

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

# **GHSC-PSM TASK ORDER 2 (MALARIA) SEMIANNUAL REPORT FISCAL YEAR 2022 Q1-Q2**

October 1, 2021–March 31, 2022



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](http://ghsupplychain.org)

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# Acronyms

3PL	third-party logistics
ACT	artemisinin-based combination therapy
ALu	artemether-lumefantrine
AMF	Against Malaria Foundation
API	active pharmaceutical ingredient
ARTMIS	Automated Requisition Tracking Management Information System
ASAQ	artesunate + amodiaquine
CHAI	Clinton Health Access Initiative
DEAS	Draft East African Standards
DRC	Democratic Republic of the Congo
DM	Defeat Malaria
eLMIS	electronic logistics management information system
EMMR	Environmental Mitigation and Monitoring Report
ESC	emergency supply chain
EUV	end-use verification
FTO	Francophone Task Order
FY	fiscal year
GAD	goods available date
GDSN	Global Data Synchronization Network

GHSC-PSM	USAID Global Health Supply Chain Program-Procurement and Supply Management project
IFU	instructions for use
IP	implementing partner
i2i	Innovation to Impact
ITN	insecticide-treated net
KSM	key starting material
LLIN	long-lasting insecticide-treated net
LQAG	LLIN Quality Assurance Group
LTA	long-term agreement
M-DIVE	Malaria Data Integration for Visualization and Eradication
M&E	monitoring and evaluation
MIS	management information system
MOH	Ministry of Health
MOP	Malaria Operational Plan
MOU	memorandum of understanding
mRDT	malaria rapid diagnostic test
MMV	Medicines for Malaria Venture
NMCP	National Malaria Control Program
NSCA	National Supply Chain Assessment
NPC	National Product Catalog

OTD	on time delivery
OTIF	on time in full
PFW	prefabricated warehouse
PMI	U.S. President's Malaria Initiative
PNLP	National Malaria Control Program (French)
PPM	Pharmacie Populaire de Mali
PPMRm	Procurement Planning and Monitoring Report for malaria
PO	purchase order
PQ	prequalification
Q	quarter
QA	quality assurance
QAT	Quantification Analytics Tool
QC	quality control
QMS	Quality Management System
QPL	QAT Problem List
RDC	regional distribution center
RDT	rapid diagnostic test
RFDA	Rwanda Food and Drugs Authority
RFP	request for proposal
RMS	Rwanda Medical Supplies

RO	requisition order
SDP	service delivery point
SIGLUS	Sistema de Informação e Gestão de Logística das Unidades Sanitárias
SMC	seasonal malaria chemoprevention
SP	sulfadoxine-pyrimethamine
SPAQ	SP + amodiaquine
TA	technical assistance
TO2	Task Order 2
TOM	Task Order Malaria
TOR	Terms of Reference
TWG	technical working group
UNICEF	United Nations Children's Fund
WHO	World Health Organization
ZAMMSA	Zambia Medicines and Medical Supplies Agency

# Executive Summary

The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project is pleased to present this semiannual report. It summarizes the project's work and performance for the malaria task order, Task Order 2 (TO2), for the first quarter (Q1) and second quarter (Q2) of fiscal year 2022 (FY 2022). This work contributes to the U.S. President's Malaria Initiative's (PMI) goals to reduce malaria deaths and substantially decrease malaria morbidity toward the long-term goal of elimination. (See text box.)

GHSC-PSM supports USAID and PMI programs through the procurement, management, and delivery of high-quality, safe, and effective malaria commodities. The project partners with national malaria control programs to improve strategic planning, logistics, data analytics, and capacity building while providing leadership for global supply, demand, financing, and product development. In Q1, PMI released its new five-year strategy, End Malaria Faster. GHSC-PSM is aligning its malaria priorities with the new malaria strategy.

GHSC-PSM made substantial progress in meeting programmatic goals in the first half of FY 2022 despite global challenges, as described in subsections A through D.

## **A. Improved Availability of Health Commodities**

In the first half of FY 2022, GHSC-PSM procured malaria commodities valued at more than \$126 million for 28 countries, including lifesaving medicines for malaria prevention and treatment, malaria rapid diagnostic tests (mRDTs), long-lasting insecticide-treated nets (LLINs), and laboratory supplies.

The project uses a variety of sourcing and procurement strategies such as proactive procurements, strategic sourcing, negotiations with vendors and suppliers, and mitigates risks to ensure the availability of malaria commodities. In the first half of FY 2022, GHSC-PSM expanded its forecasting efforts with awarded suppliers to offer rolling quarterly supplier-specific forecasts for greater supply chain visibility. The project improved its processes and tools, inventory tracking, reduced expiry risk, informed sourcing decisions, and established an approach to minimize the cycle time for strategic sourcing of ALu. GHSC-PSM executed a strategic tender for a key starting material (KSM) for SP to address supply shortages and establish sustainable pricing for the remaining FY 2022 demand. The tender also added two potential SP sources, increasing the geographical diversity of SP supply. GHSC-PSM in preparation for FY 2023 procurements for the artemisinin KSM is finalizing a strategic sourcing tender to address a volatile market for this product. The percent of the project's FY 2022 procurement value using long-term agreements (LTAs) ranged from 96 to 100 percent, exceeding the 90 percent target for major product categories. For additional details, see section A I.

GHSC-PSM remained agile to a wide range of logistical challenges in the first half of FY 2022 and delivered malaria commodities to 29 countries. The COVID-19 Omicron variant led to new lockdowns in China and India, restricted shipping capacity and the flow of shipments from air and ocean ports and created unpredictable rate fluctuations. Knock-on effects of scarce shipping containers and flight crew quarantines impacted trucking and air freight. The Russian invasion of Ukraine led to sanctions that caused airlines to shift routes and dramatically increased fuel surcharges. Reduced capacity to already underserved locations is a significant concern, which could worsen as fewer freighter aircraft serve these routes. Space on ocean vessels and equipment remained tight due to frequent sailing cancellations and last-minute omission of ports from the schedule. Vessel delays reduced scheduling reliability to 35



percent, with an average delay in transit of seven days. Logistics costs rose due to supply chain unpredictability and compounded volatility in the freight market. GHSC-PSM refreshed 3PL rates to align with market-related rates and reduce the number of spot bids. The project anticipates that the refreshed rates and fewer spot bids will likely shorten booking times and improve origin performance. For additional details, see section A2.

The first half of FY 2022 saw no reported product recalls. GHSC-PSM onboarded new laboratories, expanding testing capacity for pharmaceuticals and LLINs. The project added two ALu hard products, completed method transfer for a new artesunate injectable, and completed suitability for sterility testing of two artesunate injectable products. GHSC-PSM issued 237 certificates of conformance. For pharmaceuticals regulated by a stringent regulatory authority, GHSC-PSM reviewed manufacturers' certificate of analysis and issued certificates of conformity for seven batches of two ALu products. The project reviewed test reports for other pharmaceuticals from qualified independent laboratories for more than 397 batches, most of which were QC tested concurrently with shipments. The project managed pre-shipment inspections and tested 66 orders, representing 20,661,052 million LLINs from nine vendors and 34 orders representing 2,492,832 million mRDTs from four vendors. GHSC-PSM met or exceeded the in-target QA lead time key performance indicator. No batches of products showed nonconformity, and the project finalized 100 percent OOS reports within 30 days of completing the investigation. For additional details, see section A3.

During the first half of FY 2022, GHSC-PSM completed changes to the end-use verification (EUV) survey, including 15 changes to the survey questions and 18 changes to indicators. The project updated the EUV toolkit and the reporting template as well as trained country teams on survey implementation, including Ghana and Zambia, which began implementing the updated survey in Q2. Seven PMI-supported countries conducted EUVs with technical support from headquarters, and five GHSC-PSM countries reported the COVID-19 continuity of care module.

GHSC-PSM manages data from 29 countries using the Procurement Planning and Monitoring Report for Malaria (PPMRm). During the first half of FY 2022, GHSC-PSM tested a new PPMRm platform in all 29 countries. For additional details, see section A4.

### ***On-time and In Full Delivery***

Timeliness of GHSC-PSM deliveries remained high for standard OTD and OTIF in Q1, with 89 percent OTD (81 percent for COVID-impacted) and 89 percent OTIF (82 percent for COVID-impacted). (See Exhibit 7.) The rates in Q2 were 81 percent OTD (68 percent for COVID-impacted) and 81 percent OTIF (71 percent for COVID-impacted).

### ***Commodity Cost Savings***

GHSC-PSM achieved \$191 million in cost savings for major malaria commodities over the life of the project (see text box). In the first half of FY 2022, GHSC-PSM achieved \$43 million in cost savings alone, representing 35 percent of the total spent on procurement. Much of these savings resulted from strategic sourcing initiatives focused on diversifying the supplier base for key commodities and locking in fixed and tiered pricing.

## **B. Strengthened In-Country Supply Chain Systems**

GHSC-PSM strengthens national supply chains and improves malaria commodity availability in 22 countries. The project's health systems strengthening activities range from training and technical

assistance to host governments to seconding staff to the government to support supply chain functions. In the first half of FY 2022, GHSC-PSM developed a Microsoft Excel™-based budget template for investment planning as a stage 4 activity as part of the project's stockout reduction initiative.

The project is rolling out the Quantification Analytics Tool (QAT). In the first half of FY 2022, GHSC-PSM provided technical assistance for more than 20 countries in forecasting and supply planning and received malaria supply plans from 27 PMI-supported countries—100 percent of the project's target for the reporting period. 16 countries submitted their malaria supply plans through the GHSC-PSM quantification analytics tool (QAT). The project trained staff in five additional PMI countries, and six country teams trained MOHs and other partners on using QAT. GHSC-PSM initiated the development of the second QAT module for forecasting. For additional details, see section B1.

The project delivered over 23 million LLINs to protect nearly 67 million people in 17 countries. The project supported nine countries' preparation activities for LLIN mass distribution campaigns. For additional details, see section B2.

In the first half of FY 2022, 16 PMI-supported countries received training from GHSC-PSM. The project trained 1,826 people, either exclusively funded by the malaria task order or co-funded by the malaria task order and other health areas. The project also repurposed a previously developed 40-hour virtual Introduction to Supply Chain Management course for USAID Foreign Service Officers using a low-cost learning management system as a hybrid learning course. For additional details, see section B3.

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

In the first half of FY 2022, GHSC-PSM's global collaboration activities included a presentation on behalf of the LLINs Quality Assurance Group (LQAG) at Quality in LLINs for Procurers at the Raising the Floor Nets: ITN Quality Convening virtual meeting on LLIN quality. GHSC-PSM collaborated with the Global Fund on quality-related issues, approaches, and best practices, sharing information that aided a Global Fund investigation. The project works with global procurers to assess the impact of the rising cost of artemisinin-based products and identify incentives to use semisynthetic artemisinin.

### **D. Performance Monitoring**

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

# A. Improved Availability of Health Commodities

GHSC-PSM improves the availability of health commodities through procurement and delivery to supported countries. The project accomplishes this through enhanced commodity procurement, strengthened global logistics processes, adherence to quality assurance (QA) requirements, and improved data visibility. Activities and achievements in these areas and relevant performance indicators are summarized below.

## A.1 Enhancing Global Health Commodity Procurement

Under the PMI-funded malaria task order (TO2), GHSC-PSM supplies lifesaving prevention and treatment medicines, mRDTs, long-lasting insecticide-treated nets (LLINs), and lab supplies.

### GHSC-PSM Approach to Improving Malaria Commodity Markets

On behalf of PMI, GHSC-PSM contributes to shaping global malaria commodity markets to enhance supply security, accelerate innovation, and drive value for money. This supports near- and long-term PMI access to appropriate, quality-assured products at sustainable price points.

GHSC-PSM applies a three-pronged 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** in collaboration with global partners to inform sourcing strategies.
3. **Conduct strategic sourcing and procurement activities** to implement interventions and realize the benefits of improved timeliness for delivered goods, reduced costs incurred by recipient countries, and sustained market health.

GHSC-PSM advances strategies to achieve the best value, increase supply chain efficiencies for on time delivery (OTD), and support market health across the malaria product portfolios. The project increased the percentage of procurement value using long-term agreements (LTAs), which streamline procurement processes by leveraging agreed-upon terms and conditions. With LTAs, the project uses allocation strategies to reduce procurement time on an order-by-order basis and standardize procurement-related decision-making. The project expects that increased use of LTAs will shorten lead times from order placement to delivery and reduce complexity and effort throughout the supply chain, and result in cost savings. The percent of procurement value managed under LTAs in FY 2022 remained high, ranging from 96 to 100 percent, exceeding the 90 percent target for major product categories. (See Annex E, indicator A10).

### Proactive Procurement Strategies

GHSC-PSM uses proactive procurement strategies to ensure a supply for critical malaria commodities, such as artesunate injectables and SPAQ when countries need them. Proactive procurement strategies are used more frequently since the COVID-19 pandemic to minimize the risk of delays to the supply chain, reduce fulfillment lead times, and hedge against market uncertainty and disruptions. They also mitigate future stock risks, ensure timely delivery in constrained markets, and avail favorable market

conditions that may not continue (e.g., favorable pricing). The project executed several strategies to leverage a rotating emergency loan fund to secure large volumes of supplier production capacity in markets where supply was particularly constrained and commodities could not be delivered in time to meet countries' requested delivery dates (RDDs).

The project places proactive procurement orders based on data-driven demand signals, such as projected stock risk or peaks in demand that correspond to seasonal market constraints. This way, GHSC-PSM secures production capacity earlier in the ordering process—often before receiving orders. For instance, the project procures the vast majority of SPAQ using a proactive procurement strategy. Procurement typically occurs approximately a year in advance of RDDs for seasonal malaria chemoprevention (SMC) campaigns. GHSC-PSM forecasts demand by aggregating the planned quantities from malaria operational plans (MOPs) months in advance of receiving requisition orders. This is particularly helpful due to SPAQ having only two sources and the increased global demand for SMC campaigns in advance of the malaria season where SMC is implemented.

Despite experiencing minor goods availability date (GAD) delays in Q1, most malaria pharma markets' supply returned to a pre-COVID-19 state, with the exception of SP. The project determined that routine fulfillment without proactive procurement was the best method to procure SP during the remainder of FY 2022. See strategic sourcing activities below for more details.

The project planned implementation of vendor-stored inventory (VSI) for ALu during the first half of FY 2022. However, GHSC-PSM anticipates VSI will come online in Q3, with the first orders expected by the end of that quarter. This strategy entails proactive procurement of ALu based on forecasts and contracting the vendor to store produced goods on-site until there are firm purchase orders against the manufactured stock.

The project did not consider other proactive procurements due to lead times for manufacturing stabilizing to pre-COVID averages, thus reducing our risk of not meeting RDDs from countries.

## Supplier Engagement and Vendor Negotiations

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

- **Supplier-specific forecasts.** GHSC-PSM generates and shares supplier-specific aggregate forecasts based on a demand allocation approach for select commodity categories to improve planning and manage stakeholder expectations, including suppliers and suppliers' suppliers.
- **Re-solicitation.** The project periodically re-solicits pricing, product, and registration information, keeping vendors abreast of project objectives for the product category and allowing suppliers to generate offers that reflect market conditions and support market health.
- **Commodity risk assessments.** GHSC-PSM evaluates programmatic impact to update commodity risk profiles monthly, examining the geographical sourcing of commodities, market updates, and supplier-specific ability to meet GADs based on information about the sourcing of KSMs, raw materials, and packaging materials to mitigate and minimize near- and long-term supply disruptions.
- **Business reviews.** GHSC-PSM business review meetings with suppliers include performance reviews based on scorecards that emphasize five components: 1) purchase order 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. Performance metrics promote supplier performance improvements while informing order allocation decision-making. These efforts positively impacted the project's overall supply chain performance.

## **Strategic Sourcing Activities**

In the first half of FY 2022, GHSC-PSM sourcing efforts focused on the following strategic priorities:

- **Enhancement of inventory strategies involving key pharmaceuticals.** GHSC-PSM is sourcing and storing ALu to fulfill urgent needs and mitigate the effects of unavoidable supply constraints. In Q1, the project improved processes and tools to increase the accuracy and timeliness of inventory tracking, with the aim of ensuring the availability of goods and reducing the risk of product expiry. The changes include establishing a consistent process that minimizes the impact on overall cycle time while achieving the inventory strategies' objectives and responding to urgent needs while minimizing risk.
- **Execution of a strategic tender for the provision of SP.** The project determined that routine fulfillment without proactive procurement was the best method to procure SP during the remainder of FY 2022. In the first half of FY 2022, the project finalized an evaluation and target volume allocations to meet the remaining FY 2022 demand. The tender expanded the eligible supply base for SP to include two potential additional sources, with the added benefit of the opportunity for greater geographical diversity of supply.
- **Development of sourcing strategy for artemisinin-based pharmaceuticals.** In preparation for FY 2023 procurements, the project is finalizing a strategic sourcing approach for malaria treatments using artemisinin. The FY 2022 market for this KSM has been volatile due to logistics constraints, increased demand, potential supply shortages, and inflation. The project expects to issue a tender for this group of products in Q3 of FY 2022.

## **Supply Risk Mitigation**

### ***Upstream supply chain analysis***

The COVID-19 pandemic exacerbated previously latent risks, such as reliance on limited sources of key ingredients, which contributed to supply shortages, delays, and other supply chain disruptions. In particular, government-imposed lockdowns limited suppliers' ability to produce goods in the quantities required to meet global demand.

### ***Forecasting***

GHSC-PSM improved its forecasting processes to increase supply chain visibility and supplier preparedness, key tools in preventing delays. By refining processes, GHSC-PSM expects to increase forecast accuracy and frequency at the individual supplier level, informing supplier production planning and component material procurement decisions. In the first half of FY 2022, the project expanded its efforts to provide suppliers that receive target volume allocations with quarterly forecasts of production needs, in addition to annual forecasts, to inform supplier planning. By increasing supplier preparedness

for forthcoming demand, GHSC-PSM can increase the use of the optimal supplier to fulfill orders from recipient countries.

### ***Promoting Market Health***

Promoting and sustaining market health is a GHSC-PSM objective across product categories. The project combated market health challenges in LLINs, mRDTs, and SMC products due to factors, such as insecticide resistance, HRP2 gene deletion, and limited global capacity. The project's pursuit of increased market health in FY 2022 includes ongoing messaging to suppliers on strategic priorities, incentivizing product development through tenders, and outreach to potential suppliers to expand the supply base.

### ***Freight Efficiency***

In recent years, GHSC-PSM reduced costs incurred to recipient countries by emphasizing unit cost and freight costs with suppliers. In FY 2021, global freight costs rose, mainly due to freight and container shortages from the pandemic. These shortages demonstrated the need to minimize costs and the freight needed (e.g., number of containers) to deliver goods by the requested delivery date. Since FY 2020, GHSC-PSM has included expected freight costs in best-value evaluations of eligible suppliers and emphasized the benefits of freight efficiency through improved packaging. The project achieved substantial space-saving gains in areas such as units per pallet and units per container by collaborating with suppliers and using the following approaches:

- Including freight costs in evaluating best value.
- Using benchmarking to inform suppliers of where they stand relative to competitors to incentivize change where warranted.
- Sharing best practices such as pallet sizes and stacking heights, optimizing the size of shipping cartons, and highlighting opportunities suppliers can consider for potential improvement.

### **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 with a broad group of stakeholders within and external to the supply chain and the project. In the first half of FY 2022, GHSC-PSM collaborated with stakeholders, such as USAID Missions, suppliers, logistics providers, and customs agents, to support 29 countries<sup>1</sup> to procure more than \$126M in commodities (see Exhibit I below). Project headquarters staff provided procurement support to six countries where GHSC-PSM has no field presence: Benin, Côte d'Ivoire, the Democratic Republic of the Congo (DRC), Madagascar, Senegal, and Tanzania.

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<sup>1</sup> Angola, Benin, Burkina Faso, Burma, Burundi, Cambodia, Cameroon, Côte d'Ivoire, DRC, Ethiopia, Ghana, Guinea, Kenya, Thailand, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, Zambia, Zimbabwe.

**Exhibit I.** Countries for which GHSC-PSM procured malaria products in Q1-Q2 FY 2022

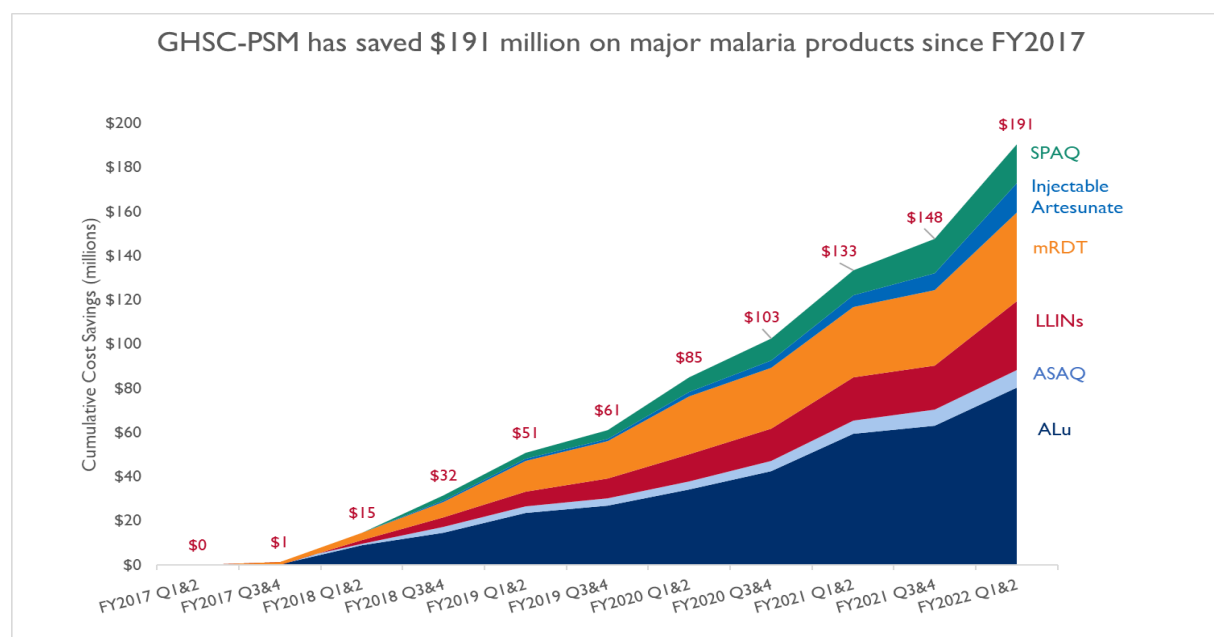


**Cost Savings on Malaria Commodities**

In the first half of FY 2022, GHSC-PSM achieved \$43 million in cost savings on malaria commodities compared to baseline prices, representing 35 percent of the total procurement value in the same in period. The project achieved \$191 million in cost savings for major malaria commodities over the life of the project. (See Exhibit 2.) The most significant contributor to this result was ACTs, where weighted average prices for dispersible ALu were at their lowest since procurements began. High-volume procurements at these low prices yielded considerable savings during this period. Despite these savings gains, the project expects savings to slow in the future. Costs for artemisinin, a key ingredient in ACTs, have risen, and suppliers are signaling price increases in the coming periods. Across the rest of the malaria portfolio, the project saw substantial savings on LLINs and injectable artesunate. Additional suppliers are eligible for procurement in the LLIN market. Increased competition of this kind often results in lower prices. As with ACTs, however, prices for LLINs are expected to rise, as the market for oil, an essential input for polyester and polyethylene, was severely impacted by global factors, most notably the war in Ukraine. A new entrant in the artesunate market has encouraged competition and price improvements over the last two years. SMC commodities and mRDTs also yielded steady savings.



**Exhibit 2.** Cumulative cost savings of \$191 million on major malaria products since 2017



**Commodity Procurement Indicators**

GHSC-PSM procured malaria commodities worth over \$126 million in the first half of FY 2022, including RDC stockpile orders and direct drops to countries, (Exhibit 3) as shown in Exhibit 9.

**Exhibit 3.** GHSC-PSM procurement totals for Q1 and Q2 of FY 2022

Product category	Value
ACTs	\$21,386,975
Laboratory	\$686,578
LLINs	\$74,839,905
Other non-pharmaceutical products	\$63,200
Other pharmaceuticals	\$9,500
mRDTs	\$15,382,193
Severe malaria medicines	\$9,401,016
SMC	\$3,229,433
SP	\$1,973,012
<b>TOTAL</b>	<b>\$126,971,811</b>



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

GHSC-PSM uses several indicators to measure its performance. Procurement results are summarized below, with details provided in Annex E. In the first half of FY 2022, GHSC-PSM procured 100 percent of all core product categories in Exhibit 3 through framework contracts, apart from LLINs and laboratory products. Procurements through framework contracts represented 96 percent of LLIN procurements and 98 percent of lab procurements. When aggregated across all product categories, the overall framework contracting percentage by commodity value for the first half of FY 2022 was 98 percent, exceeding the annual target of 90 percent.

## A.2 Strengthening Global Logistics Processes

In the first half of FY 2022, GHSC-PSM delivered malaria commodities to 29 countries. The project uses strategies initiated within the COVID-19 environment as new challenges impact the supply chain. The project was agile when faced with wide ranging logistics challenges, from shipment booking, with origins and destinations affected by reduced passenger flights, container shortages, erratic vessel scheduling, truck driver shortages, transshipment and border crossing delays, local government restrictions, and minimal port office staff, slowed processing and clearance of products for delivery. COVID-19 impacted personnel, affecting project service providers. GHSC-PSM collaborated with third-party logistics (3PL) providers and USAID Missions to mitigate these issues and meet demand across countries.

### Impacts of COVID-19 on Freight and Logistics

Throughout the first half of FY 2022, deliveries faced a constrained shipping environment impacted by COVID-19 shutdowns and other geopolitical factors. GHSC-PSM leveraged experience from 3PLs and industry teams to apply tried and tested solutions for continuous, reliable supply. (See the Cost Savings on Logistics section below for further details.) While COVID-19 impacts were felt at origins and in transit, there were fewer COVID-19-specific restrictions or impacts in the receiving countries.

- **Freight costs.** Volatility in the freight market continued. To obtain better pricing aligned to the market, GHSC-PSM ran a rate refresh against the RFP lanes from Q1. Please see additional detail in the Deliver/Return section below.
- **Origin challenges.** Export/Import activities remained constrained. Government COVID-19-related directives, limited passenger flights and impacted air freight capacity. Chinese New Year affected booking turnaround and carriers were short-staffed and canceled flights. China's Zero COVID-19 policies restricted logistics activities from door to port, and the severe container imbalance—more exports than imports or vice versa—made it harder to book ocean equipment. Truckers in China could not cross COVID-19 restricted areas, making it challenging to get containers in and out of ports. Trucking options were also very limited in Europe in the first half of FY 2022 because many truckers went home during the lockdowns and did not return. Europe is short of nearly 500,000 drivers from pre-COVID-19 numbers, while demand remains very high.

**Air freight.** During Q2, the Russia/Ukraine conflict affected the air freight market. This led to high demand and decreased capacity. Governments sanctioned large cargo carriers such as Volga Dnepr and AirBridge, as well as Russian passenger aircraft, adding to capacity challenges. Passenger demand increased but remains lower than pre-COVID levels. The higher-than-normal reliance on freighter

service continues, which mainly serves large commercial markets and leaves traditionally underserved markets with less air freight capacity.

- **Ocean freight.** Through the first half of FY 2022, COVID-19 affected the ocean freight market, including a shutdown of the port Ningbo Port in China (the third-busiest global container port). The project felt knock-on impacts on vessel scheduling and container availability. The market faced critical network congestion due to a convergence of factors, including the limited capacity of warehousing, global ports, and terminals that increased the number of days the containers were occupied. This reduced the number of containers, chassis, and railcars to move goods to and from ports. Ocean carriers implemented surcharges related to container and chassis availability, and shippers abandoned containers at ports when there was nowhere to deliver their goods.

As capacity needs increasing and the disparity between supply and demand grew, ocean freight prices climbed. Ongoing struggles with disrupted schedules and port congestion kept ocean rates eight to nine times the pre-pandemic norm.

- **Intra-Africa.** In Q1 2021, the Omicron COVID-19 variant affected air freight into Africa. The knee-jerk reaction from the airline industry saw several carriers downgrade, suspend, or cancel flights in and out of southern Africa (Botswana, Eswatini, Lesotho, Mozambique, Namibia, South Africa, and Zimbabwe). This response was short-lived, and normalcy resumed in Q2. Inter-country trucking faced delays from seasonal weather events, especially in Southern Africa, with Madagascar, Malawi, Mozambique, and South Africa experiencing cyclones, tropical storms, and flooding. Early in FY 2022, COVID-19 testing policies impaired truck shipments, which saw short delays between Kenya and Uganda of up to a few days. Aside from the Kenya and Uganda delays, the trucking situation is improving within Africa. However, residual coup d'état issues in Mali have delayed the import of ocean freight, by truck, into the country.
- **Temperature control.** GHSC-PSM and 3PLs weigh the risks consignment-by-consignment, regardless of mode, to identify the most appropriate temperature-controlled supply chain solutions and to maintain cargo integrity. Examples include sourcing the best routing from the available carriers to arrive with sufficient time for clearance and delivery and avoiding routings that would have cargo arrive on weekends.

## **Deliver/Return**

GHSC-PSM engages with 3PLs to obtain market updates through reports, webinars, and weekly calls and to keep abreast of global impacts and trends. In Q1, 3PLs participated in spot bidding while negotiations for signing an MLSA were underway. In Q2, GHSC-PSM undertook a rate refresh among the awarded 3PLs to obtain updated market-related rates. Four 3PLs serviced all lanes to ensure viable sourcing solutions where shipping constraints exist. GHSC-PSM plans to conduct a rate refresh every six months. Under the current rate refresh, if the market is upset, the 3PLs can reject a shipment award or accept it contingent on the use of revised rates. For rejected awards, GHSC-PSM will consider booking with a secondary or tertiary 3PL or open the lane to spot bidding. This rate refresh secured competitive rates in a less volatile but more expensive market. For example, China's Zero COVID-19 policy led to extended lockdowns affecting trucking to port and port activities. This resulted in higher costs and a continued impact on container shortages and vessel scheduling. However, spot bidding meant that the 3PLs could secure hard-to-obtain equipment by looking outside of ocean freight contracts and

negotiating with carriers at the market level. But, spot bids increase the shipment lead time due to the added process of quoting, awarding, and booking activities as the rates are sourced and evaluated and then applied to subsequent operations. To make sure that GHSC-PSM provides the best value, the project will continue to spot bid large shipments to obtain competitive pricing since 3PLs can typically use the larger shipments to increase their buying power and drive down costs. With the recently refreshed rates on file, GHSC-PSM anticipates that the overall number of spot bids will decrease significantly in Q3 and Q4. Reducing the number of spot bids has the potential to shorten booking times and improve origin performance.

**On-time Delivery and On-time in full Delivery**

GHSC-PSM achieved an on-time delivery (OTD) rate of 84 percent in the first half of FY 2022. Quarterly and annual project performance exceeds the target of 80 percent.<sup>2</sup> (See Exhibit 4.)

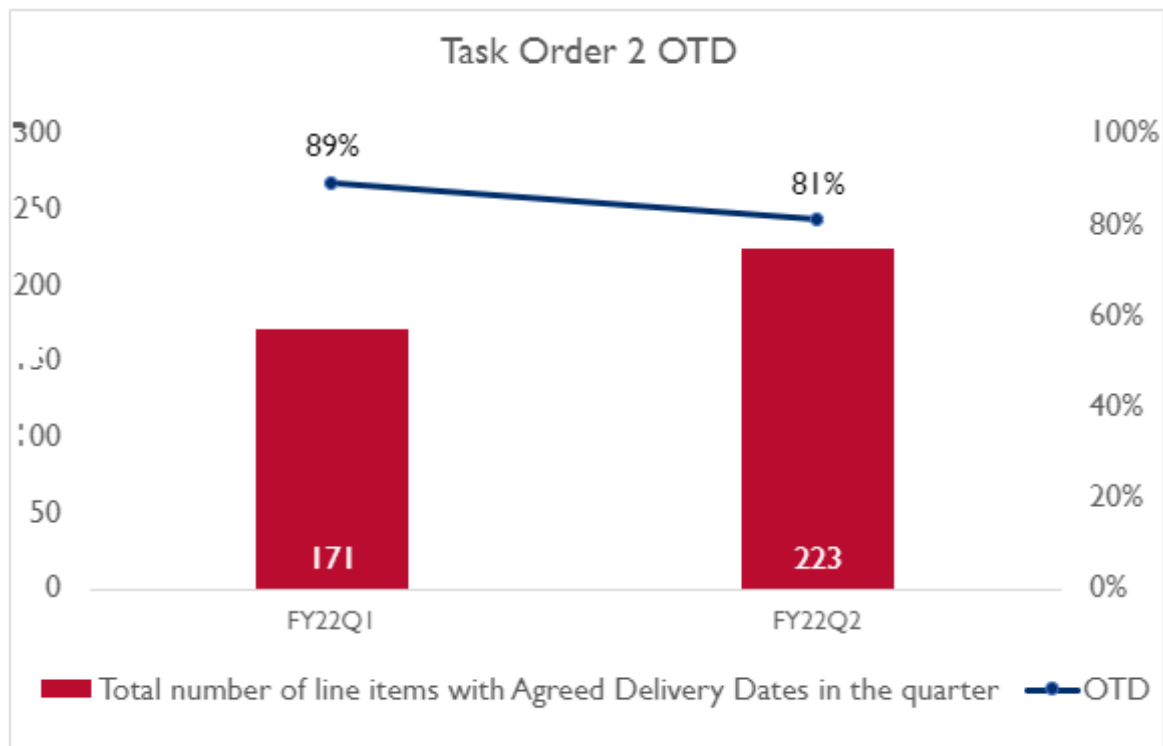
**Exhibit 4.** Comparison of OTD and COVID-impacted OTD rates for FY 2022

Time Period (FY 2022)	OTD	COVID-impacted OTD
Quarter 1	89%	81%
Quarter 2	81%	68%

The OTD rate measures the number of line items per quarter that have agreed-to delivery dates and were delivered on time out of the total number of line items per quarter with agreed-to delivery dates (Exhibit 5).

<sup>2</sup> During COVID-19, GHSC-PSM will present two versions of its usual OTD indicator. The first will be the “standard” version, calculated according to the indicator definition as laid out in the project’s monitoring and evaluation plan and in accordance with all associated policies/standard operating procedures (SOPs). These policies and SOPs allow for USAID-approved adjustments to agreed delivery dates in the case of interruptions that are beyond the project’s manageable control, including pandemic impacts. The “standard” version of OTD will therefore show the project’s performance, controlling for impacts of COVID-19 and other external disruptions. The second calculation of OTD is the “COVID-19-impacted” version. This version follows the same rules and definitions as the standard indicator, but the “control” for COVID-19 impacts will not be used. All COVID-19-impacted line items will be assessed as on time or not, according to the agreed-to delivery date at the time the order was approved. This version of the indicator will show the full impact of supplier and logistics delays because of manufacturing shutdowns, port and border closures, and other COVID-19 control measures. The delays cannot be attributed to GHSC-PSM, but the project is committed to sharing these outcomes in the interest of full transparency and acknowledgement of the challenging and unprecedented circumstances presented by COVID-19.

Exhibit 5. OTD and volume of deliveries of malaria commodities, Q1 FY 2022– Q2 FY 2022



OTD and OTIF for specific malaria product categories are provided in Annex E.

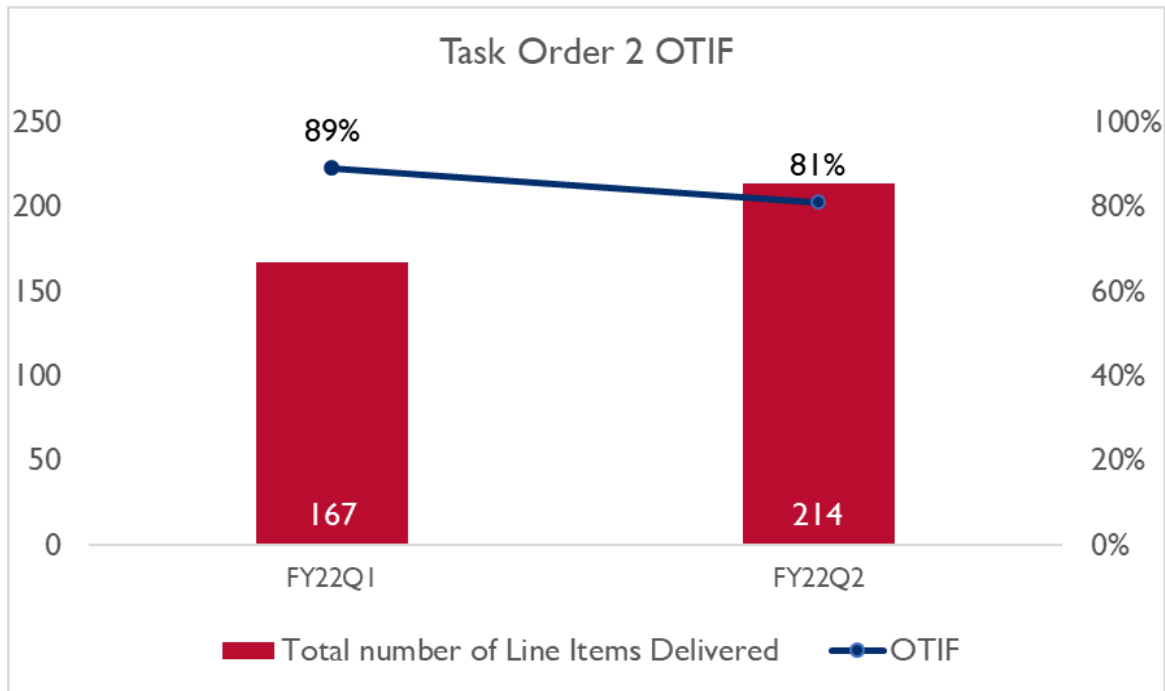
GHSC-PSM’s OTIF rate measures the percentage of deliveries during a given period delivered on time and in full. Delivery of late orders in a subsequent month to the agreed-upon delivery date drives down the OTIF rate, as can split-shipment deliveries, which helps explain the difference between OTD and OTIF rates. For OTIF, project performance continued to exceed the target of 80 percent, reaching 85 for the first half of FY 2022. (See Exhibit 6.)

**Exhibit 6.** Comparison of OTIF and COVID-impacted OTIF rates for FY 2022

Time Period (FY 2021)	OTIF	COVID-impacted OTIF
Q1	89%	82%
Q2	81%	71%

In the first half of FY 2022, GHSC-PSM’s OTIF rate for malaria commodities maintained strong performance. (See Exhibit 7.)

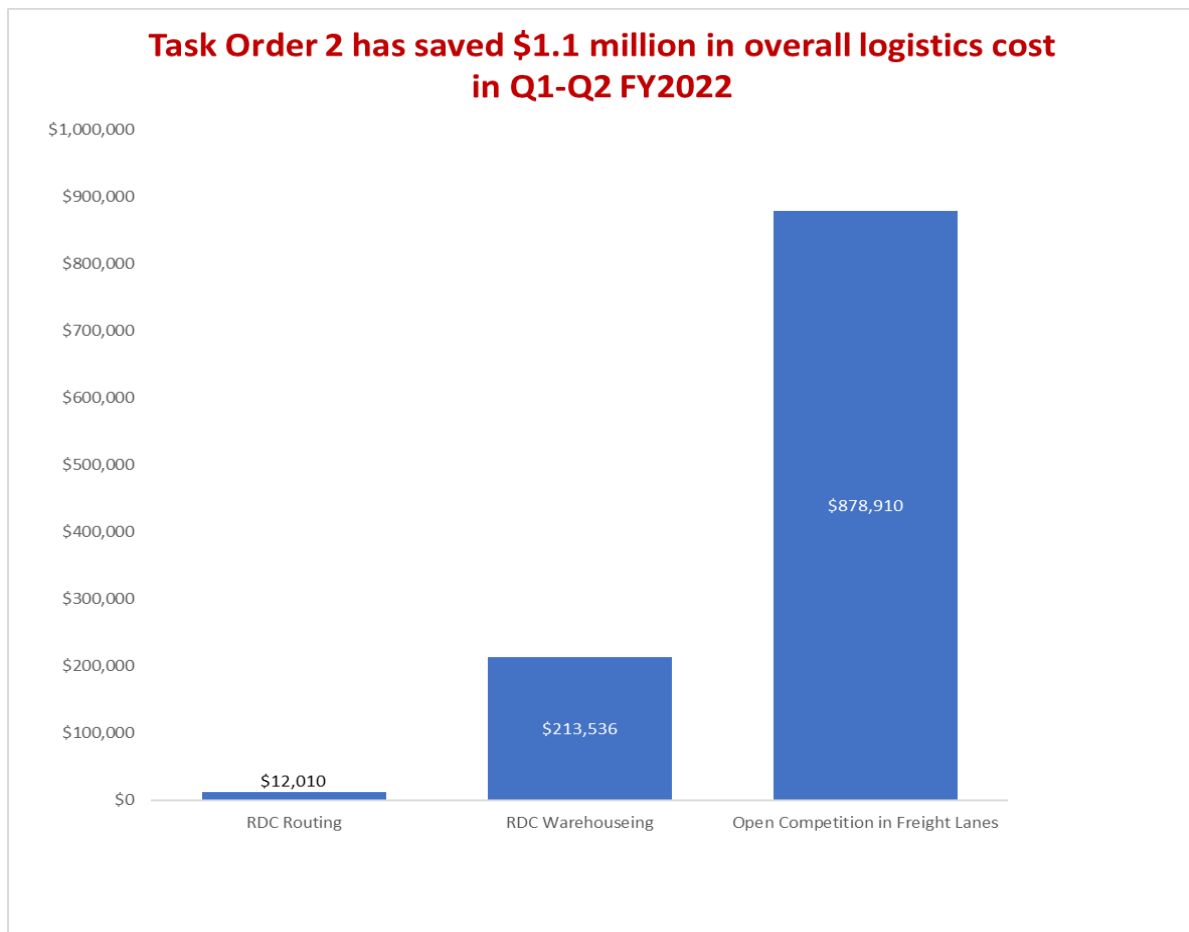
**Exhibit 7.** OTIF for malaria commodities, FY 2022 Q1–Q2



### Cost Savings on Logistics

GHSC-PSM saved \$1.1 million on malaria task order logistics in the first half of FY 2022 by managing open competition in freight lanes and optimizing our RDC network to three strategically placed warehouses. This is compared to a sole-sourced model with limited competition in freight lanes and utilizing the network of five RDC that were used at the onset of the project. This has led to a six percent reduction in logistics costs.

**Exhibit 8.** Task Order malaria logistics cost savings



### **Open Competition in Freight Lanes**

GHSC-PSM manages freight lanes through open competition rather than a sole-sourced 3PL. This improves service and cost savings on shipping rates through scale and competition for shipping lanes. Logistics savings are the difference between the rates awarded to the selected 3PL and the average of the two most expensive 3PLs. This method compares all shipping lanes and simulates the rates that would likely be obtained under a non-competitive 3PL model. Based on this methodology, GHSC-PSM Task Order 2 generated more than \$879,000 in cost savings in Q1–Q2 FY 2022 due to open competition for freight lanes.

### **RDC Warehousing and Routing**

The project saved money on logistics for malaria commodities by optimizing the project’s network of RDCs. GHSC-PSM generated savings through the following methods:

- Warehousing savings from lower costs at the project's three RDCs, measured against the costs at the previously used network of five RDCs.

- Transportation savings from shipping costs on actual commodities that moved through the three RDCs, compared to what shipping would have been for those commodities under the previous five-warehouse model.

This generated \$226,000 worth of cost savings for malaria commodities in the first half of FY 2022.

## **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***

GHSC-PSM experienced minimal losses of malaria products under its control at the Belgium RDC. In the first half of FY 2022 at the Belgium RDC, the project did not lose any ACTs due to expiry. The value of product loss at the Belgium RDC due to theft, damage, or causes other than expiry was minimal, totaling \$2,262 in FY 2022 so far.

GHSC-PSM also manages product shipment to countries, as well as some storage and distribution within countries. Product losses that occurred in project custody, either in transit, in-country, or while in project-managed storage, totaled \$43,870 in FY 2022 so far (less than one-tenth of a percent of the semiannual delivery total). These included small damages, expiries, missing items, and thefts.

### ***Cycle Time***

Cycle time measures 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.** Countries typically enter a large volume of orders simultaneously around the annual PMI call for orders, which takes in preparation for 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 earlier order entry, the time between when countries place orders and when funding is available grows larger. Country FY funding obligations tend to 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 avoid funding delays and meet the most urgent needs. However, there is a gap between the funding requirements for orders entered by countries before and during the annual PMI call for orders, and the funding available to process those orders. All orders subject to funding availability must be placed on hold, which is common and can be extensive.
- **Validation of specifications.** Complex or uncertain specifications of an order increase the time required to prepare the order for procurement, increasing the cycle time. This is most true 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 calendar year 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 as the default was already ocean for them. 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.
- **COVID-19.** Every step in the order life cycle is longer and more labor-intensive due to COVID-19 compared to pre-pandemic performance. Manufacturing and logistics processes can identify and account for the impact of COVID-19, but the pandemic also impacts earlier cycle time segments. Country lockdowns, border closures, personal protective equipment, exportation bans, and manufacturers focused on COVID-19 commodities at the expense of malaria commodities made sourcing some products difficult. This resulted in lengthy tendering events and, for unidentifiable supplies and long discussions with countries about alternative products. Moreover, when suppliers temporarily shut down during COVID-19 outbreaks, the project had to cancel or reallocate orders to other suppliers, resulting in duplicated work that added to cycle times. From a logistics standpoint, the imbalance and the shortage of containers further constrained supply chains, increasing the overall cycle time for shipments of goods by the ocean.
- **Challenging destinations.** GHSC-PSM serves complex destinations such as DRC, which has up to 10 delivery destinations per commodity. This is many times the number of lines of delivery for the average country order—all with the same requested delivery date, each requiring individual processing along the same timeline. DRC accounted for almost a quarter of the malaria shipments delivered in the first half of FY 2022. These orders are labor and time-intensive due to the complexity of this destination. Moreover, the project delivers to some inland destinations, which entail longer delivery timelines and skew the malaria commodity average cycle time (see discussion below).
- **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.** Country-specific import challenges (e.g., in Burma and Kenya, where circumstances outside of the project's control resulted in lengthy delays to order processing and holding of goods at supplier sites pending resolution to importation challenges), supplier-specific quality issues, client-requested holds, and in-country quantifications that result in changes after an order is in process contribute to lengthy cycle times. The project uses new 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 processing time more precisely for any order. This applies to cycle time segments before purchase order (PO) execution, so the cycle time for any country-specific challenges like those described above are not adjusted. The project adjusted and clarified the hold status policy to begin implementation in FY 2020 and reported dwell-adjusted cycle time throughout the first half of FY 2022.



The average cycle time for the first half of FY 2022 was 351 days (see Exhibit 9), against a target of 340 days. This is an improvement of 14 days over FY 2021, which averaged 365 days. Comparing quarter by quarter, FY 2022 showed further improvements. In FY 2021, end-to-end results by Q3 and Q4 were within two days of each other (355-357 days). The average cycle time in FY 2022 has so far been lower, with an average cycle time of 358 in Q1 and 346 in Q2. Average cycle time was lower in Q2 FY 2022, as a high proportion of orders were delivered early or on time.

The project began reporting on dwell-adjusted cycle time in FY 2021. In FY 2022, data showed that active cycle times were 58 days shorter than end-to-end results in Q1 and 35 days shorter in Q2. The most common reasons for holds were orders awaiting country FY funding obligations and confirmation of order specifications and quantities. GHSC-PSM analyzes hold usage and dwell-adjusted cycle time to identify insights about active cycle times and opportunities for process improvement to drive gains in global supply chain responsiveness.

**Exhibit 9.** Task Order 2 cycle times for FY 2022

Time period (FY 2022)	Overall average cycle time (days)	Dwell-adjusted cycle time (days)	Average cycle time without DRC (days)
Q1	358	300	349
Q2	346	311	292

***Cross-cutting Process Improvements***

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

- Using the emergency loan fund strategically to execute proactive procurements based on-demand data. This contributes to reducing the lead time from requisition order (RO) entry through the delivery of goods against the agreed delivery date (ADD).
- Implementing standardization protocols and a workflow checklist to streamline the RO approval process.
- Implementing a tool to support more 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.
- Managing the impact of COVID-19 by identifying and mitigating supply and freight risks.
- Aligning procurement, QA, and logistics processes.
- Implementing management systems to identify and manage orders that are lagging at any point in the order lifecycle.

- Developing and piloting a Task Order Malaria (TOM) Microsoft Power BI™ dashboard, which pulls salient information from various modules, including, QAMS and LMIS data along with specific fields available in ARTMIS as a source of truth to provide daily updates to data users.
- Establishing system connections for facilitating the flow of data to be stored in a PowerBI dataflow that is referenced by the TOM report thus avoiding redundancy of entering the same data into multiple systems for reporting purposes. This reduces chances of data entry error, and the level of effort from users who maintain data across multiple systems.

**Managing the Malaria ALu Stockpile**

In the RDC in Belgium, GHSC-PSM maintains PMI’s malaria emergency stockpile of a relatively small cache of ACTs (specifically ALu) for rapid allocation to countries based on need. Stockpile quantities are based on historical data and estimated to satisfy emergency orders. The estimation is repeated multiple times per year by presentation to create frequent replenishment of orders based on the remaining stock. GHSC-PSM plans to review the information on a quarterly basis, but more frequently under required circumstances, to identify any shelf-life issues with the current stock, probable utilization of stocks with risk of expiry to orders that are not normally fulfilled by the RDC, as well as determining any new quantities that need procurement. In the first half of FY 2022, the project received \$177,853 in ALu for pre-positioning at the Belgium RDC (Exhibit 10).

**Exhibit 10.** GHSC-PSM ALu total product received at the RDC in the first half of FY 2022

Product	Number of treatments delivered to the Belgium RDC
ALu 20/120 mg dispersible tablet, 6x2 blister packs	36,000
ALu 20/120 mg tablet, 6x3 blister packs	198,000
ALu 20/120 mg tablet, 6x4 blister packs	135,000

GHSC-PSM used this stock to fill urgent or emergency orders of ALu to three countries (Exhibit 11). The project used quality control (QC)-tested commodities held in RDC, which reduced delivery and cycle times and prevented stockouts.

**Exhibit 11.** ALu deliveries by country from the stockpile in the first half of FY 2022 (door delivery date in-country)

Recipient country	Product	Number of treatments delivered
Burundi	ALu 20/120 mg tablet, 6x3 blister packs	177,000
Uganda	ALu 20/120 mg dispersible tablet, 6x1 blister packs	208,020
Uganda	ALu 20/120 mg tablet, 6x4 blister packs	62,700
Zambia	ALu 20/120 mg dispersible tablet, 6x2 blister packs	987,300

### Remaining Shelf Life for Warehoused Commodities

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

By the end of Q2, GHSC-PSM had \$317K of ACTs stockpiled with over the target of 70 percent of the weighted average remaining shelf life. The project has consistently met the shelf life targets quarter-over-quarter in part due to frequent stock rotations to meet emergency and urgent demand.

### Backlogged Line Items

The percentage of promised line items that were undelivered at the end of the first half of FY 2022 was 1.5 percent. This is below the target of 5 percent.

## A.3 Adhering to Quality Assurance Requirements

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

### Strategies and Innovations

GHSC-PSM expanded testing capacity for pharmaceuticals and LLINs by onboarding new laboratories following the third-party laboratory request for proposal (RFP), performing method transfers, and validating at additional pharmaceutical testing laboratories. The project added two ALu hard-tablet products in Q1 FY 2022 and completed method transfer for a new artesunate injectable product at a primary lab. The project completed suitability testing for sterility testing of the two artesunate injectable products at secondary labs in Q2. GHSC-PSM managed confirmatory testing at a secondary lab for artesunate injectables as a trial to confirm the lab's capability to test the product. The method transfers and validations have allowed the project to broaden the number of laboratories capable of testing key high-volume products.

## **Collaboration**

In the first half of FY 2022, the project had several collaboration activities with global partners and in-country stakeholders on LLIN quality requirements and other quality-related investigations. For more details, please see section C.1 of this report.

## **Promoting Supply Chain Health**

GHSC-PSM supports strategic sourcing and procurement by performing QA documentation reviews for LLINs, pharmaceuticals, and mRDTs to be added to the project list of quality-assured products eligible to be procured by the project. In the first half of FY 2022, the project completed a review of two pharmaceutical products and two mRDTs (see Exhibit 12 Product Review for Eligibility Table below). The quality review facilitated the addition of the products to the Restricted Commodity Waiver List governed by USAID Automated Directives System 312, making the product eligible for procurement.

**Exhibit 12.** Product Reviewed for Eligibility

<b>Product category</b>	<b>Product subcategory</b>	<b>Product detail</b>
Pharmaceuticals	SP	1,000 tablet jars of sulfadoxine-pyrimethamine.
Pharmaceuticals	SP	Sulfadoxine and pyrimethamine 500 mg/25 mg tablets (Falcistat)
mRDTs	mRDT	Paracheck Pf - Rapid test for P. falciparum malaria device HRP2 (Pf), 10 packs, Code
mRDTs	mRDT	ParaHIT f Ver. 1.0 Rapid Test for P. falciparum Malaria Device, 10 pack

## **Team Activity in Fostering Greater Product Quality and a more Robust QMS**

In the first half of FY 2022, there was no reported product recalls. GHSC-PSM facilitates robust QA and quality management systems (QMSs) within various product types procured through comprehensive investigations and collaborations with other external partners and global donors.

## **Fostering Quality in Pharmaceuticals**

In Q1, GHSC-PSM's risk-based QA testing strategy identified OOS results for sterility in some batches that are components of the artesunate injectable product kit. The project initiated an investigation to determine the validity of the test results and placed a hold on product distribution. During the investigation, the project explored several strategies and tested hypotheses to determine whether the

sterility of OOS resulted during third-party laboratory testing or whether the product was contaminated during the manufacturing process. Following the testing and review of data and evidence, the project determined no assignable root cause of the OOS. PMI concurred with GHSC-PSM's recommendation to prioritize patient safety and reject those product batches that were found to be OOS, in addition to adjusting the testing strategy moving forward. In Q2, FY 2022, GHSC-PSM concluded its investigation.

GHSC-PSM also investigated an OOS for water content in the artesunate powder component of the artesunate injectable product kit. The third-party testing lab reported higher results than the specification, which is no more than 0.5 percent for water content. The project determined that various methods for water content testing were available and then consulted with the supplier on the test methodology. Subsequently, the lab performed four additional studies/hypotheses that yielded conform results. Based on the data, the project concluded that although the test results were inconsistent (most results yielded conform results), the stability study data indicated no risk to the safety or efficacy of the product due to water content. GHSC-PSM recommended the release of the product, and PMI concurred.

### ***Fostering Quality in LLINs***

In the first half of FY 2022, the project took steps to prevent quality issues by engaging with an LLIN supplier and LQAG, discussing the potential impact of the supplier's new baling system on its product quality. The new baling system offered the potential to save around 15 percent of freight space, but it was shown to negatively impact LLIN dimensional stability. GHSC-PSM and other LQAG procurers requested that implementation of the new baling system be paused while the supplier liaised with WHO PQ to ensure that applicable data and documentation were in place to support the use of the new baling system.

In the first half of FY 2022, GHSC-PSM investigated a batch of LLINs that was OOS for mesh size. The project determined that when using the 100-centimeter square tool, the third-party lab's results were 23 holes per square centimeter. However, using the one-inch square tool, the mesh size met the specification and was reported as 24 holes. In reviewing the data and evidence gathered, GHSC-PSM concluded that the marginal difference in mesh size had little to no impact on the efficacy of the LLINs, given that all other parameters met WHO specifications. PMI concurred with the project's recommendation that the batch is accepted and notified the supplier to monitor the mesh size parameter during in-process and finished product testing.

### ***Fostering Quality in mRDTs***

In the first half of FY 2022, GHSC-PSM initiated an investigation of mRDTs following complaints from two countries that after testing samples were added to the mRDT cassettes, results took longer to read, were erroneous, or invalid. The project presented the complaint to the supplier, who provided a preliminary report, including samples retained from complaint batches, and retested them. All complied with the instructions for use (IFU). The project performed a preliminary investigation, comparing the IFUs for mRDTs in its portfolio, and noted that different brands of mRDTs have different IFUs. GHSC-PSM will continue its investigation in Q3 to determine whether the root cause of the complaints was due to the quality of the mRDTs or to countries not being familiar with the brand of mRDTs and their corresponding IFU.

### ***Certificates of Conformance***

GHSC-PSM maintained a high level of productivity in the first half of FY 2022, issuing 237 certificates of conformance (CoCs) that met quality requirements and allowed commodities to be released for distribution. The CoC per commodity type is as follows: 117 CoCs for pharmaceuticals, 25 for mRDTs, 33 for LLINs, and two for lab commodities.

### ***Pharmaceuticals Regulated by a Stringent Regulatory Authority***

Malaria pharmaceuticals that are regulated by a stringent regulatory authority do not require laboratory testing according to PMI-approved instructions. In lieu of testing, GHSC-PSM reviews the manufacturer's certificate of analysis before shipment. In the first half of FY 2022, the project reviewed certificates of analysis for seven batches of two ALu products. The project found that all had satisfactory results and issued certificates of conformity.

### ***Other Pharmaceuticals***

GHSC-PSM uses qualified independent laboratories to inspect, sample, and test other pharmaceuticals—including generic ALu, artemether injectables, artesunate injectables, artesunate suppositories, generic artesunate + amodiaquine (ASAQ), SP tablets, SPAQ tablets, and various essential medicines before shipment. In the first half of FY 2022, the project reviewed test reports for more than 397 batches before releasing the orders for distribution. Most of the batches were QC tested concurrently with the shipment, using a risk-based approach to meet delivery timing requirements.

### ***LLINs and RDTs***

In the first half of FY 2022, the project managed pre-shipment inspections and tested 66 orders, representing 20,661,052 million LLINs from nine vendors. The project reviewed all test results before clearing orders for distribution.

GHSC-PSM managed pre-shipment inspections and tested 34 orders representing 2,492,832 million mRDTs from four vendors. The project reviewed all test results before clearing orders for distribution.

### ***Key Performance Indicators***

GHSC-PSM met or exceeded the in-target QA lead time key performance indicator through the first half of FY 2022. Target QA lead time is 80 percent, and the results were 83.56 percent in Q1 and 91.84 percent in Q2.

No batches of products showed nonconformity in Q1 or Q2 (target is less than 1.0 percent). 100 percent OOS reports were finalized within 30 days of completing the investigation.

### ***Cost Savings***

In the first half of FY 2022, the total cost savings resulting from the risk-based testing totaled \$179,762.

## A.4 Improving Data Visibility

GHSC-PSM increases data visibility into the supply chain at all levels. 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 information system, provides visibility into GHSC-PSM procurement and delivery. External users, such as PMI, USAID offices, and GHSC-PSM country office staff can view important order updates and performance information through procurement and delivery dashboards. GHSC-PSM enhances system efficiency, improves data quality, and improves visibility into its supply chain operations. The project makes enhancements to improve data visibility, including the life of project data. Specific improvements to ARTMIS in the first half of FY 2022 included:

- Maintained the integration with the Malaria Data Integration for Visualization and Eradication (M-DIVE) platform, which provides daily updates on the order, shipment, and catalog data for visualization for the full PMI interagency team. GHSC-PSM provided monitoring and evaluation results data to M-DIVE through Q1 FY 2022. Also, the project added two new fields in the integration for better visibility within M-DIVE (the prime line ship number and the fiscal year).
- Maintained the integration with the Quantification Analytics Tool (QAT) and ARTMIS storefront to review tagged orders in the report and analyze module.
- Provided adaptive maintenance to the ARTMIS integration with the Procurement Planning and Monitoring Report for malaria (PPMRm); GHSC-PSM supports the PPMRm upgrade by enabling the application to pull in daily shipment order updates.
- Enhanced solution, so that purchase orders open directly in Microsoft Word™ format, reducing user clicks.
- Refined key reports, including freight estimate versus actual, requisition order history, and Task Order Malaria (TOM) table, and added fields to the ad hoc reporting (i.e., additional IWorldSync Global Data Synchronization Network™ (GDSN) attributes).
- Maintained the automated feed from the GDSN to update the GHSC-PSM catalog with attribute data for catalog items from network suppliers.

### TOM Table

The TOM table provides quick information on current orders in progress for management decisions and is used in bi-weekly reviews and status briefings. GHSC-PSM transitioned from the Excel-based TOM table into a TOM Power BI dashboard to move away from the manual manipulations made to generate the TOM table and provide end-users with the most up-to-date order information through visuals generated from ARTMIS data. The goal was to provide enhanced data visibility and improved order management through the primary contractual deliverable of TO2.

The dashboard design is being implemented in two phases. In Phase I, GHSC-PSM developed the TOM Country View Power BI dashboard, which mimics the Excel version of the TOM table. This version was

piloted with PMI and countries in Q2 and will be rolled out in Q3. In Phase II, the project will build a Management View Dashboard that will allow for enhanced order portfolio management, exception management, and data quality management.

### ***Vision***

The aim of the TOM Country View Dashboard is the ease of navigation, with a focus on end-users' access to daily updates regarding the status of their orders, such as when the order is expected to arrive, and bringing critical delays to their attention. Salient pieces of information include:

- Where is my order?
- When can I expect to receive my order?
- Is it too late to change my order?
- Has my order been delayed/is my order on hold for some reason?
- Is there anything needed from me for my order to progress?

The aim of the TOM Management View Dashboard is to design a tool with an interface and analytics that enable a more efficient, targeted portfolio and better exceptions management for the project and PMI across all countries.

- Identify and diagnose issues to mitigate as they occur
- Retroactively review issues for targeted process improvements

### ***TOM Country View Dashboard highlights:***

- Provides daily updates and summary statistics of a country's current orders through a robust report.
- Provides end-users with a single source to access order information.
- Minimizes manual manipulations, and the final TOM reflects data pulled from the systems of record for better visibility.
- Provides regular insights on order status so relevant stakeholders can make informed supply chain decisions.

The Power BI TOM Table retains the simplicity and ease of navigation provided by the Excel-based TOM table. As part of the TOM Country View Dashboard rollout process, GHSC-PSM adopted several change management measures, including hands-on trainings, development of a dashboard user guide, demonstration recordings, and office hours to orient the TOM audiences on the dashboard's use cases and navigation and ensure a smooth transition from TOM Excel-based reporting to the TOM Power BI dashboard.

### **Country Assessments: End-Use Verification Surveys**

The end-use verification (EUV) survey monitors 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 EUV methodologies align with data used for decision-making



with reliability, trust, and known precision. In Q1 FY 2022, data collection for six EUVs took place and, in Q2, data collection for three EUVs took place.

### ***EUV Change Board***

In FY 2021, GHSC-PSM initiated a change board process that aligned the survey with how data was used for decision-making. The project approved more than 36 changes from the 17 GHSC country offices that conduct the EUV, as well as PMI, USAID FP/RH, USAID MNCH, and the GHSC-PSM EUV team.

In Q1 FY 2022, GHSC-PSM used resources from malaria, family planning and reproductive health, and maternal, newborn, and child health task orders to complete the EUV survey changes. This included an update to the standard survey structure and a revision of the EUV toolkit (background documents, guidance documents, and training tools) to reflect the change board findings, including 15 changes to the survey questions, 18 changes to indicators, and several changes to the report structure. To roll out the updated EUV survey, GHSC-PSM developed a training program for country teams and technical backstops to review survey changes and their potential impact on implementation.

In Q2, GHSC-PSM revised the EUV toolkit and resources, enabling country teams to implement the updated EUV survey. The project held two online trainings, one in English and one in French, for country teams and technical backstops to explain the survey changes, orient country teams to the updated EUV tools and resources, and provide guidance to implement the updated survey. Following training, Ghana and Zambia implemented the updated survey. Several countries are preparing to implement the updated survey in Q3. Country survey updates coincide with the scheduled timing of country surveys and will take place on a rolling basis through the end of FY 2022. The EUV PowerBI report template was updated in Q2 to reflect the survey changes.

### ***EUV Data Consolidation***

In line with efforts begun in FY 2018 to standardize the EUV surveys, GHSC-PSM implemented an automated process for ingestion of historical and future EUV surveys into consolidated tables for analysis by PMI and the project. This automated process uses open-source coding tools (Python and YAML Ain't Markup Language (YAML)) and creates a transparent and repeatable process that continuously improves with every new survey added. For example, product naming conventions were not consistent across countries or time periods within a single country. These inconsistencies were improved through the change board process but needed to be standardized across all surveys. The EUV consolidation process checks that all product names are standard when a survey is loaded into the consolidated table. If it finds a product name that does not match up with the standardized list, it checks the non-standard spelling against the YAML file to determine if the spelling matches a previously recorded spelling and then adjusts the product name to the standard spelling for that product, without requiring any intervention. This process learns from the past and maintains a list of all mappings used in product name correction. The mappings are validated by a subject matter expert, the historical data are maintained in the original files, and the consolidated table produces consistent, standardized names for the products, enabling the user of the consolidated table to a) compare data across time periods and countries, as product names will now be consistent across surveys, b) build trust in the naming conventions, and c) rapidly identify issues, update the mappings, and regenerate the consolidated tables in a straightforward and expedient process.

The consolidated tables contain the 55 surveys that are classified as linkable; these surveys predominantly come from surveys conducted after Q2 FY 2020, when the project implemented the

standardized EUV survey. Additionally, the process documents the 45 surveys that were not linkable in the consolidated table. These non-linkable surveys are mostly historical (before February 2020) and used a non-standard sampling process. In cases of non-linkable data, the survey is stored and retained for use in its unprocessed form. The level of effort to include new surveys has been greatly reduced due to automation. This efficiency will continue to improve as more surveys are added and will increase the reliability of the consolidated table and standardization across the surveys. The next step is utilizing the consolidated tables to produce annual interactive reports of EUV surveys. The purpose of the interactive reports will be to allow PMI and the project to see changes in key indicators across countries and across time; greater visibility and deeper insights from the EUV will guide an understanding of the current state and the recent trends to guide future actions.

### **Country EUV Examples**

In the first half of FY 2022, seven GHSC-PSM TO2 countries conducted EUVs with technical support from headquarters. Five GHSC-PSM countries also reported the COVID-19 continuity of care module, developed in Q4 FY 2020.

The project shares the EUV reports and recommendations with Ministries of Health (MOHs), National Malaria Control Programs (NMCPs), and other stakeholders to inform decision-making. Examples are provided below.

#### **Liberia**

In Q2 FY 2022, the EUV identified several areas impacting product availability, including high staff turnover and product delays to warehouses. The GHSC-PSM country team addresses these challenges by:

- To address timely receipt of products, MOH partners should encourage the introduction of a monitoring matrix to understand which products were requested but not received. Partners can use these data to ensure proper commodity distribution and avoid facility-level stockouts.
- The MOH and partners should prioritize LMIS training for health workers at facilities and districts to have sufficiently trained staff in an environment of high turnover. For LMIS training, in April 2022, GHSC-PSM in collaboration with the MOH conducted Supply Chain Data Quality Training (SC-DQT) for 329 health workers. Participants were trained on the use of the LMIS tools, the eLMIS interface and data quality monitoring skills. The training participants included District Health Officers (DDO), District Data Officers (DDO), County Pharmacists, SC Coordinators, Database Managers, Monitoring and Evaluation Staff and Program (Malaria, HIV, FP, EDP) Leads

#### **Guinea**

In Q2 FY 2022, Guinea identified opportunities to improve health workers' adherence to ordering standards, an increased need for supportive supervision, and actions that align with the national supply plan through the EUV. GHSC-PSM recommended using stock according to plan principles, such as ordering based on the average monthly consumption, increased training on stock and case management principles, and taking proactive steps to resupply regional agencies according to the national supply plan to capitalize on the identified opportunities for improvement.

## **Mali**

In Q2 FY 2022, the project identified several actions from previous EUV surveys that continued to have an impact. These activities included increased weekly monitoring of malaria stock status at the central and regional levels and overall increased reporting rates throughout the surveyed regions. Despite these successes, low stock availability remains a challenge for key malaria treatment commodities. The project identified activities to continue and additional actions that should increase overall commodity availability, including:

- Increasing stock card and logistics management training and supervision visits to address the challenge of low stock card updating rates and increase the quality, availability, and accuracy of logistics data during the quantification process.
- Continuing the weekly monitoring exercises. This mechanism, alongside training, promotes proper ordering timelines and overall availability of products, particularly at the central and regional levels. It also shares stock status at central and regional level and provides the central level information about receipts to monitor regional order processing.

## **Procurement Planning and Monitoring Report for Malaria (PPMRm)**

During the first half of FY 2022, **PPMRm managed data from 29 countries.**<sup>3</sup> PPMRm is a quarterly report that provides data on central and subnational stock and commodity security along with updates on key malaria commodities from PMI-supported countries. It identifies stock issues, including potential risks, and assists with order prioritization and reconciliation.

Information from PPMRm assists with order prioritization, including the reallocation of orders or stock to mitigate the risk of stockouts or expiries. GHSC-PSM used shipment data in PPMRm to inform collaborative meetings with other global donors to plan shipment logistics, assess supplier capacities, and coordinate orders.

### ***PPMRm New Platform***

PMI-supported countries have used the PPMRm reporting platform since 2008 to generate quarterly reports. The platform allowed data providers in the 29 PMI-supported countries to enter stock and commodity information into data fields and provide context about commodity-level management. In response to PMI's request to produce monthly PPMRm reports and enhance PPMRm functions and user-friendliness, GHSC-PSM started to develop a new PPMRm platform for monthly reporting in FY 2020. The new platform includes the previous functions for commodity security updates and stock-level reporting but is equipped with a more user-friendly interface, as well as the revised ARTMIS data flow system for increased accuracy for PMI shipment data and reduced level of efforts in providing and reviewing PMI's shipment data. The new platform allows monthly data reporting to identify and address stock issues earlier. GHSC-PSM tested the new PPMRm platform in all 29 countries in Q2 FY 2022. The project is addressing issues encountered in the testing phase and expects to launch the new platform in Q3 FY 2022.

### ***PPMRm Country Examples***

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<sup>3</sup> Angola, Benin, Burkina Faso, Burma, Burundi, Cambodia, Cameroon, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Ghana, Guinea, Kenya, Laos, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Thailand, Uganda, Zambia, Zimbabwe

Based on PPMRm data, the project took the following actions at the global or national level during the first half of FY 2022:

- Identified stockout risks and recommended or took actions to expedite PMI or Global Fund shipments to mitigate the risk, such as:
  - In Q1: **Burkina Faso** (ALu 6x1, ALu 6x3, Artesunate Injection 120mg), **Cameroon** (SP), **Ghana** (ALu 6x3, ALu 6x4), **Malawi** (mRDT), **Mali** (ALu 6x4, artesunate injection 60mg), **Nigeria** (ALu 6x3), **Zimbabwe** (mRDT)
  - In Q2: **Ghana** (artesunate suppositories 100mg, ASAQ 100mg/270mg -3 Tabs, artesunate injection 120mg, SP), **Madagascar** (ASAQ 100mg/270mg -3 Tabs, ASAQ 100mg/270mg -6 Tabs), **Niger** (artesunate suppositories 100mg), **Zambia** (ALu 6x2, artesunate injection 60mg, SP), **Zimbabwe** (ALu 6x3).
- Deferred shipments to prevent overstocking, such as:
  - In Q1: **Rwanda** (ALu 6x1, ALu 6x2, ALu 6x3, ALu 6x4), **Zimbabwe** (ASAQ 25mg/67.5mg - 3 Tabs)
  - In Q2: **Rwanda** (ALu 6x1, ALu 6x2, ALu 6x3, ALu 6x4)
- Redistributed stocks within the country, such as:
  - In Q1: **Burma** redistributed excess stock of ALu 6x4 among partners to mitigate potential expiry
  - In Q2: **Zimbabwe** redistributed overstocked ALu 6x1 and ALu 6x3 to reduce an overstock at the central level and minimize the risk of expiry.

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

Adopting Global Standards—a common business language that all trading partners can use from manufacture to dispense—to identify, capture, and share information about products and their movement in the supply chain, along with labeling standards, is key to improving data visibility. Without these standards, trading partners and systems (e.g., purchasing, inventory management, logistics, reporting) use their own identifiers and data formats. This approach breaks the connection between those systems, creating a high-maintenance, error-prone environment that adds complexity, inaccuracy, and cost when aggregating data and monitoring product movement and can be prohibitive for traceability implementation. GHSC-PSM supports the adoption of GSI healthcare Global Standards through its procurement requirements for pharmaceutical, medical device, sterile kit, laboratory reagent, and LLIN suppliers to adopt standardized product identification and labeling and to exchange product master data. This happens through continued direct supplier engagement, as well as targeted activities to address areas in need of additional support, such as wholesaler procurement and GDSN master data quality assessment.

In the first half of FY 2022, GHSC-PSM undertook targeted activities around the upcoming June 2022 serialization requirements, working with USAID to establish expectations for supplier compliance and data collection approaches. The project circulated a survey to suppliers to understand their progress toward and current capabilities for item serialization and serialization data exchange.

GHSC-PSM supports the adoption of Global Standards in supply chain processes by providing technical assistance for adopting standards within country programs as described in Section B1.

## **B. Strengthened In-Country Supply Chain Systems**

### **B.1 Improved Strategic Planning and Implementation Related to Supply Chain Management and Commodity Security**

#### **Forecasting and Supply Planning**

GHSC-PSM provides technical assistance to develop and validate supply plans, aggregate commodity demand, and evaluate and reconcile seasonal demand with orders. The project's sustained efforts to support country supply planning have resulted in more countries that can independently manage this critical activity.

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

#### **Supply Planning Technology**

In FY 2021, GHSC-PSM rolled out the project-developed supply planning module of the QAT in 17 PMI-supported countries. The QAT supply plan module leverages new technologies (e.g., cloud-based). It replaces PipeLine, the former supply planning tool, with an improved user interface, increased analytical capabilities, and automated data exchange. Program managers can optimize commodity procurement and delivery schedules, monitor the stock status of products and share data with external platforms and stakeholders.

In the first half of FY 2022, 16 PMI countries submitted their malaria supply plans through QAT. Of these countries, three (Guinea, Rwanda, and Uganda) had not done so previously. The project expects an additional eight countries (Angola, Burma, Cambodia, DRC, Liberia, Mozambique, Niger, and Tanzania) to do the same by the end of FY 2022.

The project also conducted trainings for five PMI countries (DRC, Guinea, Liberia, Mozambique, and Niger); two were in-person through short-term technical assistance, and six GHSC-PSM country teams (Cameroon, Guinea, Nigeria, Rwanda, Sierra Leone, and Zambia) led training for Ministries and other partners on using QAT.

In the first half of FY 2022, GHSC-PSM initiated the development of the second QAT module for forecasting. The project expects to pilot this module in Q3 FY 2022 with remote training for two PMI countries (Ethiopia and Malawi). Following the pilot, GHSC-PSM is planning two regional in-person trainings for Anglophone and Francophone countries. The TO2 countries expected to participate in these trainings are Angola, Benin, Burkina Faso, Burundi, Ghana, Guinea, Mali, Nigeria, Zambia, and Zimbabwe.

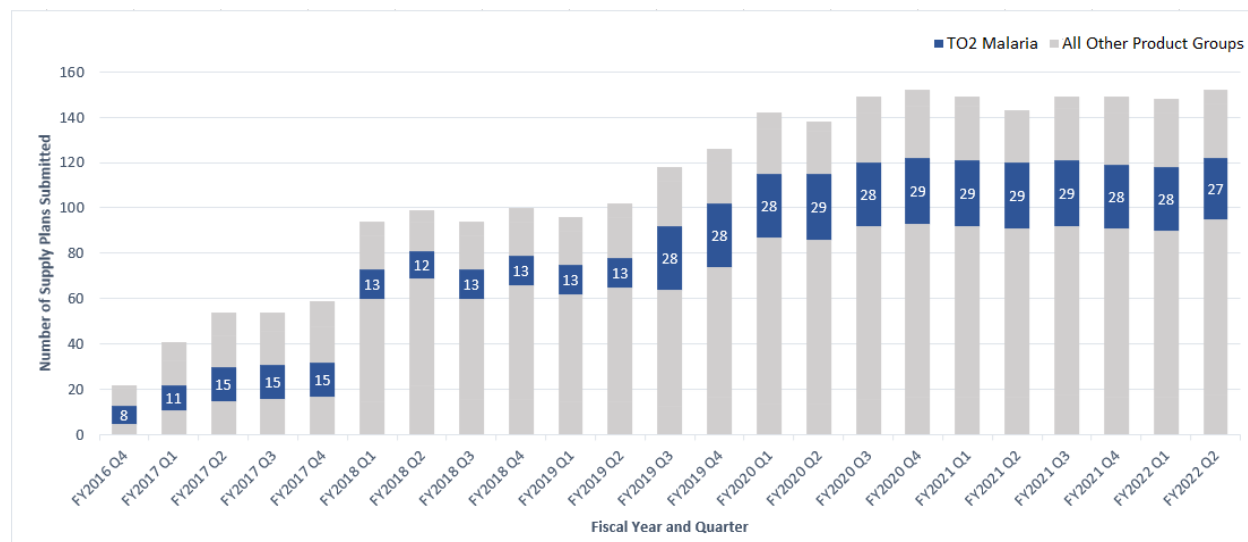
#### **Supply Plan Reviews**

In ensuring procurement-ready plans, GHSC-PSM conducts quarterly supply plan reviews to drive continuous commodity availability and submission in PipeLine or QAT.

Countries that submit supply plans through PipeLine use the GHSC-PSM–built supply chain automation tool each quarter to review and address data quality issues before submission to project headquarters. For QAT-submitted supply plans, the built-in QAT Problem List (QPL) enables users to easily identify data issues and correct them before committing a supply plan to the server. The QPL allows users and reviewers to leave comments specific to the issue and provides visibility into those comments during future quarterly reviews for context.

In Q2 FY 2022, GHSC-PSM received malaria supply plans from 27 PMI-supported countries--100 percent of the target for Q2). Of those, 16 were submitted through QAT.

**Exhibit 13.** Malaria supply plan submissions and technical reviews over the life of the project



### Forecasting and Supply Planning Technical Assistance

In the first half of FY 2022, the project assisted more than 20 countries in forecasting and supply planning. GHSC-PSM adjusted technical assistance methods to comply with restrictions on travel and large group meetings due to COVID-19. Examples of technical assistance follow.

#### Guinea

In Q2 FY 2022, GHSC-PSM provided technical and financial support to the NMCP for a six-day quantification workshop to forecast malaria commodity needs through 2024. Representatives attended from the NMCP technical working group (TWG), Pharmacie Centrale De Guinee, National Directorate of Pharmacies and Medicines, GHSC-PSM, StopPalu+, and Catholic Relief Services (CRS). The quantification methods included essential epidemiologic, demographic, morbidity, and average monthly consumption data from the NMCP, national health administration, and other facilities. This quantification helped the NMCP and its partners identify and eliminate potential funding gaps, mobilize financial resources, and ensure enough funding to cover the supply plan. The TWG quantified 28 malaria commodities to prevent, diagnose, and treat malaria and estimated that to meet the needs through 2024 would require over US\$59 million.

## **Zambia**

In Q2 FY 2022, in collaboration with the Zambian government, GHSC-PSM leveraged analysis from the QAT to identify a \$6 million commodity funding gap for the MOH. The MOH and partners advocated filling the funding gap by regularly sharing gap analyses in meetings with NMEC and USAID/PMI. This resulted in resource mobilization and reduced the gap by 43 percent to \$2.6 million.

### **Logistics Management Information Systems Technical Assistance**

GHSC-PSM improves data accuracy and quality as a priority for management information system (MIS) implementation, including conducting six supply chain information system maturity assessments to evaluate functionalities, processes and identify the strengths, weaknesses, and opportunities for MIS improvements. The absence of standard product information and the need for standardization were common findings. To address this, the project recommended improving the GSI-compliant standardized product data to build standardized master datasets for end-to-end data visibility. The objectives of the assessment will improve the MIS, reduce duplicated data, and promote data exchange and sharing across systems and donors. Establishing methods and plans for managing master datasets (products, facilities, etc.) across information systems prevents redundant data entry and improves data accuracy and quality. GHSC-PSM works with countries to evaluate the data captured in MIS (e.g., electronic logistics management information systems (eLMISs) and warehouse management systems) for standardization.

The project promotes operational uniformity through approaches, such as national product catalogs (NPCs) and the Supply Chain Information System Maturity Model. GHSC-PSM invites external and in-country experts to present new technologies and lessons learned for knowledge sharing.

In the first half of FY 2022, GHSC-PSM conducted webinars, presented to working groups, made recommendations for system interoperability, and introduced standardized approaches to achieving data visualization through innovative tools for improving processes and efficiency. Country-specific examples of technical assistance follow.

## **Malawi**

In Q2 FY 2022, the project assisted the Digital Health Division with stock status data exchange between the OpenLMIS and the District Health Information System 2 to manage data exchange rules and protocol between these systems for secure data sharing between software. GHSC-PSM also finalized a mobile Android version of the NPC. A release is pending approval on the Apple store.



## ***Mozambique***

The project continued the implementation phase of Sistema de Informação e Gestão de Logística das Unidades Sanitárias (SIGLUS), a mobile application used in health facilities to collect stock report data monthly. In Q2, GHSC-PSM finalized the development of SIGLUS v3 (based on the latest version of OpenLMIS) to allow full functionality and align with the Government of Mozambique's requirements and interoperability between SIGLUS Web and the SIGLUS Desktop applications.

## ***Zambia***

GHSC-PSM provides technical assistance for two important warehouse information systems. In November 2021, the project rolled out a warehouse management system, WarehouseExpert, for Zambia Medicines and Medical Supplies Agency (ZAMMSA) to seven regional hubs. WarehouseExpert allows an uninterrupted downstream supply chain with fast order processing, turnaround time, and improved data visibility. Since the rollout of the stand-alone WarehouseExpert, the hubs can connect to the NetLog reporting tool, which is a cloud-based system, to consolidate all hub and CMS inventory data for real-time inventory and transactional reporting, allowing quick supply plan processes in any location. Also, ZAMMSA and the MOH could implement a decentralization policy by designating hubs as strategic stockholding facilities and shortening responses to the provincial health facilities.

## **Improved Data Use**

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

## ***Burma***

GHSC-PSM provided mSupply super-user LMIS training to Defeat Malaria (DM) and CHAI to improve health commodity data visibility and availability. mSupply is the national LMIS, supporting inventory management across various health areas, including malaria. Due to the difficulty in supporting the national program following the coup d'état in 2021, the project pivoted its technical assistance toward development partners such as PMI's service delivery implementing partner, DM. The project coordinated with partners such as CHAI, which plans to expand its many-year implementation of mSupply to the Expanded Program on Immunization to strengthen the mSupply ecosystem. The two-day training, attended by six DM and three CHAI staff, equipped participants with skills to troubleshoot the software and create or edit customers, suppliers, commodities, and reports. The training covered the use of the tender, purchase order, location management, and tablet module applications, and how to customize the project-developed mSupply dashboard.



## **Cameroon**

In Q1 FY 2022, GHSC-PSM worked with the government of Cameroon to collect and analyze logistics data during cycle four of the SMC campaign. This data-informed reverse logistics of 253,348 and 145,250 SPAQ doses from health areas in the Far North and North regions, respectively, by districts to the PMI-supported regional warehouses. Quantities returned to the warehouses were then sorted and repackaged. These quantities were factored into the FY 2022 quantification exercise to reduce waste, promote efficiency, and improve the availability of SPAQ doses in the country.

## **Mali**

To improve the availability of antimalarials and reduce health facility stockouts, GHSC-PSM partnered with the National Malaria Control Program (PNLP) to establish a call center collecting antimalarial stock on hand data from community health centers in the Gao, Kayes, Koulikoro, Mopti, and Timbuktu regions.

The call center was integrated with the local telephone network to make calls online to track inventory and improve logistics data quality. Other countries that used this methodology saw a significant stockout rate reduction of health products. GHSC-PSM and PNLN restricted call center access to limit security challenges and poor data quality. The project implemented a pilot of the call center before replacing the paper-based system. GHSC-PSM selected eight areas for call centers (Bandiagara, Djenne, Gao, Kalaban-Coro, Kenieba, Mopti, Oussoubidiagna, and Timbuktu). Operations have begun in Mopti, Timbuktu, and Gao.

## **Global Standards and Traceability**

GHSC-PSM provided technical support to several PMI-funded countries to adopt GSI standards for product and location identification and data exchange. Adopting Global Standards can reduce costs, enhance efficiency, and improve the availability of health commodities in countries' public health supply chains. Recent country highlights included:

### **Ghana**

In Ghana, the project partnered with the MOH to finalize a National Pharmaceutical Traceability Strategy. In Q1, GHSC-PSM and the MOH established a governance body to oversee its implementation and developed Terms of Reference (TOR) for the National Traceability Steering Committee. In Q2, the project facilitated a workshop to formalize the steering committee.

### **Malawi**

In Malawi, the MOH hosted a workshop to review and advance traceability implementation. GHSC-PSM delivered targeted training to stakeholders, including the government, donor partners, and USAID, on concepts related to GSI standards, product master data management, traceability governance, and traceability regulation and policies. High government staff turnover prompted the training to understand traceability implementation. GHSC-PSM provided further technical assistance to workshop participants in finalizing the development of regulations and guidelines for traceability initiatives.

### **Rwanda**

In Rwanda, the Rwanda Food and Drugs Authority (RFDA) hosted a workshop to finalize the development of the regulations and guidelines for implementing the traceability initiatives. The workshop included attendees from RFDA, USAID, United Nations Children’s Fund (UNICEF), United Nations Population Fund (UNPF), private sector partners, and GSI Global. GHSC-PSM delivered a training on traceability and facilitated discussions on how to identify, capture, share, and incorporate GSI health care standards into these regulations.

### **Zambia**

In Zambia, GHSC-PSM worked with the MOH to bolster national traceability objectives by implementing an NPC. In Q2, the project deployed the NPC management tool and conducted a user acceptance training to test the tool with MOH-appointed data stewards. The project developed SOPs and cleaned and finalized the master data file hosted in the tool. The tool establishes a single source of truth for product master data to be accessed by government stakeholders, including the Zambia Medicines and Medical Supplies Agency (ZAMMSA). GHSC-PSM supported the Zambia Medicines Regulatory Agency by incorporating industry feedback on draft identification and labeling guidelines, making progress on policy and regulations to support traceability efforts.

### **Zimbabwe**

In Zimbabwe, GHSC-PSM established a master data task team within NatPharm, the central medical store, in FY 2021 to standardize master data leveraging GSI. In Q1 FY 2022, the project began standardizing product master data at NatPharm to align with Global Standards.

In Q2, GHSC-PSM published the “Key Considerations for Traceability Models Quick Guide,” a resource that provides countries contemplating a resource on how to implement centralized approaches for pharmaceutical verification, tracking, and tracing. The resource is included in the GHSC-PSM Traceability Planning Framework Toolkit.<sup>4</sup>

## **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 service delivery points (SDPs) in two ways: first, by providing technical assistance to host governments in warehousing and delivery; and second, by directly distributing commodities in some countries, often through contracts with in-country logistics companies.

### **Stockout Reduction Initiative**

Despite government and global partners’ investments, SDPs often experience stockouts of critical malaria commodities. PMI seeks to reduce malaria commodity stockout rates at SDPs in PMI-supported countries over the next two to three years. The project implemented a stockout reduction initiative in 21 countries in FY 2021 following a playbook through four stages:

1. Reviewing baseline and targets based on available data
2. Reviewing root causes using supporting evidence

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<sup>4</sup> <https://www.ghsupplychain.org/globalstandards>

3. Validating proposed solutions
4. Developing each country's investment plans and incorporating prioritized investments into FY 2022 work plans

In FY 2021, 20 countries developed investment plans. In Q2 FY 2022, GHSC-PSM developed an Excel-based budget template for investment planning (an extension of stage 4). The template incorporates the investment plan with cost drivers and malaria operational plan (MOP) categories and includes partners' contributions for three years (2023–2025), along with guidance for use.

The budget template guides the budgeting process through four steps:

1. Review existing investment plan outputs
2. Define the current state of each investment and expected impact
3. Provide costing details for each investment activity
4. Assess outputs to make decisions

The project shared the template with three country offices, will refine the template based on their feedback, and will introduce the refined template to all country offices as part of the FY 2023 work plan and MOP planning.

### **Warehousing and Distribution Technical Assistance**

GHSC-PSM provides TA to improve countries' warehousing and distribution processes to strengthen their supply chains. GHSC-PSM incorporates private sector best practices into public health supply chains by applying lean methodologies, such as activity-based costing. 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 the product from one end of the supply chain to the other) and the orchestration (coordination of products) of all activities and service levels.

#### ***Sierra Leone***

GHSC-PSM revised the central-level template in Q1 to work as a district-level malaria commodities distribution matrix to use facility-level stock data and account for adjustments for stockout periods and under-reporting. The project used the revised matrix in Q2, which was effective in allocating quantities to each district or hospital when compared to the previous allocation matrix that reflected fewer quantities of commodities to re-supply. The revised matrix is available through Google Sheets, and the responsible district or hospital staff can easily access the template to populate their physical stock counts quarterly.

#### ***Rwanda***

The Rwandan Government established Rwanda Medical Supply (RMS) Ltd. in 2020 with a mandate to ensure that quality, affordable health products, and medical technologies are readily available to the public through a cost-efficient, sustainable, and effective supply chain. The commodities are procured, stored, and distributed through an economical and financially sustainable supply chain that meets current and future needs and manages increasing complexity. To achieve its mission, RMS needs a dedicated team of supply chain professionals equipped with updated tools and procedure manuals. GHSC-PSM trained RMS staff in Q2 to use monitoring tools to track supply chain key performance indicators and to

implement SOPs for RMS operations for greater efficiency. The training built the skills of RMS staff to use the operational processes and key performance indicators and to develop and monitor tools to track supply chain performance.

## LLIN Distribution

The project provides various support, including procurement and delivery, technical assistance, and distribution in collaboration with NMCP and implementing partners for LLIN distribution in various countries. In the first half of FY 2022, the project delivered over 23 million LLINs to protect nearly 67 million people in 17 countries for mass and continuous distribution (see Exhibit 14 on the next page).

**Exhibit 14.** LLIN deliveries in FY 2022

Country	Number of LLINs delivered
Angola	1,963,040
Benin	550,000
Burkina Faso	1,181,321
Cameroon	347,042
Congo DRC	1,141,683
Côte d'Ivoire	346,374
Ghana	891,865
Kenya	1,663,576
Laos	220,314
Niger	100,000
Nigeria	9,958,433
Rwanda	1,142,263
Senegal	786,522
Sierra Leone	333,000
Tanzania	1,769,796
Thailand	50,000
Zimbabwe	995,000
<b>Grand Total</b>	<b>23,440,229</b>

In the first half of FY 2022, the project supported nine countries<sup>5</sup>, and delivery of LLINs, transporting LLINs to the designated locations through local 3rd party logistics (3PL) service providers, training, and execution, depending on the project's scope in the countries. Among these nine countries, Liberia and

<sup>5</sup> Angola, Burkina Faso, Ethiopia, Ghana, Guinea, Liberia, Malawi, Nigeria, Zimbabwe

Nigeria completed a school-based distribution and a mass distribution in a state, respectively. These massive initiatives provide communities, particularly areas with high concentrations of malaria cases, with the nets they need before the rainy season. Distributions can last a few weeks, while logistics, supply planning, procurement, and pre-positioning of the nets can take months. The project also provided technical or transportation support to 12 countries<sup>6</sup>

### ***Liberia***

The National Malaria Control Program collaborated with key stakeholders (PMI, GHSC-PSM, READ Liberia, Breakthrough Action, Ministry of Education, and County Health Teams) and launched the school-based LLIN distribution campaign in Montserrado, Bong, and Nimba Counties. In the first half of FY 2022, the campaign took place in Montserrado County. The project delivered a total of 53,658 LLINs to 129 public schools to benefit the same number of students. The Bong and Nimba Counties campaigns will take place in Q4. During the campaign, GHSC-PSM provided technical assistance in quantifying the need for LLINs for each district and county school and designed the preposition strategy, as well as supported transportation of LLINs to the designated schools via 3PLs. GHSC-PSM coordinated with partners through daily virtual meetings where each partner provided updates on implantation bottlenecks encountered during the distribution. This coordination greatly enhanced the distribution process by jointly addressing challenges or preventing delays in distributing the LLINs.

### ***Nigeria***

In the first half of FY 2022, the project supported NMCP in completing the ITN mass distribution campaign in Nasarawa State. The project introduced ICT4D tools to monitor the distribution. The use of ICT4D is a transition from the paper-based approach to a technology-driven model that improves accountability, efficiency, and mitigates fraud. Additionally, the project facilitated a training of trainers workshop to prepare 143 persons to train and manage various aspects of the ITN mass distribution at the local government and community levels. The campaign distributed 1,961,067 ITNs which benefited nearly 4 million people.

### ***Ethiopia***

In Ethiopia, GHSC-PSM, with the MOH/National Malaria Elimination Program (NMEP), conducted a workshop to refine the central LLIN distribution plan and build consensus with four regional health bureaus and the Zonal Health Departments in Q1. The project and the regional health bureaus in Amhara, Oromia, The Southern Nations, Nationalities, and Peoples' Region, and Southwest Ethiopia Peoples developed detailed implementation plans for distributing 2.9 million LLINs. The workshop briefed participants on how to carry out the campaign strategy amidst the COVID-19 pandemic. This increased cooperation between the project and counterpart staff within NMEP during the LLIN planning process.

### ***Zambia***

GHSC-PSM, with the National Malaria Elimination Center (NMEC) and other key implementing partners, developed the activity plan for the 2023 LLIN mass campaign. NMEC adopted universal coverage with LLINs as the major vector control intervention rather than indoor residual spraying (IRS).

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<sup>6</sup> Burkina Faso, Burundi, Cameroon, Guinea, Liberia, Malawi, Niger, Rwanda, Sierra Leone, Uganda, Zambia, Zimbabwe.

This campaign required 15 million LLINs, but committed funds would only cover the procurement of five million LLINs. The project, and partners, are advocating that the AMF fill the funding gap.

In addition to the mass distribution campaign, GHSC-PSM supported continuous distribution. The project quantified in-country costs for delivering the LLINs directly to health facilities. GHSC-PSM procured 600,000 LLINs in Q1 and delivered them in Q2 based on the malaria burden per facilities' catchment areas in accordance with NMEC guidance.

#### Global Collaboration for LLIN distribution

The project also collaborated with other global partners in the procurement and distribution of LLIN in Guinea and Nigeria. Please see Section C1 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 approaches to workforce development, improving countries' ability to sustain programs. Interventions include in-service and pre-service training, supportive supervision or mentoring, leadership, and change management competencies.

GHSC-PSM offers USAID personnel the opportunity to partake in an annual Introduction to Supply Chain Management course. In Q3 FY 2021, the project held a virtual course over 10 days. In Q2 FY 2022, the project relaunched the course through a low-cost learning management system, re-purposing the entire original, 40-hour course as a hybrid learning course. The new course employs self-learning through pre-recorded video lectures, discussion boards, pre-recorded interviews, and six synchronous live sessions over three weeks. Of the 37 participants who enrolled in the course, 35 completed it in the given timeframe.

Based on lessons learned from Q2, GHSC-PSM will modify the next offering, tentatively scheduled for Q3 FY 2022. The course is now mandatory for USAID Mission staff assigned to health offices.

Additional country examples of workforce development activities follow.

#### ***Ethiopia***

To contribute to providing standardized supply chain training courses, GHSC-PSM supported MOH and Ethiopian Pharmaceutical Association in developing a manual of new in-service training courses for "Supply Chain Monitoring and Evaluation, Inventory Management, and Pharmaceuticals Procurement Management" on malaria and other health commodities. The project submitted the manual to the MOH for approval.

## **Sierra Leone**

In Sierra Leone, GHSC-PSM updated the integrated health commodities logistics system SOPs. The SOPs involve operations at all levels, including peripheral health units, secondary and tertiary hospitals, district medical stores, and central medical stores. By the end of Q2, the project drafted a zero draft of the SOPs. The SOPs are expected to be finalized in Q3 and approved in Q4. Training will start in Q4. The project will support curriculum development for a training of trainers for selected MOH central and district level supply chain personnel that will cascade the training to all facilities.

## **Zambia**

The project collaborated with the MOH, the National Malaria Elimination Centre, the Nursing and Midwifery Council of Zambia, the University of Zambia School of Medicine, the Biomedical Society of Zambia, and the Pharmaceutical Society of Zambia to develop supply chain management e-learning materials on a multi-feature online platform to alleviate the disruptions of in-person training caused by COVID-19 restrictions. The initiative will increase the knowledge and skills of student nurses, pharmacists, biomedical scientists, and MOH professionals in supply chain management across all logistics systems. The project recorded 13 e-learning sessions on topics for nurses, pharmacists, and laboratory professionals.

GHSC-PSM enrolled 24 nursing students from Kafue and St. Luke College of Nursing and Midwifery in the Health Supply Chain Management in Zambia e-learning course for three weeks. WhatsApp and Google Meet served as communication platforms between facilitators and students during the course. Of the 24 students who enrolled, 21 completed the course. GHSC-PSM will implement the course for students at five additional nursing schools in FY2023.

## **Number of Trainees**

In the first half of FY 2022, GHSC-PSM trained in-country specialists on the full range of supply chain health systems strengthening areas. A total of 16 PMI-supported countries<sup>7</sup> received training from GHSC-PSM. The project trained 1,826 people, either exclusively funded by the malaria task order or co-funded by the malaria task order and other health areas. Women comprised 30 percent of the trainees, and men comprised 70 percent. The countries with the most malaria task order-funded training recipients were Nigeria (954 individuals), Kenya (251 individuals), and Cameroon (116 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 improve supply chains. These strategies reflect findings from country-level assessments, including national supply chain assessments (NSCAs) and EUV surveys.

### **Leadership and Governance**

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<sup>7</sup> Angola, Burkina Faso, Burma, Burundi, Cameroon, Ethiopia, Ghana, Guinea, Kenya, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Zambia, Zimbabwe

GHSC-PSM's governance work builds supply chain systems led by a strong team 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 are provided below.

### ***Ethiopia***

In Q1 of FY 2022, the project provided technical support for the emergency supply chain (ESC) response to conflict-affected health facilities in the Afar and Amhara regions. This support included adapting the ESC playbook (previously developed for disease outbreak management), including developing different tool formats for logistics management; determining the quantity of malaria commodity starter stock needed and to be delivered to affected health facilities; participating in supportive supervision at 30 sites; facilitating the delivery of products to more than 200 health facilities; and providing forklift maintenance services. Some health facilities received starter stock of malaria and other programmatic commodities for four to six months after being affected by the conflict.

### ***Rwanda***

The project supported the RFDA in conducting an internal pre-validation workshop with selected RFDA staff for the following documents developed by MOH and RMS to support the implementation of pharmaceutical pricing policy.

- TOR for the National Pharmaceutical Products Pricing Advisory Committee and related working documents.
- Regulations determining the maximum sales price of human medicinal products through maximum mark-up.
- Regulations determining the maximum sales price of human medicinal products using internal and external reference pricing.

Workshop participants incorporated technical comments into the above regulations for consideration in the upcoming executive validation workshop, where final validation and approval of the regulations will take place.

### **Country Assessments: National Supply Chain Assessment**

The national supply chain assessment 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.

In the first half of FY 2022, GHSC-PSM conducted an NSCA in Rwanda, with activities conducted jointly as part of an overall assessment. The project conducted the country-based activities for the NSCA, both a supply chain mapping workshop and primary data collection across Rwanda for the Capability Maturity Model and key performance indicators. For the supply chain mapping workshop, stakeholders from across the supply chain mapped how the supply chain operates. Participants conducted strengths, weaknesses, opportunities, and threats analysis of supply chain functional areas. This workshop will inform the final report. During the primary data collection, 17 teams collected data from over 200 sites



in less than three weeks. The project is conducting a joint analysis with MOH staffers with a report due in Q3.

GHSC-PSM implemented the NSCA in the DRC in collaboration with the GHSC-TA: Francophone Task Order (FTO) project. GHSC-PSM advisors led the assessment and provided technical input and oversight. The project completed country work for the assessments, and report writing is underway.

In Q2 of FY 2022, GHSC-PSM hosted an open-invite webinar for the French-speaking health supply chain community. The webinar detailed NSCA components, reasons for choosing the NSCA for an assessment, and strategies to deploy the toolkit in a local context. The event drew more than 50 participants.

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

GHSC-PSM's global collaboration activities provide research to shape global markets for health commodities, share supply chain information with other donors and collaborators as a global good, ensure that the project's supply chain stays current with emerging requirements, and effectively manage and share 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**

At PMI's request, GHSC-PSM participated in three malaria global task forces since the onset of COVID-19, the Malaria Pharmaceutical (Pharma) Global Task Force, mRDT Global Task Force, and the Vector Control Access (the former ITN/IRS Global Task Force), to coordinate and manage COVID-19–related impacts on malaria commodity markets and in-country programming. Taskforce members are stakeholders in the global malaria community, including donors and non-governmental organizations like the Bill and Melinda Gates Foundation and Medicines for Malaria Venture. The frequency of the mRDT task force meetings was reduced to quarterly instead of monthly in Q2 of FY 2022, and the global procurer calls to discuss mRDT demand and supplier capacity now take place on an ad-hoc basis instead of monthly. Other task force meetings take place monthly to track COVID-19–related disruptions and delays but also focus more on overall market conditions, particularly as they relate to rising costs, along with supply capacity and other risks.

GHSC-PSM provides market intelligence, informs discussions around market health and supply chain risk, and contributes to suggesting risk mitigation strategies and interventions in these forums. The project takes a leading role in smaller working groups as well. GHSC-PSM contributes to a sub-working group of the Pharma Task Force that focuses on upstream supply chain challenges in the KSM and API markets. (For additional information, see section C2.)

GHSC-PSM works with major procurers to coordinate activities in strategic pharmaceutical markets. In Q2, the project worked with global procurers to assess the impact of the rising cost of artemisinin-based products due to the rise in the cost of artemisinin and potential levers to incentivize the use of semisynthetic artemisinin.

#### **Global Collaboration for Quality Assurance Activities**

GHSC-PSM meets monthly with the LLIN quality and the QMS working group called LLINs Quality Assurance Group (LQAG). The LQAG is composed of GHSC-PSM, PMI, the Global Fund, UNICEF, and WHO Pre-Qualification (PQ). It gathers information and brainstorms processes to improve QMS for LLINs.

In the first half of FY 2022, the project continued to collaborate with global procurers and stakeholders through the LQAG platform to facilitate robust quality and QMS in the LLIN market space. GHSC-PSM presented on behalf of the LQAG at [Quality in LLINs for Procurers at the Raising the Floor Nets: ITN Quality Convening](#) virtual meeting hosted by Bill and Melinda Gates Foundation (BMGF), the Clinton Health Access Initiative (CHAI), and Innovation to Impact (i2i). The webinar convened industry stakeholders, including procurers, suppliers, regulators, and end-users, to discuss LLIN quality. In Q2, GHSC-PSM in the LQAG platform discussed feedback from the Raising the Floor Nets: ITN Quality Convening, which also discussed participation in the second Convening on ITN Quality planned for Q3.

In the first half of FY 2022, GHSC-PSM collaborated with Missions and country stakeholders on quality issues to align the project with country requirements. In Q1, GHSC-PSM, through LQAG, provided the Uganda National Bureau of Standards with comments on DEAS 455:2021 for LLINs, which outlines harmonized requirements governing the quality of products and services in the East African community.

GHSC-PSM also collaborated with the Rwandan government and LLIN suppliers in the first half of FY 2022 in establishing quality agreements to align the differences between country-level QC requirements and methodology, specifically for the post-shipment inspection of LLINs, with WHO and PMI/GHSC-PSM QC requirements. The project ensured that QC activities were executed according to the agreements, which resulted in the LLINs meeting Rwanda QC requirements. Rwanda stakeholders accepted the first consignment of LLINs and included them in their countrywide distribution.

GHSC-PSM, the Global Fund, and PMI meet monthly to collaborate. PMI and Global Fund engage the same manufacturers, use WHO guidance, and often experience similar supplier challenges. Representatives from both teams discuss QA/QC activities to mitigate COVID-19 restrictions, out-of-specification (OOS) investigations, and other shared experiences. In Q2, GHSC-PSM collaborated with the Global Fund on quality-related issues, approaches, and best practices. During the investigation into an artesunate injectable product that was inconclusive for OOS for sterility testing, the project shared data from a third-party testing lab and the joint analysis and discussed the investigation approach and hypothesis with the Global Fund, which then aided the Global Fund in its internal investigation and QC processes for the batches it procured.

## **Global Collaboration for Warehousing and Distribution**

GHSC-PSM works closely with international collaborators, donors, and other stakeholders, to share warehousing and distribution information and resources. 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 best value, as described in the following illustrative examples:

### **Guinea**

GHSC-PSM collaborated with the National Malaria Control Program (NMCP), Catholic Relief Services (CRS, with funding from Global Fund), Stop-Palu+, and a local telecommunication infrastructure provider to improve the management of an LLIN mass distribution campaign. The MOH, through the NMCP to optimize LLIN distribution activities and developed the digitalized campaign. As part of this collaborative effort, CRS supported app development and internet access, Stop Palu+ purchased the server, and GHSC-PSM installed, configured, and maintained the server in the MOH data center via a local subcontractor. This initiative leveraged resources between partners and shared the cost of internet provision, app configuration, and server hosting and maintenance. The mobile app developed for the campaign assigns a QR Code to count the households and calculate the number of mosquito nets and

count net distribution. As a result, the LLIN mass distribution campaign continues to improve planning, implementation, data collection, and visibility, allowing better coverage of LLINs for beneficiaries.

Also, in support of LLIN distribution efforts in Guinea, in Q2 FY 2022, GHSC-PSM collaborated with the Against Malaria Foundation (AMF) to ship 3.1 million LLINs. In Q1 FY 2021, GHSC-PSM drafted and executed an memorandum of understanding (MoU) with AMF, and QA/QC activities took place in the first half of FY 2022. Delivery of the LLINs to the Central Medical Store in Conakry is expected in seven staggered shipments in Q3.

In terms of collaborative warehousing in Guinea, GHSC-PSM works with the Global Fund, Gavi the Vaccine Alliance, and the Government of Guinea to provide technical assistance to build a prefabricated warehouse (PFW) at the Coyah site. In Q2 FY 2022, GHSC-PSM presented the PFW Steering Committee, composed of members of the MOH, with plans for architectural, civil engineering, electric, firefighting, ventilation, information and technology, surveillance, and access control. GHSC-PSM developed bills of quantities associated with the components of the PFW to cost the construction. To facilitate this multi-donor and multi-stakeholder collaboration, GHSC-PSM developed an MoU and Terms of Reference (TOR) to define and document the roles and responsibilities of each party for financing and managing phases of the construction and implementation. The MoU and TOR are under review. The signed MoU will authorize the next phase of assembly. In support of this initiative, GHSC-PSM held technical assistance meetings with Pharmacie Centrale de Guinée (PCG) and Unité d'Appui à la Gestion et à la Coordination des Programmes (UAGCP) to review study deliverables and guide the preparation of a call for tender to identify a qualified firm to assemble the PFW and a QA contractor to oversee the work.

## **Nigeria**

GHSC-PSM works with the AMF to deliver AMF-procured 3.7 million pyrethroid-piperonyl butoxide (PBO) LLINs in Akwa Ibom province. GHSC-PSM, AMF, and PMI developed an MoU and executed it in Q4 FY 2021 to outline the roles and responsibilities of all parties. AMF agreed to procure the LLINs from the supplier, while GHSC-PSM was responsible for the QA/QC (inclusive of inspection, sampling, and testing at one of the project's third-party QC laboratories) and logistics activities (inclusive of pickup, shipping, and delivery). The project undertook QA activities in Q1 FY 2022 and delivered LLINs in eight staggered shipments to the Akwa Ibom Central Medical Store in Q2.

## **Global Collaboration for Global Standards and Traceability**

The project with the TraceNet working group adopts Global Standards for LLINs in collaboration with strategic partners such as the IDA Foundation. The recommendations and timeline adopted by the TraceNet working group require standards-based identification, data capture (barcoding), and master data sharing in a phased implementation structure. The final requirement for serialization of the individual LLINs and standards-based labels on bales will be mandatory as of Q3. The project engaged with suppliers on compliance updates with this requirement, and most suppliers began the necessary processes to implement this change.

## **C.2 Global Market Dynamics Research and Innovations**

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

## Commodity Risk Mitigation

The project experienced an uptick in notifications of raw material challenges from pharmaceutical suppliers in Q1, largely attributed to production constraints due to government-imposed environmental restrictions in China, the main source of pharmaceutical raw materials. Chinese New Year, the Beijing Olympics, and the emerging COVID-19 Omicron variant compounded the impacts on personnel along the supply chain from factories to ports to logistics workers throughout Q2.

GHSC-PSM held a Commodity Council meeting in Q2, in advance of releasing the FY 2023 artemisinin-based pharmaceutical tender, to discuss volatility in the artemisinin market and present mitigation strategies. Vegetal artemisinin prices increased 50 percent over the course of FY 2021, and semisynthetic prices are up due to various market conditions, including the increasing cost of natural gas and the impact on production exacerbated by the war in Ukraine. The project contributed to stakeholder discussions on the need for a sustainable long-term solution to stabilize prices and ensure secure supply for this KSM into the future.

An OOS investigation of a supplier of injectable artesunate led to a severe malaria supply disruption in Q2 (See section A3 for details) that impacted orders for 14 countries, four of which experienced a stockout in Q2, despite the project's issuance of an RFI to assess lead time and availability of partner products, and a poll of countries' willingness to accept alternatives. GHSC-PSM worked with the supplier and other procurers on a fulfillment solution that is underway to restore demand.

GAD delays on all lab commodities, the project's most complex product category, involving many catalog options, persisted in both quarters. Competing demand for use in the global COVID-19 response, the consolidated nature of pick-ups and movement between various ports, and manufacturing constraints exacerbated the situation.

Surging demand for rapid diagnostic tests in the first half of FY 2022, in the wake of the COVID-19 Omicron Variant, prompted multiple mRDT suppliers to prioritize their COVID-19 diagnostics production lines. A combination of reallocation and countries accepting longer lead times in Q2 enabled the project to meet country needs in the first half of the year due to the temporary surge in demand for the COVID-19 test. mRDT GADs stabilized at the end of Q2, with only one supplier having challenges receiving raw materials from China.

LLINs, the project's bulkiest and heaviest commodity, experienced residual shipping and container delays throughout the first half of FY 2022. One supplier with manufacturing in Thailand overcame its production backlog in Q2 after being forced to halt production in Q1 due to an outbreak. The Shanghai port lockdown in Q2 impacted two suppliers' shipments to West Africa, delaying requested dates by approximately four weeks. Despite the logistics challenges, GHSC-PSM expects it can continue to meet demand, albeit with longer lead times.

The war in Ukraine and its effects on international energy markets have impacted the manufacture of various malaria commodities, which rely upon crude oil derivatives, in addition to product transportation. These impacts are expected to extend into Q3 FY 2022. GHSC-PSM monitors and mitigates such supply chain disruptions by soliciting bi-weekly updates from suppliers at the order-line level to understand and proactively respond to near-, medium-, and long-term challenges.

## Other Global Innovations

At the central and country levels, GHSC-PSM tests and promotes new approaches to ensure the availability of lifesaving commodities for the people who need them. Illustrative innovations from the first half of FY 2022 include:

- In advance of the SP strategic tender, the project met with global stakeholders to discuss the progress of three African manufacturers of sulfadoxine-based products towards WHO prequalification. Separately, the project onboarded a new SP manufacturer based in Europe, which will shorten product transit times to West Africa. These efforts advanced the primary objectives of the new tender: support sustainable pricing (reflective of the current market conditions), expand the supply base, and improve geographic diversity.
- Dual forces in the artemisinin market, namely concerns about diminishing supply of vegetal artemisinin given competing interests, such as the opportunity to plant other more lucrative agricultural crops, and concerns related to sustained production of the semi-synthetic product, led the project in the first half of FY 2022, to facilitate out-of-cycle meetings with members of the KSM/API Working Group to discuss on volatility in both the vegetal and semisynthetic artemisinin markets and opportunities for market-shaping intervention. Through this collaboration, GHSC-PSM analyzed historical artemisinin import data to one of the primary locations of finished product manufacturing and then combined it with antimalarial production insights and semisynthetic material spot price data to create a model for estimating the incremental funding required to procure applicable volumes of finished product utilizing various amounts of, generally higher-priced, semi-synthetic artemisinin at different price points. The model and input shared from other members of the Working Group helped inform GHSC-PSM's decision to continue with an incentive-based approach for finished product manufacturers utilizing semi-synthetic artemisinin in their FY 2023 artemisinin-based finished pharmaceutical product tender. While price implications are anticipated, the incentive is ultimately in the advancement of longer-term consistent, affordable access to quality-assured semi-synthetic artemisinin, contributing to more stabilized antimalarial prices for patients and the donor community.

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

### International Meetings and Conferences

GHSC-PSM represents the supply chain point of view in key global meetings and conferences to ensure that donors and governments consider the supply chain in program planning. In the first half of FY 2022, GHSC-PSM participated in the following conferences:

In Q1, GHSC-PSM's Zambia team made two poster presentations on the project's malaria and data visibility work at the [American Society of Tropical Medicine and Hygiene 2021 Annual Meeting](#):

- [Protecting Patients from Malaria Using a Data Analytics Application to Redistribute Health Commodities in Zambia](#)
- [Supply Chain Management During the COVID-19 Pandemic: A Lesson from the Malaria Pre-elimination Districts in Zambia](#)

In Q2, GHSC-PSM prepared three abstracts for submission to the ASTMH 2022 Annual Meeting, to be held in Seattle from October 30 – November 3, 2022. One abstract is from Cameroon on “Strengthening District Teams for Improved Malaria Logistics Data Availability, Quality and Use in the North and Far North Regions of Cameroon,” and two abstracts are from Ethiopia on “Applying Effective Approaches Contributing to the Reduction of Wastage and Better Availability of Essential Medicines” and “Assessment of Primaquine Utilization in Four Ethiopian Health Facilities in the Context of Ethiopia’s Malaria Elimination Strategy.”

In Q1, GHSC-PSM participated in the [Global Health Supply Chain Summit \(GHSCS\)](#). GHSC-PSM Malawi was shortlisted as a finalist for the GHSCS prize “Healthcare Supply Chain Excellence in Global Health in Low- and Low-Middle Income Countries” for its vaccine deployment support to the Malawian Ministry of Health. Presentations included:

- [Supporting the Malawi Ministry of Health to adapt the public health supply chain to respond to COVID-19 effectively and efficiently](#)
- [Building capacity for the future: A case study of sustainable supply chain workforce development in Angola](#)
- [Malawi Ministry of Health and partners adapt the public health supply chain to swiftly and effectively distribute COVID-19 vaccines](#)
- [Adapting public health supply chain supportive supervision to the context of COVID-19 to maintain availability of lifesaving medicines \(Ethiopia\)](#)

### Other Malaria Meetings and Events

- Attended the **Alliance for Malaria Prevention Partners Meeting**, an annual partners’ meeting. Held virtually in Q2, the meeting focused on LLIN access and distribution. The main themes included 1) LLIN access, 2) Scaling up new LLIN types, and 3) COVID-19 adaptations and distribution outcomes.
- Participated in the **KSM/API sub-working group**<sup>8</sup> of the **Malaria Pharma Task Force**:<sup>9</sup> In Q1, the working group focused on discussing, tracking, and validating activity in the artemisinin market surrounding a KSM used in all ACTs and rectal and injectable artesunate. The Working Group renewed discussions around the use of semisynthetic artemisinin in the wake of increased pricing and sourcing challenges for vegetal artemisinin.
- Participated in the [Quality in LLINs for Procurers at the Raising the Floor Nets: ITN Quality Convening](#) virtual meeting for the **LQAG in Q1**. This group, made official in Q4 FY 2021, also includes the Global Fund, PMI, UNICEF, and WHO PQ. GHSC-PSM chairs the working group,

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<sup>8</sup> KSM/API Working Group members include CHAI, BMGF, GHSC-PSM, the Global Fund, Medicines for All Institute, Medicines for Malaria Venture (MMV), Maisha Meds, PATH, Unitaid, PMI, and WHO.

<sup>9</sup> Pharma Task Force members include the Asia Pacific Leaders Malaria Alliance Secretariat, CHAI, BMGF, GHSC-PSM, the Global Fund, Impact Malaria, the Malaria Consortium, MMV, Médecins Sans Frontières, Pan-American Health Organization, PATH, PMI, UNICEF, and WHO.



whose objective is to provide a forum for monitoring and communicating LLIN quality-related concerns and trends to facilitate and/or implement activities to mitigate identified quality issues and potential risks.

- Worked with the **Global Fund**, **UNICEF**, and the **Malaria Consortium** to share demand information and coordinate procurement planning for SPAQ for FY 2022 SMC campaigns.

## **C.4 Coordination and Collaboration within GHSC-PSM**

### **Coordination Across Health Areas Within the IDIQ**

- GHSC-PSM promotes collaboration across the four health areas and with other GHSC-funded activities. The project uses the scale of its work across multiple health areas to benefit all task orders. Due to the project's economies of scale, significant cost savings related to infrastructure (e.g., through RDCs and contracts with 3PL service providers) are possible. See section A.2 for additional details on logistics cost savings.
- The project built the ARTMIS information system to manage its supply chain with funding from all health areas. Other enhancements include creating new requisition orders, purchase orders, and inventory order reports, developing a toolbox to estimate lead time and freight costs, and designing integration with other tools. (See Section A.4.) ARTMIS integrates with partner systems like the Global Family Planning Visibility and Analytics Network, M-DIVE, and Data Development Commons (in progress). Shared funding allows for specialized support, such as market dynamics, knowledge management and communications, and monitoring and evaluation (M&E).
- The project's four primary health areas co-fund innovations such as GSI. GHSC-PSM supports the adoption of Global Standards in supply chain processes through technical assistance within country programs. In the first half of FY 2022, GHSC-PSM undertook targeted activities around the upcoming Q3 serialization requirements, working with USAID to establish expectations for supplier compliance and data collection approaches. For full details on GSI activities in FY 2022, see Sections A.4 and C.1.
- The project advanced the forecasting and supply planning tool from PipeLine to QAT in FY 2021, co-funding all four health areas. The module for supply planning was implemented in 13 countries in FY 2021 and three additional countries in Q1 FY 2022. In the first half of FY 2022, six countries advocated and trained their government counterparts' staff to use QAT. GHSC-PSM initiated the development of the second QAT module for forecasting. The project will pilot this module in Q3 FY 2022. See Section B.1.
- Numerous health programs observed the utility of PMI's long-standing EUV survey and requested GHSC-PSM to adapt the survey to meet their needs, such as reproductive health and maternal, newborn, and child health programs. 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. In the first half of FY 2022, the project finalized the revision of the indicators and a reporting template for implementation in Q3. For full details on EUV activities in FY 2022, see Section B4.



- GHSC-PSM maximizes synergies across health programs. The project develops approaches and systems in one health area that diffuse to other areas. Multiple health areas fund most of GHSC-PSM country offices. This provides enormous benefits for country offices, which share the cost of office space, infrastructure, and staff. The health areas 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 forecasting and supply planning, warehousing, distribution, inventory management, and LMISs.

### **Coordination with Other USAID GHSC-funded Activities**

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

## D. Performance Monitoring

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

### D.1 Indicators

GHSC-PSM has a USAID-approved M&E plan with performance indicators that reflect the project's results framework. Annex A provides the framework and Annex B provides the list of indicators and their definitions. Annex C details the sources of all the commodities the project procures. Annexes D–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 indicator values for each reporting period; and reports these indicators in contractual quarterly and annual reports. GHSC-PSM performs extensive quality assurance (QA) of on time delivery (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:

- A weekly malaria task order management team meeting to discuss activities.
- Daily global supply chain meetings to review pending orders and prioritize actions for malaria order management.
- Weekly GHSC-PSM program management meetings on cross-cutting project issues that impact project health areas, including the malaria task order.

#### **GHSC-PSM Standing Meetings with USAID/PMI Include:**

- Weekly GHSC-PSM malaria task order 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 malaria task order QA and PMI meetings to review progress on QA activities.
- Biweekly GHSC-PSM management team and USAID check-in meetings to review cross-cutting project performance with the USAID Contracting Officer's Representatives.

- Biweekly M&E TWG meetings to develop, review, update, and promote global M&E strategies, processes, and tools for the project; identify and share best practices across countries and other USAID partners; and address technical assistance that has cross-country applicability.
- Biweekly logistics TWG meetings to review deliver/return and 3PL metrics and logistical challenges and issues; 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 corrections to defects or new functionalities.
- Bi-weekly ARTMIS meetings to provide the technical status (e.g., accomplishments, planned roadmap tasks, and risks) to USAID MIS backstops.
- Country MIS meetings, organized by Country Program Management Units, to provide updates to USAID MIS backstops on countries' MIS operations or implementation status.
- Monthly QAT steering committee meetings to update USAID, GHSC-PSM task order directors, GSC, and Commodity Security teams and discuss 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 provide financial updates across task orders.
- Bi-monthly (every two months) GHSC-PSM and USAID Development Data Library Working Group meetings to review requirements and best practices for data sharing with USAID and other partners.

### **D.3 Other Monitoring**

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

In Q2, GHSC-PSM completed the FY 2021 Environmental Mitigation and Monitoring Report (EMMR) and received comments from USAID. Once completed, the FY 2021 EMMR will be distributed to the USAID Global Health Bureau Environmental Officer.

Additionally, GHSC-PSM issued the second sub-task order to one of four health care waste management indefinite-quantity subcontract (IQS) holders. The work will support Angola's MOH to develop new SOPs on waste management, reverse logistics, and environmental compliance. The SOPs support the country's processing of health care waste generated by COVID-19 vaccine campaigns. It is expected that during Q3, GHSC-PSM will issue an additional three sub-task orders to address the waste disposal needs of expired and damaged products at Belgium, Dubai, and South Africa RDCs.

# GLOBAL HEALTH SUPPLY CHAIN PROGRAM

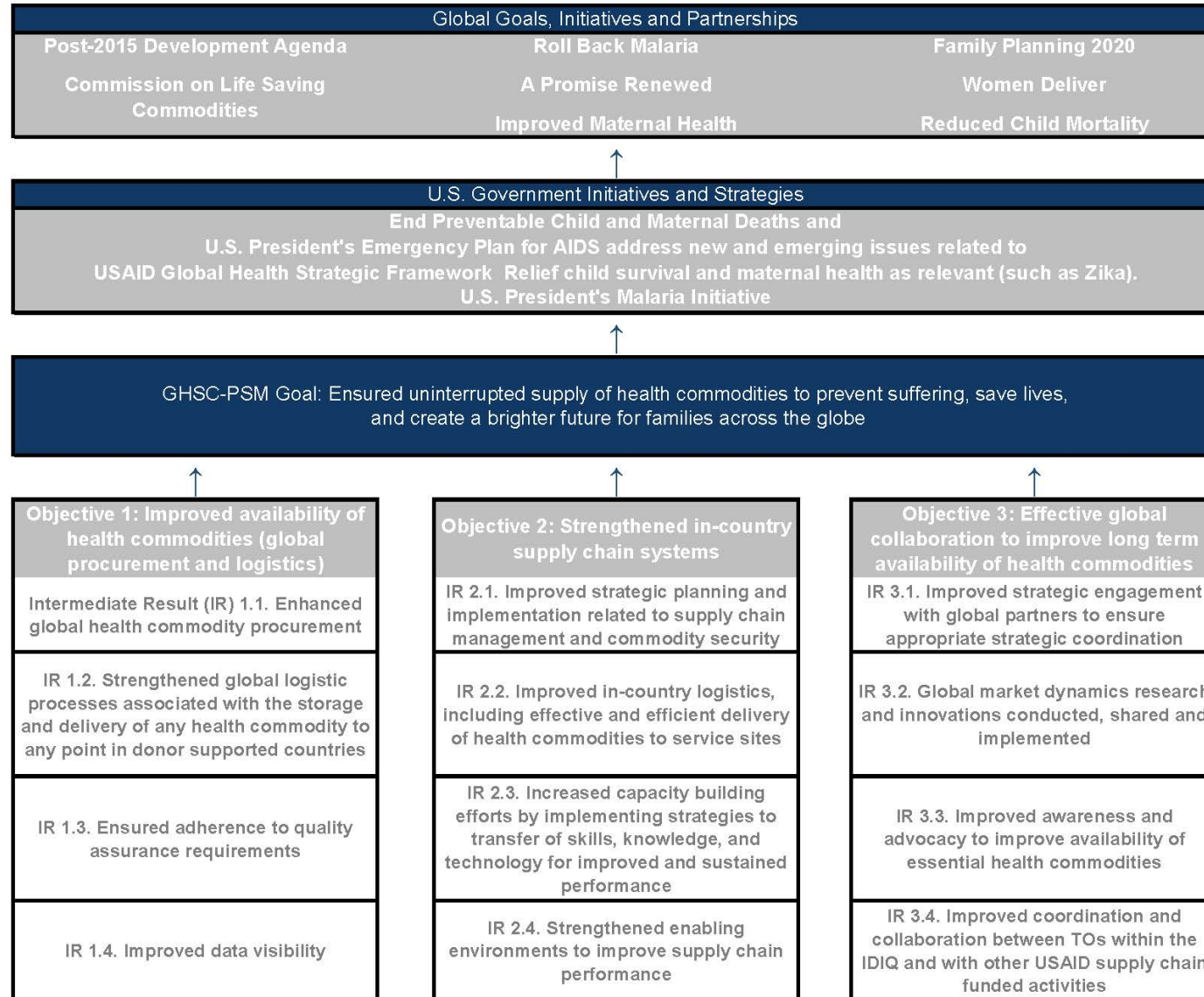
## Procurement and Supply Management

### GHSC-PSM Task Order 2 (Malaria)

Semi-Annual Report External Annex FY 2022



# 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.
A03	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. The project is implementing new dwell tracking procedures, with the intent of reporting dwell-adjusted cycle time by FY2021.
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, 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 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, 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
V.K.A. Polymers Pvt. Ltd.	MagNet®	Polyethylene	Alpha-cypermethrin
V.K.A. Polymers Pvt. Ltd.	Veeralin®	Polyethylene	Alpha-cypermethrin + PBO

# Annex C. Commodity Sources

Eligible RDT Manufacturers			
Manufacturer	Test Name	Target Antigen	Species
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Arkray Healthcare Pvt. Ltd.	Malaria Rapid Diagnostic test (RDT) HRP2 (Pf) Cassette, 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
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	Malaria Rapid Diagnostic Test (RDT) HRP2/pLDH (Pf/Pv) Cassette, 25 Tests (Bulk + POCT)	HRP2/pLDH	Pf/Pv
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	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 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, 25x3, 50x3, 100, 1000
Guilin	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 25x3, 50x3, 100, 1000
Jiangsu Pengyao	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 25x3, 50x3, 100, 1000
Medopharm	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 25x3, 50x3, 100, 1000
Micro Labs	SP	500 mg Sulfadoxine/25mg Pyrimethamine, 10x3, 25x3, 50x3, 100, 1000

## **Annex D. Malaria Commodities Procured and Delivered**

**Note:** Malaria Commodities Procured and Delivered are reported on an annual basis and are not included in the semi-annual report.



# Annex E. GHSC-PSM Procurement Indicators

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

Reporting Period Product Category	2022-Q1			2022-Q2		
	Procurement total	Framework contract percentage	Framework contract target	Procurement total	Framework contract percentage	Framework contract target
ACTs	\$14,327,884	100%		\$7,059,091	100%	
Laboratory	\$188,898	100%		\$514,082	98%	
LLINs	\$34,592,528	100%		\$39,926,556	93%	
mRDTs	\$4,873,430	100%		\$10,508,763	100%	
Other Non-Pharma	\$19,331	100%		\$43,869	100%	
Other Pharma				\$9,500	100%	
Severe Malaria Meds	\$9,614,176	100%		\$3,106,406	100%	
SMC	\$3,229,433	100%				
SP	\$1,286,161	100%		\$686,852	100%	
<b>Total</b>	<b>\$68,131,840</b>	<b>100%</b>	<b>90%</b>	<b>\$61,855,120</b>	<b>96%</b>	<b>90%</b>

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

Reporting Period Product Category	2022-Q1		2022-Q2	
	OTIF	Total # of Line Items Delivered	OTIF	Total # of Line Items Delivered
ACTs	88%	57	68%	95
Laboratory	93%	14	79%	19
LLINs	96%	26	90%	42
mRDTs	68%	19	92%	13
Other Non-Pharma	100%	13	100%	1
Other Pharma	100%	2	100%	1
Severe Malaria Meds	92%	13	95%	21
SMC			100%	16
SP	91%	23	100%	6
<b>Total</b>	<b>89%</b>	<b>167</b>	<b>81%</b>	<b>214</b>

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

Reporting Period Product Category	2022-Q1		2022-Q2	
	OTD	Total # of Line Items with ADDs in the quarter	OTD	Total # of Line Items with ADDs in the quarter
ACTs	91%	55	71%	100
Laboratory	100%	14	83%	18
LLINs	83%	30	88%	42
mRDTs	71%	21	92%	13
Other Non-Pharma	100%	13	50%	2
Other Pharma	100%	1	100%	2
Severe Malaria Meds	93%	14	91%	22
SMC			100%	16
SP	91%	23	75%	8
<b>Total</b>	<b>89%</b>	<b>171</b>	<b>81%</b>	<b>223</b>

**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

## A16. Percentage of backlogged line items

Reporting Period	2022-Q1		2022-Q2	
Product Category	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	0.2%	414	0.0%	396
Laboratory	0.0%	68	2.8%	72
LLINs	3.5%	141	5.4%	149
mRDTs	0.9%	116	1.1%	95
Other Non-Pharma	0.0%	27	3.8%	26
Other Pharma	16.7%	6	0.0%	5
Other RTK	0.0%	1	0.0%	1
Severe Malaria Meds	0.0%	97	5.0%	101
SMC	0.0%	29	0.0%	45
SP	4.1%	49	5.1%	39
<b>Total</b>	<b>1.1%</b>	<b>948</b>	<b>2.0%</b>	<b>929</b>

## A6a. Absolute percent supply plan error

Product Category	Supply plan error	Supply plan bias	4-quarter error	4-quarter bias	4-quarter error target
<b>ACTs</b>					
2022-Q1	48%	48%	2%	2%	35%
2022-Q2	23%	23%	10%	10%	35%
<b>mRDTs</b>					
2022-Q1	26%	26%	5%	-5%	25%
2022-Q2	66%	66%	25%	25%	25%

## A4. Total inventory turns (annual)

Reporting Period	Inventory turns	Inventory Turns Target
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## 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)
2022-Q2	15.2%	18.4%

## 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)
2022-Q2	16.2%	20.0%

## A3. Cycle Time (Average)

Reporting Period	Average Cycle Time	Cycle time target	Average dwell-adjusted cycle time
2022-Q1	358	340	300
2022-Q2	346	340	311

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

Reporting Period	% Shelf Life Remaining	Shelf life target
2022-Q1	67%	70%
2022-Q2	62%	70%

**Note:** A4 is an annual indicator and therefore has no data for the semi-annual report.

# Annex F. Other GHSC-PSM Logistics Indicators

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

Reporting Period Product Category	2022-Q1		2022-Q2	
	% QA Processes On Time	Total # of QA processes completed	% QA Processes On Time	Total # of QA processes completed
ACTs	85%	20	100%	40
LLINs	100%	16	100%	16
mRDTs	100%	13	83%	12
Other Pharma		0		0
Severe Malaria Meds	69%	13	100%	10
SMC	57%	7	100%	6
SP	50%	4	80%	10
<b>Total</b>	<b>84%</b>	<b>73</b>	<b>96%</b>	<b>94</b>

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

Reporting Period Product Category	2022-Q2	
	Report submissions	# of reports due
ACTs		0
LLINs	100%	1
mRDTs		0
Other Pharma		0
Severe Malaria Meds	100%	1
SMC		0
SP		0
<b>Total</b>	<b>100%</b>	<b>2</b>

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

Reporting Period Product Category	2022-Q1		2022-Q2	
	% Out-of-spec	Total # of batches tested	% Out-of-spec	Total # of batches tested
ACTs	0.0%	89	0.0%	127
LLINs	0.0%	37	0.0%	20
mRDTs	0.0%	36	0.0%	46
Other Pharma		0		0
Severe Malaria Meds	0.0%	58	0.0%	20
SMC	0.0%	45	0.0%	37
SP	0.0%	7	0.0%	14
<b>Total</b>	<b>0.0%</b>	<b>272</b>	<b>0.0%</b>	<b>264</b>

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

Reporting Period Product Category	2022-Q1		2022-Q2	
	% using temp waiver	Total # of line items delivered	% using temp waiver	Total # of line items delivered
ACTs	0.0%	57	3.2%	95
Laboratory	0.0%	15	0.0%	19
LLINs	57.7%	26	21.4%	42
mRDTs	52.6%	19	38.5%	13
Other Non-Pharma	0.0%	13	0.0%	1
Other Pharma	100.0%	2	100.0%	1
Severe Malaria Meds	15.4%	13	9.5%	21
SMC			0.0%	16
SP	4.3%	23	33.3%	6
<b>Total</b>	<b>17.9%</b>	<b>168</b>	<b>10.3%</b>	<b>214</b>

## 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
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**Note:** There was no RDC expiry in Q1 or Q2.

### 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
2022-Q1	TO2 - Malaria	Congo DRC	Damage	Malaria Pharmaceuticals	\$1,509	\$1,599,292	0.09%
2022-Q1	TO2 - Malaria	Congo DRC	Missing product	LLINs	\$1,626	\$1,046,543	0.16%
2022-Q2	TO2 - Malaria	RDC	Damage	Malaria Pharmaceuticals	\$2,262	\$1,049,970	0.22%