belgium	1,727,100							10,046,100	
Benin	1,999,980		1,157,103	2,000,000			309,000	580,000	515,000
Burkina Faso	3,935,470		520,000	7,500,000			1,200,000	4,386,050	
Burundi	1,261,890		1,585,868	904,075			105,550		
Cambodia	63,610								
Cameroon	1,197,750		300,000	1,525,425			1,231,280	8,595,600	400,000
Congo DRC	9,464,310		2,594,100	10,584,025			1,879,429		4,266,200
Côte d'Ivoire	1,189,320		172,304	7,164,600			55,800	123,000	
Ethiopia		1,169,520	2,990,605	156,000		7,300,000	755,473		
Ghana			800,000				292,615	4,018,550	
Guinea		6,100			120,000		1,869,892		
Kenya	319,920	2	2,561,000	5,000,000			1,113,500		
Laos			70,000			150,000			
Liberia	1,136,280		300,400	750,000		347,000	5,500		326,133
Madagascar	1,476,120	2,481		2,504,400		20,000	86,516		
Malawi			1,533,150	12,329,250					2,356,000
Mali	2,076,150	85,179	1,180,000	3,500,000	4,480		1,440,800	6,072,850	1,818,933
Mozambique	12,242,010			13,616,250			679,072		2,133,333
Myanmar	10,020			300,000		570,000			
Niger	2,520,480			1,471,500			1,301,626	6,200,050	
Nigeria	12,996,150	4,177,400	7,884,582	12,631,400	100		246,649	11,500,000	
Rwanda	420,000		1,571,700						
Senegal	1,294,101		400,000	3,792,500		119,800	279,926	6,551,050	
Sierra Leone	1,610,640			1,400,000			520,000		
Tanzania		13,456	6,188,682				1,620,000		
Thailand			80,300	18,750		90,000	7,000		
Uganda	2,071,380		3,999,516	3,118,525			438,840		
Zambia	4,482,300	1,095,620	600,000	3,920,000			926,924		2,083,333
Zimbabwe	198,810		1,200,000						
Total	66,160,816	7,292,758	38,423,360	103,582,700	924,580	8,596,800	16,900,313	58,073,250	15,034,933

Notes: Table includes commodities delivered to countries. Orders for the emergency stockpile and regional distribution center are excluded. The laboratory category includes a mix of reagents, consumables, and other products, which have varying units. Severe malaria medicines units may be either vials or suppositories depending on the product. The unit for all other commodities is the treatment quantity (including SP, where the treatment uses 3 tablets). Commodities "delivered" includes all line items fully delivered into a country's supply chain for distribution in the fiscal year. Line items partially delivered this year are excluded and will be reported in the year the deliveries are completed.

Annex E. GHSC-PSM Procurement Indicators

A10. Percentage of product procured using a framework contract (framework contract percentage)

Reporting Period Product Category	2023-Q1			2023-Q2			2023-Q3			2023-Q4		
	Procurement total	Framework contract percentage	Framework contract target	Procurement total	Framework contract percentage	Framework contract target	Procurement total	Framework contract percentage	Framework contract target	Procurement total	Framework contract percentage	Framework contract target
ACTs	\$11,301,145	100%		\$3,283,313	100%		\$10,722,167	100%		\$5,060,284	100%	
Laboratory	\$62,615	100%		\$605,109	96%		\$45,320	100%		\$70,455	100%	
LLINs	\$5,164,033	100%		\$35,389,758	100%		\$58,417,707	100%		\$5,297,441	100%	
mRDTs	\$11,210,251	100%		\$10,935,918	100%		\$4,131,627	100%		\$1,775,923	100%	
Other Non-Pharma	\$2,511	100%		\$106,825	100%		\$44,637	100%				
Other Pharma	\$133,400	100%		\$15,000	100%					\$70,790	100%	
Severe Malaria Meds	\$4,559,008	100%		\$2,955,602	100%		\$4,324,953	100%		\$1,196,171	100%	
SMC	\$4,950,815	100%					\$407,198	100%		\$3,472,167	100%	
SP	\$1,266,705	100%		\$730,903	100%		\$158,377	100%		\$1,078,021	100%	
Total	\$38,650,483	100%	95%	\$54,022,427	100%	95%	\$78,251,986	100%	95%	\$18,021,253	100%	95%

A1a. Percentage of line items delivered on time and in full, within the minimum delivery window (OTIF)

Reporting Period Product Category	2023-Q1		2023-Q2		2023-Q3		2023-Q4	
	OTIF	Total # of Line Items Delivered	OTIF	Total # of Line Items Delivered	OTIF	Total # of Line Items Delivered	OTIF	Total # of Line Items Delivered
ACTs	89%	45	95%	60	68%	50	94%	93
Laboratory	86%	65	84%	19	60%	10	68%	28
LLINs	85%	27	92%	25	92%	13	89%	46
mRDTs	91%	11	82%	17	80%	15	94%	18
Other Non-Pharma	100%	1	100%	2	100%	1	100%	2
Other Pharma	100%	1	50%	2	100%	1	100%	4
Other RTK							0%	1
Severe Malaria Meds	68%	34	89%	19	95%	20	81%	26
SMC	100%	3	100%	8	93%	14	100%	3
SP	100%	1	80%	5	90%	10	89%	9
Total	84%	188	90%	157	80%	134	88%	230

A1b. Percentage of line items delivered on time, within the minimum delivery window (OTD)

Reporting Period Product Category	2023-Q1		2023-Q2		2023-Q3		2023-Q4	
	OTD	Total # of Line Items with ADDs in the quarter	OTD	Total # of Line Items with ADDs in the quarter	OTD	Total # of Line Items with ADDs in the quarter	OTD	Total # of Line Items with ADDs in the quarter
ACTs	93%	44	96%	52	70%	60	97%	89
Laboratory	80%	70	84%	19	100%	6	70%	27
LLINs	83%	29	100%	22	92%	13	77%	52
mRDTs	100%	10	70%	20	100%	12	90%	20
Other Non-Pharma	100%	1	100%	2	100%	1	100%	2
Other Pharma	33%	3	100%	1	100%	1	80%	5
Other RTK							0%	1
Severe Malaria Meds	75%	32	90%	20	100%	19	91%	23
SMC	100%	3	90%	10	100%	12	100%	3
SP	67%	3	100%	4	82%	11	88%	8
Vehicles and Other Equipment	0%	3						
Total	82%	198	91%	150	84%	135	87%	230

Note: Blank or 0 values for a product category in the above OTIF and OTD tables indicate that there were no actual or agreed deliveries for that category in that period.

Annex F. Other GHSC-PSM Logistics Indicators

A3a and A3b. Cycle Time (Average) and Dwell-Adjusted Cycle Time (Average)

Reporting Period	Average Cycle Time	Cycle time target	Average dwell-adjusted cycle time	Dwell adjusted cycle time target
2023-Q1	372	340	327	300
2023-Q2	311	340	285	300
2023-Q3	359	340	323	300
2023-Q4	362	340	327	300

A4. Total inventory turns (annual)

Reporting Period	Inventory turns	Inventory Turns Target
2023-Q4	2.0	2.0

A5. Total landed cost - including QA costs

Task Order	TO2 - Malaria			
Reporting Period	Total Landed Cost (Freight and Logistics)	Total Landed Cost (Freight, Logistics, and HQ Operations)	TLC Target	
2023-Q2	25.3%	29.4%	20%	
2023-Q4	21.8%	26.5%	20%	

A6a. Absolute percent supply plan error

Product Category	Supply plan error	Supply plan bias	4-quarter error	4-quarter bias	4-quarter error target
ACTs					
2023-Q1	87%	87%	56%	56%	35%
2023-Q2	32%	32%	51%	51%	35%
2023-Q3	16%	-16%	36%	36%	35%
2023-Q4	221%	-221%	4%	4%	35%
mRDTs					
2023-Q1	93%	93%	40%	40%	25%
2023-Q2	31%	31%	24%	24%	25%
2023-Q3	2%	2%	29%	29%	25%
2023-Q4	276%	-276%	11%	11%	25%

A8. Average percentage of shelf life remaining for warehoused commodities, weighted by the value of each commodity's stock (product at risk)

Reporting Period	% Shelf Life Remaining	Shelf life target
2023-Q1	85%	70%
2023-Q2	78%	70%
2023-Q3	85%	70%
2023-Q4	77%	70%

A5. Total landed cost - excluding QA costs

Task Order	TO2 - Malaria			
Reporting Period	Total Landed Cost (Freight and Logistics)	Total Landed Cost (Freight, Logistics, and HQ Operations)	TLC Target	
2023-Q2	24.0%	27.5%	20%	
2023-Q4	21.0%	25.1%	20%	

Annex F. Other GHSC-PSM Logistics Indicators

A16. Percentage of backlogged line items

Reporting Period Product Category	2023-Q1		2023-Q2		2023-Q3		2023-Q4	
	Backlog	Total # of line items with ADDs in the last 12 months	Backlog	Total # of line items with ADDs in the last 12 months	Backlog	Total # of line items with ADDs in the last 12 months	Backlog	Total # of line items with ADDs in the last 12 months
ACTs	0.4%	282	0.8%	238	1.0%	200	5.0%	258
Laboratory	5.2%	173	4.0%	174	2.4%	124	0.0%	121
LLINs	4.4%	159	0.7%	136	1.0%	100	8.4%	119
mRDTs	1.6%	62	5.9%	68	0.0%	58	3.2%	62
Other Non-Pharma	0.0%	21	0.0%	21	0.0%	17	0.0%	6
Other Pharma	42.9%	7	0.0%	5	0.0%	6	9.1%	11
Other RTK							0.0%	1
Severe Malaria Meds	1.1%	92	13.9%	101	1.0%	99	1.0%	97
SMC	0.0%	39	5.4%	37	0.0%	32	0.0%	28
SP	2.9%	34	21.1%	38	7.1%	28	11.1%	27
Total	2.6%	869	4.6%	818	1.4%	664	4.1%	730

Annex F. Other GHSC-PSM Logistics Indicators

A2. Percentage of quality assurance (QA) processes completed within the total estimated QA lead times

Reporting Period	2023-Q1		2023-Q2		2023-Q3		2023-Q4	
Product Category	% QA Processes On Time	Total # of QA processes completed	% QA Processes On Time	Total # of QA processes completed	% QA Processes On Time	Total # of QA processes completed	% QA Processes On Time	Total # of QA processes completed
ACTs	100%	29	93%	28	95%	39	95%	20
LLINs	100%	9	100%	9	100%	32	100%	25
mRDTs	100%	8	100%	18	100%	11	100%	11
Other Pharma	100%	2		0	100%	1	100%	1
Severe Malaria Meds	100%	22	68%	19	100%	13	100%	8
SMC	100%	2	43%	7	100%	4		0
SP	100%	5	80%	5	50%	4	100%	2
Total	100%	77	85%	86	96%	104	99%	67

A13. Percentage of batches of product for which the final result is showing nonconformity (out-of-specification-percentage)

Reporting Period	2023-Q1		2023-Q2		2023-Q3		2023-Q4	
Product Category	% Out-of-spec	Total # of batches tested	% Out-of-spec	Total # of batches tested	% Out-of-spec	Total # of batches tested	% Out-of-spec	Total # of batches tested
ACTs	0.0%	42	0.0%	102	0.0%	72	0.0%	45
LLINs	0.0%	22	0.0%	39	0.0%	26	0.0%	31
mRDTs	0.0%	25	1.9%	52	0.0%	20	0.0%	36
Other Pharma		0	0.0%	1	0.0%	8		0
Severe Malaria Meds	0.0%	65	0.0%	61	0.0%	52	0.0%	35
SMC	0.0%	6	0.0%	47	0.0%	18		0
SP	0.0%	9	0.0%	5	0.0%	11	0.0%	3
Total	0.0%	169	0.3%	307	0.0%	207	0.0%	150

A15. Percentage of quality assurance investigation reports submitted within 30 calendar days of outcome determination (semiannual indicator)

Reporting Period	2023-Q2		2023-Q4	
Product Category	Report submissions	# of reports due	Report submissions	# of reports due
ACTs	100%	2	100%	2
LLINs		0		0
mRDTs		0	100%	1
Other Pharma	100%	1		0
Severe Malaria Meds		0		0
SMC		0		0
SP		0		0
Total	100%	3	100%	3

Annex F. Other GHSC-PSM Logistics Indicators

A7. Percentage of Delivered Line Items that required Temporary Waiver Registration

Reporting Period Product Category	2023-Q1		2023-Q2		2023-Q3		2023-Q4	
	% using temp waiver	Total # of line items delivered	% using temp waiver	Total # of line items delivered	% using temp waiver	Total # of line items delivered	% using temp waiver	Total # of line items delivered
ACTs	2.2%	45	6.3%	63	4.0%	50	4.3%	93
Laboratory	0.0%	65	0.0%	19	0.0%	10	3.6%	28
LLINs	7.4%	27	0.0%	25	0.0%	13	4.3%	46
mRDTs	36.4%	11	31.3%	16	26.7%	15	5.6%	18
Other Non-Pharma	0.0%	1	0.0%	2	0.0%	1	0.0%	2
Other Pharma	100.0%	1	50.0%	2	0.0%	1	75.0%	4
Severe Malaria Meds	23.5%	34	11.1%	18	15.0%	20	19.2%	26
SMC	0.0%	3	25.0%	8	42.9%	14	66.7%	3
SP	100.0%	1	60.0%	5	0.0%	10	55.6%	9
Total	9.0%	188	10.8%	158	11.2%	134	10.0%	229

Annex G. Commodity Losses

C7a. Product loss due to expiry while in GHSC-PSM control

Reporting Period	Task Order	Country	Type of Loss	Product Group	Loss Value	Loss Denominator	% Loss
2023-Q3	TO2 - Malaria	RDC	Expiry	SMC	\$403	\$93,397	0.43%

C7b. Product loss due to theft, damage and other causes while in GHSC-PSM control

Reporting Period	Task Order	Country	Type of Loss	Product Group	Loss Value	Loss Denominator	% Loss
2023-Q1	TO2 - Malaria	Angola	Damage	Laboratory	\$3,514	\$106,833	3.29%
2023-Q2	TO2 - Malaria	Mali	Missing product	LLIN	\$3,278	\$3,397,011	0.10%
2023-Q2	TO2 - Malaria	DRC	Missing product	LLIN	\$7,626	\$2,490,334	0.31%
2023-Q2	TO2 - Malaria	DRC	Damage	LLIN	\$14,865	\$2,490,334	0.60%
2023-Q3	TO2 - Malaria	Liberia	Damage	LLINs	\$1,043	\$670,172	0.16%
2023-Q3	TO2 - Malaria	Nigeria	Damage	RDTs	\$22,399	\$2,569,911	0.87%