USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM
Procurement and Supply Management

FISCAL YEAR 2022

QUARTERLY REPORT | QUARTER 1

OCTOBER 1, 2021 TO DECEMBER 31, 2021

USAID FROM THE AMERICAN PEOPLE

PEPFAR U.S. President's Emergency Plan for AIDS Relief

PMI U.S. PRESIDENT'S MALARIA INITIATIVE
LED BY USAID FROM THE AMERICAN PEOPLE CDC

FISCAL YEAR 2022

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Contract No. AID-OAA-I-15-00004

The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project is funded under USAID Contract No. AID-OAA-I-15-00004. 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.

Contents

ACRONYMS

3HP	isoniazid/ and rifapentine (combination treatment for tuberculosis)
3PL	third-party logistics
ABC	activity-based costing
ALu	artemether-lumefantrine
ACT	artemisinin-based combination therapy
AMF	Against Malaria Foundation
API	active pharmaceutical ingredient
APWG	ARV/3HP Procurement Working Group
ARPA	American Rescue Plan Act
ART	antiretroviral therapy
ARV	antiretroviral

BMGF	Bill & Melinda Gates Foundation
BoMRA	Botswana Medicines Regulatory Authority
CHAI	Clinton Health Access Initiative
CHTF	Child Health Task Force
CMS	central medical store
COC	combined oral contraceptive
COP	country operational plan
DCP	decentralized procurement
DEAS	Draft East African Standards
DMPA	depot-medroxyprogesterone acetate
DNO	diagnostic network optimization
DRC	Democratic Republic of the Congo

DRF	Drug Revolving Fund
DT	dispersible tablet
DTG	dolutegravir
EDT	Electronic Dispensing Tool
EID	early infant diagnosis
eLMIS	electronic logistics management information system
EPSA	Ethiopia Pharmaceuticals Supply Agency
EPI	Expanded Programme on Immunization
ERP	enterprise resource planning
ESC	emergency supply chain
FASP	forecasting and supply planning
FLARE	First-Line ARV Reporting and Evaluation

FP/RH	family planning/reproductive health
FY	fiscal year
GAD	goods availability date
GDSN	Global Data Synchronization Network
GHS	Ghana Health Services
GHSC-PSM	Global Health Supply Chain Program-Procurement and Supply Management project
GHSC-QA	Global Health Supply Chain Program-Quality Assurance project
GHSC-RTK	Global Health Supply Chain Program-Rapid Test Kit project
GHSC-TA	Global Health Supply Chain Program-Technical Assistance project
GTIN	Global Trade Item Number
HSSP	Health Sector Strategic Plan
IAR	inter-action review

ICC	integrated call center
IM	intramuscular
INH	isoniazid
IRS	indoor residual spray
i2i	Innovation to Impact
ITN	Insecticide-treated net
IUD	intrauterine device
KPI	key performance indicator
KSM	key starting material
LLIN	long-lasting insecticide-treated net
LMIC	low- and middle-income country
LMIS	logistics management information system

LOX	liquid oxygen
LQAG	LLIN Quality Assurance Group
LZN	lamivudine/zidovudine/nevirapine
MCH	maternal and child health
MIS	management information system
MMD	multi-month dispensing
MNCH	maternal, newborn, and child health
MOH	Ministry of Health
MoHSS	Ministry of Health and Social Services
mRDT	malaria rapid diagnostic test
MSF	Médecins Sans Frontières
MTaPS	Medicines, Technologies and Pharmaceutical Services

NPC	National Product Catalog
NMCP	National Malaria Control Program
NMEP	National Malaria Elimination Program
OTD	on-time delivery
OTIF	on-time, in-full delivery
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PLHIV	people living with HIV
PMI	U.S. President's Malaria Initiative
PNLP	National Malaria Control Program (acronym in French)
POC	point of care
PPE	personal protective equipment
PQM+	Promoting the Quality of Medicines

PPH	postpartum hemorrhage
PPMR	Procurement Planning and Monitoring Report
PPMRm	Procurement Planning and Monitoring Report for malaria
PQ	prequalification
PrEP	pre-exposure prophylaxis
PSBI	possible serious bacterial infection
Q	quarter
QA	quality assurance
QAT	Quantification Analytics Tool
QC	quality control
QMS	quality management system
RDC	regional distribution center

RDT	rapid diagnostic test
RFP	request for proposal
RFQ	request for quotation
RFTOP	request for task order proposals
RHSC	Reproductive Health Supplies Coalition
RMS	regional medical store
RRM	Rapid Response Mechanism
RTK	rapid test kit
SC	subcutaneous
SDP	service delivery point
SGB	Sourcing Governance Board
SMC	seasonal malaria chemoprevention

SMO	social marketing organization
SOP	standard operating procedure
SP	sulfadoxine/pyrimethamine
SPAQ	sulphadoxine-pyrimethamine + amodiaquine
SSA	sub-Saharan Africa
SSWG	Systems Strengthening Working Group
TB	tuberculosis
TE	tenofovir/emtricitabine
TL	tenofovir/lamivudine
TLD	tenofovir/lamivudine/dolutegravir
TO	task order
TPT	TB preventive treatment

TransIT	transportation information tool
UCC	ultra-cold chain
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	U.S. Government
VAN	Global Family Planning Visibility and Analytics Network
VMMC	voluntary medical male circumcision
WHO	World Health Organization
ZAMMSA	Zambia Medicines and Medical Supplies Agency
ZPBF	Zambian Pharmaceutical Business Forum

EXECUTIVE SUMMARY

The USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project, funded by the U.S. Agency for International Development (USAID), is pleased to present this report to summarize our work and performance for the first quarter (Q1) of Fiscal Year 2022 (FY 2022). The project provides lifesaving medicines and other health commodities. It builds efficient, reliable, and cost-effective supply chains to deliver these drugs and health supplies for the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the U.S. President's Malaria Initiative (PMI), USAID's programs in voluntary family planning and reproductive health (FP/RH), and the Agency's program in maternal, newborn, and child health (MNCH), which share the cost of the project. USAID's response to the novel coronavirus (COVID-19) is also described in this report.

GHSC-PSM Fast Facts

Over the life of the project, GHSC-PSM has:

- Delivered more than **64.4 million bottles of TLD** to **29 countries**
- Delivered enough antimalarials to treat **406.4 million infections**
- Delivered contraceptives to provide **94.5 million couple-years** of protection
- Procured a total of over **$23.8 million in MNCH commodities**
- Delivered a total of **697,880 lab commodity items** valued at over **$430.1 million** to 26 countries
- Supported **50 countries** with technical assistance

In Q1 FY 2022, the emergence of the Omicron variant of COVID-19 dashed near-term hopes for stabilization in the state of global logistics. Shipping from South Africa and the surrounding region was particularly impacted due to a shutdown for a little over a month in response to the spread of the new variant, but, by the end of Q1, ports and terminals were beginning to restore operations, and almost all air traffic returned to normal. Rising infections and lockdowns in key, high-volume ports in China and India also directly affected shipping capacity and restricted the flow of shipments, while knock-on effects of scarce shipping containers and flight crew quarantines negatively impacted trucking and air freight.

Supply chain unpredictability compounded volatility in the freight market, and the project saw logistics costs continue to rise, a trend that is unlikely to abate in FY 2022.

However, there are glimmers of good news. The project is seeing stabilization in manufacturing, particularly for antiretroviral medicines, malaria pharmaceuticals, and family planning commodities, with some exceptions. (See sections B1. HIV and B2. Malaria for more information). GHSC-PSM continues to keep its finger on the pulse of global and local logistics, constantly obtaining, updating and analyzing information in real-time to enable the project to pivot when needed and ensure the continuous flow of commodities to those who need them most. In Q1, for example, GHSC-PSM conducted business reviews with 23 key suppliers. These supplier meetings update the project on the impact of regional shutdowns, logistical challenges, and other production and delivery schedule issues, while commodity and supplier risk profiles inform performance assessments and order allocation strategies.

Through it all, GHSC-PSM continues to meet its procurement and technical assistance programmatic commitments, as is noted in the health area highlights. Some additional examples:

In Q1, GHSC-PSM provided technical assistance to seven countries—Botswana, Ghana, Namibia, Nigeria, Rwanda, Zambia, and Zimbabwe—to support their adoption of GS1 standards for product identification, location identification, and data exchange. Adopting global standards can enable countries to reduce costs, enhance efficiency, and improve the availability of health commodities in their public health supply chains. (For more information, see C2: Health Systems Strengthening.)

The project continues to make significant progress rolling out the Quantification Analytics Tool (QAT). QAT's supply planning module is a modernized solution for country-led quantification that leverages new technologies and has enhanced features over the existing supply planning tool, PipeLine, and will eventually replace it. By the end of Q1, 21 countries submitted 93 supply plans through QAT, with 13 additional supply plans in process and more countries and supply plans to be added later in FY 2022. At the end of Q1, QAT users numbered 409 worldwide. (See more about supply planning submissions in C2a. Project Performance.)

For GHSC-PSM, Q1 of each fiscal year is conference season. GHSC-PSM represented 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. The project shared lessons learned, success stories, and innovations while promoting USAID's supply chain thought leadership at the American Society of Tropical Medicine and Hygiene 2021 Annual Meeting, the Association for Supply Chain Management CONNECT Conference, the Health Informatics in Africa 2021 Conference, African Society for Laboratory Medicine 2021 Conference, International Conference on AIDS and STIs in Africa, and the Global Health Supply Chain Summit 2021, where the project's Malawi vaccine team was one of three finalists for the Global Health Supply Chain Summit grand prize. (For more information, see section C3. Global Collaboration.)

With $18.89 M in U.S. Government (USG) funds, GHSC-PSM provides technical assistance and related procurement support to 19 countries in their COVID-19 vaccine rollout. These countries made significant progress in their planned activities in Q1. Technical support varies from country to country and includes cold chain and ultra-cold chain storage and distribution, waste management planning and coordination of vaccine rollouts through in-country technical working groups. GHSC-PSM built health and logistics staff capacity to manage vaccines and emergency health situations in more than six countries in Q1 such as hosting a training for Pakistan's Ministry of National Health Services, Regulations & Coordination on public health emergency response and COVID-19 data management, and hosting two Emergency Supply Chain Playbook sessions for 46 district health staff in Botswana. (For more information, see Annex A: COVID-19 Response.)

GHSC-PSM also took on new pandemic response activities after receiving $11.5M in funding under the American Rescue Plan Act (ARPA) to procure cold chain supplies, cold chain equipment, bulk liquid oxygen, diagnostic tests, general patient care commodities, laboratory consumables, essential medicines, and personal protective equipment (PPE); $18M for GHSC-PSM's newly established Rapid Response Mechanism to procure a limited range of critical COVID-19 commodities for countries requiring emergency supplies; and $3M to establish a virtual stockpile of COVID-19 commodities and provide related technical assistance specifically for Botswana and Lesotho. (For more information, see Annex A: COVID-19 Response).

Global Supply Chain Performance

Section C1 describes GHSC-PSM's global supply chain procurement and logistics activities and achievements. Highlights of our global supply chain performance in Q1 are below.

Procured over $276 million in drugs, diagnostics, and health commodities in Q1, and over $4.2 billion to date.

Delivered over $201.4 million in drugs, diagnostics, and health commodities in Q1, and over $3.8 billion to date.

Achieved **on-time delivery[1] (OTD) of 86 percent (75 percent COVID-impacted)[2] and on-time, in-full delivery (OTIF) of 84 percent (72 percent COVID-impacted)** (See Exhibits 1 and 2). The backlog of late orders was 5 percent.

OTD and OTIF rates stayed consistently strong for all health areas in Q1. OTD was 86 percent (75 percent COVID-impacted) and OTIF was 84 percent (72 percent COVID-impacted) for the quarter, the eleventh successive quarter that OTD has been above 85 percent. OTD was 86 percent (75 percent COVID-impacted) for HIV; 89 percent (81 percent COVID-impacted) for malaria; 98 percent (91 percent COVID-impacted) for FP/RH and 99 percent (47 percent COVID-impacted) for maternal, newborn and child health (MNCH) medicines and commodities, each of which exceeded the contract's

[1] The project's delivery window is –14/+7 days. With this window, deliveries are considered on time if they are made within the period 14 days before or seven days after the agreed-to delivery date.

[2] During the COVID-19 pandemic, 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-to 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 pandemic impacts will not be used. All pandemic-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 pandemic 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.

80 percent quarterly target. Note that, as of the end of Q2 FY 2020, the number of COVID-impacted orders started to increase significantly and, as predicted in previous reports, continued to adversely impact on-time delivery performance through Q1. The high degree of uncertainty and the extreme volatility in freight costs in global supply chains caused by the pandemic continues to impact a large number of orders. GHSC-PSM continues to conduct root-cause analyses of late deliveries to refine procurement and supply chain processes and to continuously improve performance.

Exhibit 1. OTD January 2021–December 2021

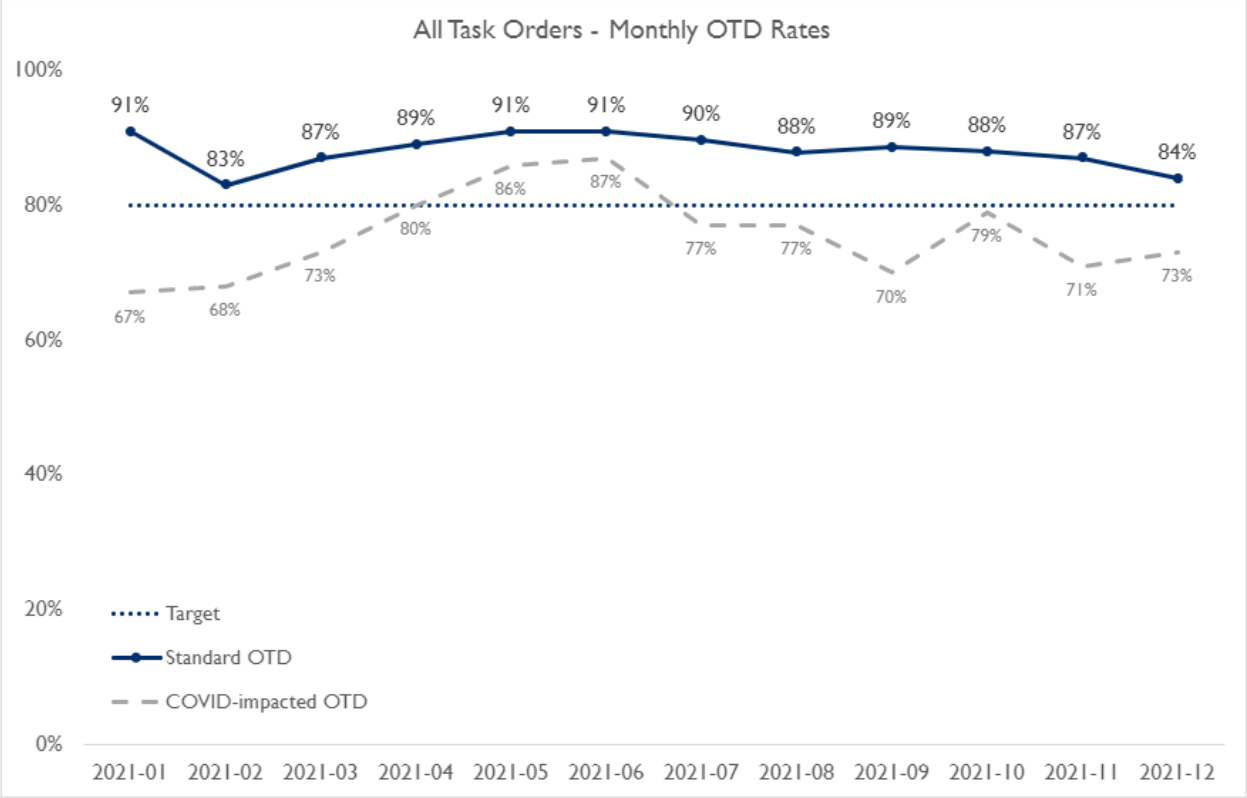
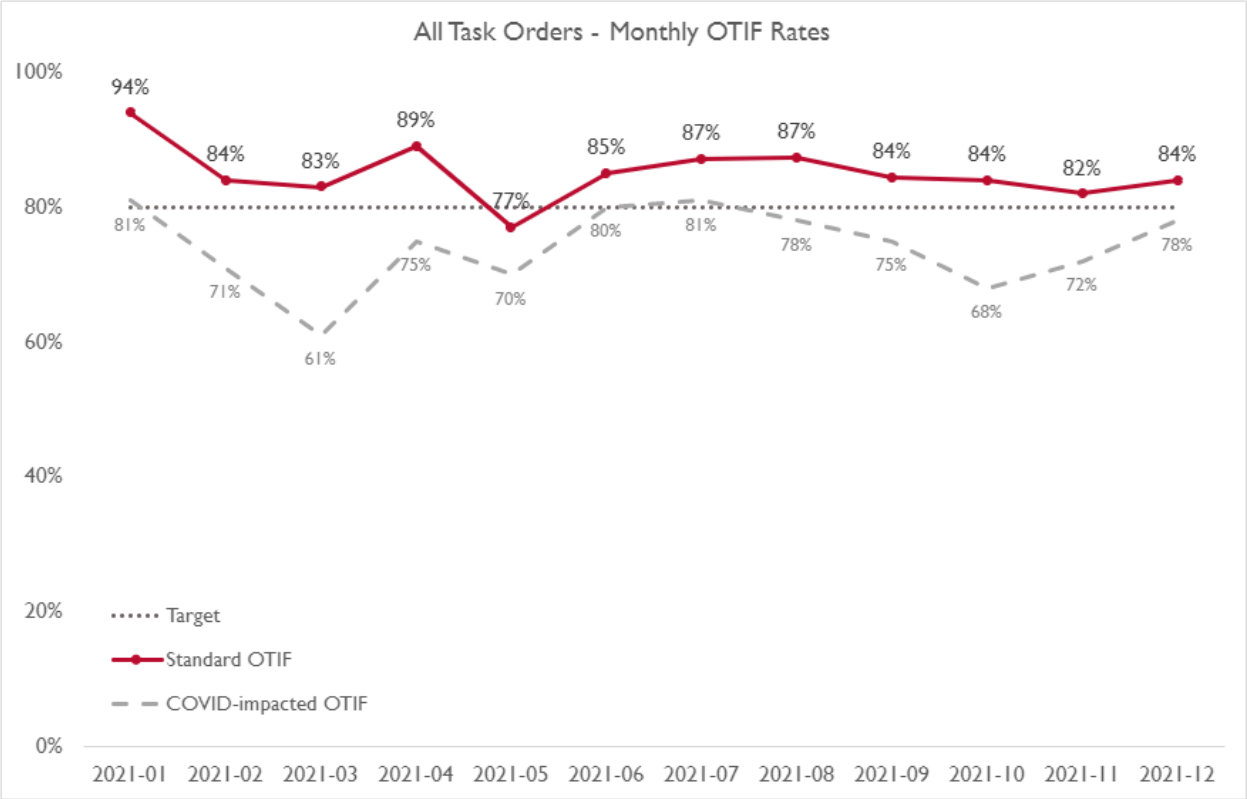


Exhibit 2. OTIF January 2021–December 2021



Significant efforts were made in Q1 to stem the impacts of COVID-19 on freight and logistics as deliveries faced a shipping environment defined by unprecedented COVID-19 shutdowns. The project continues to adapt to unforeseen shifts in the marketplace.

Health Areas

GHSC-PSM provides procurement services and technical assistance to strengthen supply chains and promote global collaboration for the USG programs for HIV/AIDS, malaria, FP/RH, MNCH, and emerging health threats. Highlights of project achievements are provided below.

GHSC-PSM has delivered enough antiretroviral therapy to provide **nearly 16.5 million patient-years** of HIV treatment to date.

This includes **11.6 million patient-years of TLD treatment delivered** to date.

HIV/AIDS

Transitioning to dolutegravir (DTG) 10 mg. Building on the transition to the new optimal pediatric ARV, DTG 10 mg, in Q1, GHSC-PSM had delivered more than 181,000 bottles of DTG 10 mg to Côte d'Ivoire, Kenya, and Mozambique, helping to ensure the transition to the new optimal pediatric ARV. For more information, see section B1: HIV/AIDS.

Actualizing multi-month dispensing. In Q1, GHSC-PSM processed $68 million in one-off procurements for TLD 90 and 180 for 10 countries; 24.6 percent of these procurements were related to emergency orders. Also, the average treatment cost per patient for TLD decreased from $54.16 to $50.83 this quarter, resulting in cost savings in excess of $1.9 million compared to historic pricing. For more information, see section B1: HIV/AIDS.

Expanding the ARVs Delivered at Place (DAP program). In Q1, GHSC-PSM expanded the DAP program by awarding DAP allocations across seven suppliers and increased the number of DAP targeted countries to 10. For more information, see section B1: HIV/AIDS.

Implementing viral load awards. Preliminary end-of-the-year data analysis shows that from January through December 2021, GHSC-PSM and designated non-project buyers (e.g., the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), Ministries of Health, and national procurement agencies) placed orders for 12 million viral load (VL) and early infant diagnosis (EID) tests for deliveries and generated approximately $33 million in savings. For more information, see section B1: HIV/AIDS.

Modernizing the supply chain for sustainability and risk reduction. GHSC-PSM works with countries to modernize their supply chain systems to increase efficiencies, reduce costs and minimize risks. In Q1 GHSC-PSM published the Network Approach to Laboratory Services, which is a new approach to optimizing lab services, but more importantly, provides examples and lessons learned from different countries that have begun implementing this approach. GHSC-PSM also began exploring other vendor-managed solutions together with USAID and the global supplier base.

To date, GHSC-PSM **procured over $1 billion in malaria medicines and commodities for 30 countries.**

This includes treatment for **19.5 million infections** in Q1 and **406.4 million** to date.

In Q1, GHSC-PSM **delivered 9.9 million long-lasting insecticide-treated nets (LLINs) to 6 countries.**

Malaria

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 global leadership in supply, demand, financing, and product development. In Q1, PMI released its new five-year strategy, entitled *End Malaria Faster* The project's malaria work has begun to respond to that strategy by aligning priorities with the new strategy across our malaria work..

Achieving on-time delivery. GHSC-PSM achieved consistently high OTD performance for malaria drugs and commodities in Q4—89 percent (81 percent COVID-impacted) for the quarter. For more information, see section B2: Malaria.

Focusing on sourcing and procurement strategies. The impact of COVID-19 on malaria commodity supply chains continued throughout Q1. The project took proactive measures, liaising with potentially impacted suppliers and third-party logistics (3PL) providers to identify and mitigate potential disruptions, as well as improve processes and tools to ensure accurate inventory tracking, reduce risk of product expiry, inform future sourcing decisions, and establish a consistent process to minimize the impact on overall cycle time. FY 2022 order fulfillment is emphasizing key product categories such as artemisinin-based combination therapies (ACTs), severe malaria medications, sulphadoxine/ pyrimethamine + amodiaquine, LLINs, and malaria rapid diagnostic tests (mRDTs). In proactively managing these procurements, the project focused on sourcing key starting ingredients from a more geographically diverse range of locations, and on ensuring greater options for producing core commodities closer to client countries. For more information, see section B2: Malaria.

Providing quality assurance (QA). In Q1, the QA team continued its efforts to innovate and implement more robust quality assurance and quality management systems within the various product types procured by the project through investigations and collaborations with other external partners and global donors.

Following the laboratory request for proposal, the project onboarded a new laboratory for LLINs testing and a new laboratory for pharmaceutical product testing and actively initiated the use of the additional laboratories for product testing.

In Q1, the project presented on the topic of Quality in LLINs for Procurers at the Raising the Floor Nets: Insecticide-treated Net Quality Convening webinar hosted by the Bill and Melinda Gates Foundation, the Clinton Health Access Initiative, and Innovation to Impact. For more information, see section B2: Malaria.

Prioritizing and redirecting orders. GHSC-PSM, works closely with USAID to prioritize orders based on need and conducts commodity order transfers to improve stock status. In Q4 FY 2021, GHSC-PSM began transferring stock from the regional distribution center (RDC) artemether- lumefantrine (ALu)

emergency stockpile to mitigate the risk of expiry. Burundi, Uganda, and Zambia agreed to receive disbursements to mitigate potential stockouts. Orders were placed with the RDC in Q1 for delivery in Q2.

Distributing LLINs. In Q1, many countries continued to deliver LLINs for routine distribution. Other countries planned, launched or continued large-scale LLIN distribution campaigns as a critical malaria prevention strategy. The project supported the delivery and distribution of nearly 9.9 million LLINs to protect almost 19.8 million people in 6 countries—Benin, Cameroon, Democratic Republic of the Congo (DRC), Kenya, Nigeria, and Tanzania. For more information, see section B2: Malaria.

GHSC-PSM has delivered enough contraceptives that, when combined with proper counseling and correct use, are estimated to p**rovide 94.5 million couple-years of protection** to date.

This includes **4.3 million couple-years of protection** in Q1.

FP/RH In Q1, GHSC-PSM worked with activity leads and country offices through virtual workshops or other strategies to ensure program continuity despite COVID-19 restrictions. For more information, see section B3: Family Planning and Reproductive Health. GHSC-PSM focuses on contraceptive security and the introduction of new products and innovations, including greener and harmonized packaging with the United Nations Population Fund. Through our support to the Global Family Planning Visibility and Analytics Network (VAN), GHSC-PSM provides market analysis to provide a better understanding of government priorities and to improve decision making around procurement needs.

On-time delivery. GHSC-PSM delivered 98 percent (91 percent COVID-impacted) of FP/RH commodities on time in Q1. For more information, see section B3: Family Planning and Reproductive Health.

Collaboration with global stakeholders. The project supports global partners and raises awareness of the U.S. Government's FP/RH priorities and programs. It supported USAID's leadership in contraceptive security through various activities. In Q1, GHSC-PSM:

- Provided support to the Reproductive Health Supplies Coalition (RHSC) Systems Strengthening Working Group (SSWG). In November 2021, GHSC-PSM Senior Forecasting and Supply Planning Advisor John Durgavich was selected as chair of the RHSC SSWG. The group held an introductory meeting to review the FY 2022 work plan and reestablish activity leads, timelines for implementation, as well as dissemination plans.

- Participated in the 10th Annual Meeting of the Ouagadougou Partnership. The partnership includes nine West African countries with the goal to accelerate progress in the use of FP services.

- Provided key contributions to support strategic development and scale-up of the VAN platform and processes. In Q1, GHSC-PSM continued to focus on enabling the project to realize the benefits of the tool by supporting and onboarding users, validating new features, processes, and data integrated with the VAN, and engaging in strategy sessions for use of the VAN in FY 2022.

For more information, see section B3: Family Planning and Reproductive Health.

In Q1, the project **completed delivery of 190 refrigerators** to health facilities **across Ghana** to appropriately store the maternal health commodity oxytocin so it is safe to administer.

MNCH

GHSC-PSM works to prevent child and maternal deaths by increasing access to quality-assured MNCH medicines and commodities, strengthening systems to ensure long-term financing and availability of MNCH commodities, and providing global technical leadership in these areas. This fiscal year the project is focused on ensuring countries have the information and tools they need to avail and ensure the quality of commodities used to treat and prevent postpartum hemorrhage (PPH), a leading cause of pregnancy-related death, and commodities used to treat childhood diarrhea and pneumonia, leading causes of child death. GHSC-PSM will also work to strengthen the domestic wholesaler operating environment for MNCH commodities and provide guidance to countries on how to update their national systems to include the most effective commodities to tackle threats to maternal and child health. By facilitating discussions and sharing data and lessons learned from across GHSC-PSM countries–and even within countries across states and regions–the project will help ensure sustainable systems are in place to improve child health and pregnancy outcomes.

Procuring and delivering commodities. Since the start of the project, GHSC-PSM has delivered over $23.8 million in MNCH drugs and commodities. GHSC-PSM completed the procurement and delivery of a large order of MNCH essential medicines for DRC in Q1. For more information, see section B4: Maternal, Newborn and Child Health.

Providing international MNCH supply chain leadership and guidance. In Q1, GHSC-PSM began planning for a series of technical discussions on availing commodities to treat childhood pneumonia and Possible Serious Bacterial Infection. The project is partnering with many organizations—and leading the series

with USAID's other supply chain projects, the Medicines, Technologies and Pharmaceutical Services and Promoting Quality Medicines Plus Program. For more information, see section B4: Maternal, Newborn and Child Health.

Improving availability of quality MNCH commodities. The project partnered with the Zambian Pharmaceutical Business Forum and International Federation of Pharmaceutical Wholesalers, Inc. in Q1, conducting a series of six workshops on organizational structure, how to identify and manage financial and human resources, governance and communications. GHSC-PSM also worked in Q1 to document lessons learned from work with domestic wholesalers of FP and MNCH commodities across multiple countries. This report will be available in Q2. For more information, see section B4: Maternal, Newborn, and Child Health.

Improving management of PPH commodities. The project works on global and country-specific initiatives to improve the availability of commodities for treating and preventing PPH, including properly stored oxytocin that is effective at the point of administration to mothers. Following more than a year's work to streamline the oxytocin supply chain in Ghana, 190 refrigerators were delivered to facilities with cold storage gaps. The project also hosted a workshop in Malawi to train stakeholders on PPH commodity management and to plan around oxytocin and misoprostol (another PPH commodity) quality challenges. For more information, see section B4: Maternal, Newborn, and Child Health.

Working with countries to improve adherence to commodity quality standards and enhance in-country coordination and collaboration. The project facilitated MNCH supply chain successes through technical assistance for 19 countries in Q1. GHSC-PSM helped assess the MNCH supply chain and availability of key MNCH commodities at facilities in Nepal, advance the launch of drug revolving funds in multiple states in Nigeria, and assess the availability of MNCH commodities in the private sector in Ghana. For more information, see section B4: Maternal, Newborn and Child Health.

Strengthening Health Systems

GHSC-PSM's strategic goal is for every country to have a locally led health supply chain that is integrated, optimized, accountable, agile, lean, and able to sustainably supply quality products to all citizens. GHSC-PSM manages 33 country or regional offices, supplemented by headquarters-based experts; these offices provide wide ranging technical assistance to strengthen national health supply chains.

Several years of investment in strengthening supply chain systems are yielding important innovations and positive results on many fronts. Examples of project activities in systems strengthening include the following:

- In **Colombia**, conducted an assessment of the national information system "PAI Web" to help mitigate a backlog in registering COVID-19 vaccinations, focusing on the supply chain operation of LMIS nationwide and providing support to address challenges with the system.

- In **Ethiopia**, provided intensive technical support to the Ethiopia Pharmaceuticals Supply Agency (EPSA) head office and the Adama and Hawassa hubs for ISO 9001:2015 certification in October 2021. The ISO certification will help EPSA to ensure that the agency's supply chain processes are strategically aligned to reduce stockout and improve availability of public health commodities.

- Also in **Ethiopia**, provided technical support on emergency supply chain (ESC) response to health facilities in Afar and Amhara regions, adapting the ESC play book (previously developed for disease outbreak management) to the conflict-affected areas.

- In **Mali**, partnered with the National Malaria Control Program to establish a call center–adapted from a model developed in South Sudan–to collect stock on hand of antimalarial medicines in community health centers (CSCOMs) in the regions of Gao, Kayes, Koulikoro, Mopti and Timbuktu.

- In **Nigeria,** facilitated a training for 17 master trainers from Sokoto on key concepts, processes, and components of the Drug Revolving Fund (DRF), a system that helps ensure sustainable financing for public health commodities. The training is part of preparation to launch DRF in Sokoto State in Q2.

- In **Zambia**, collaborated with the MOH and other partners to develop supply chain management eLearning materials on a multi-feature online platform to alleviate the disruptions of in-person training caused by COVID-19 pandemic restrictions. The project has so far recorded 13 e-learning sessions on topics for nurses, pharmacists and laboratory professionals.

(For more information, see section C2: Systems Strengthening and Technical Assistance.)

COVID-19 Response Activities

The USG allocated additional funds to GHSC-PSM for COVID-19 response activities. These include:

- With a funding envelope of $11.5M, procuring medicines, medical equipment and supplies through the ARPA.

- Procuring respiratory and cardiac supplies, intensive care unit (ICU) beds, and patient monitors valued at $9.8M for Italy.

- Providing ad hoc ventilator support.

- Procuring oxygen-related equipment and providing technical assistance.
- With a funding envelope of $18M, procuring emergency supplies of a limited range of critical COVID-19 commodities for countries through the newly established Rapid Response Mechanism (RRM).

In Q1, GHSC-PSM made significant progress in procuring oxygen commodities and continuing clinical and non-clinical technical assistance for oxygen work in seven countries, ranging from local delivery of products to training facility staff to use specific oxygen commodities. This work strengthening the oxygen sector is part of USAID's greater response to the pandemic. This work is vital, as oxygen support quickly became the primary clinical intervention for patients suffering from COVID-19. GHSC-PSM also added oxygen products–such as oxygen analyzers, regulators and nose catheters–and cold chain equipment–such as cold boxes, temperature monitors, and coolant packs–to its COVID-19 commodity offerings to countries that have been approved for ARPA funds. (For more information, see Annex A. COVID-19 Response).

In Q1, GHSC-PSM **placed orders for eight countries** with approved ARPA funds for commodities ranging from **COVID-19 RDTs to syringes, coolant packs, pulse oximeters, medical masks,** and more. The project also began planning for **bulk liquid oxygen** delivery to **four potential sites in Botswana and eight in Namibia**.

For more information, see Annex A. COVID-19 Response

Introduction

A1. Background

GHSC-PSM works to ensure uninterrupted supplies of quality medicines and commodities to save lives and to create a healthier future for all. The project directly supports the following global health areas of importance to the U.S. Government (USG):

- The U.S. President's Emergency Plan for AIDS Relief (PEPFAR) to help reach its HIV/AIDS global 95-95-95 testing, treatment, and viral-load suppression targets.
- The U.S. President's Malaria Initiative (PMI) to reduce malaria deaths and substantially decrease malaria morbidity toward the long-term goal of elimination.
- USAID's Family Planning and Reproductive Health (FP/RH) program to ensure that key reproductive-health commodities are available for safe and reliable voluntary family-planning.
- USAID's maternal and child health (MCH[3]) program to prevent child and maternal deaths.
- Other public health threats as they emerge, with support for Zika and COVID-19 at this time.

The project procures and delivers medicines and commodities, offers comprehensive technical assistance (TA) to strengthen national supply chain systems, and provides global supply chain leadership to ensure that lifesaving health supplies reach those most in need. The project procured commodities or provided TA to 62 countries over the life of the project (see Exhibit 3 below).

A2. About This Report

We are pleased to present our performance report for Q1 FY 2022 (October 1, 2021, through December 31, 2021). GHSC-PSM is a matrixed project that integrates work across two axes: health areas and technical objectives. Accordingly, the report is organized as follows:

- Section B summarizes major activities in each of the **five health areas**, including HIV/AIDS; malaria; FP/RH; maternal, newborn and child health and other public health threats.
- Section C describes activities under each of the **three main technical objectives** (global commodity procurement and logistics, systems strengthening and global collaboration), including key indicator results for those objectives.

[3] To clarify, the program externally is referred to as the "Maternal and Child Health Program," which was the impetus to name the task order the "Maternal and Child Health" task order. However, we often refer to maternal, newborn, and child health (MNCH) when discussing the technical content because we have a particular emphasis on supporting newborns.

- Annex A describes the activities GHSC-PSM has undertaken with **COVID-19 funding** to respond to the pandemic.

- Annex B provides **performance indicators** for October 1, 2021, through December 31, 2021 (annual indicators).

Given the size and complexity of GHSC-PSM, this report summarizes our primary efforts and achievements in Q1 and reflects only a fraction of the project's efforts each day to help people around the world live healthier lives.

Exhibit 3. Countries for which GHSC-PSM procured commodities (proc.) or provided TA over the life of the project (does not include ventilator procurements).

	Proc.	TA
AFRICA:		
Republic of Angola	•	•
Republic of Benin	•	
Republic of Botswana	•	•
Burkina Faso	•	•
Republic of Burundi	•	•
Republic of Cameroon	•	•
Republic of Chad		•
Republic of Côte d'Ivoire	•	
Democratic Republic of the Congo (DRC)	•	•
Federal Democratic Republic of Ethiopia	•	•
Republic of Ghana	•	•
Republic of Guinea	•	•
Republic of Kenya	•	•
Kingdom of Lesotho	•	•
Republic of Liberia	•	•
Republic of Madagascar	•	•
Republic of Malawi	•	•
Republic of Mali	•	•
Republic of Mozambique	•	•
Republic of Namibia	•	•
Republic of the Niger	•	•
Federal Republic of Nigeria	•	•
Republic of Rwanda	•	•
Republic of Senegal	•	•
Republic of Sierra Leone	•	•
Republic of South Africa	•	
Republic of South Sudan	•	•
Kingdom of Swaziland (Eswatini)	•	•
United Republic of Tanzania	•	•
Republic of Togo	•	
Republic of Uganda	•	•
Republic of Zambia	•	•
Republic of Zimbabwe	•	•

	Proc.	TA
ASIA:		
People's Democratic Republic of Bangladesh	•	
Burma	•	•
Kingdom of Cambodia	•	•
Republic of Indonesia		•
Republic of Kazakhstan	•	•
Kyrgyz Republic	•	•
Lao People's Democratic Republic	•	•
Federal Democratic Republic of Nepal	•	•
Islamic Republic of Pakistan	•	•
Independent State of Papua New Guinea	•	
Republic of Tajikistan	•	•
Kingdom of Thailand	•	•
Socialist Republic of Viet Nam	•	•
LATIN AMERICA & CARIBBEAN:		
Barbados		•
Republic of Colombia	•	
Dominican Republic	•	•
Republic of Ecuador	•	
Republic of El Salvador	•	•
Republic of Guatemala	•	•
Republic of Haiti	•	•
Republic of Honduras	•	•
Jamaica	•	•
Republic of Nicaragua	•	•
Republic of Panama	•	•
Republic of Paraguay	•	
Republic of Peru	•	
Republic of Suriname	•	•
OTHER:		
Ukraine	•	
Republic of Yemen	•	

PROGRESS BY HEALTH AREA

This section summarizes GHSC-PSM's support in Q1 for HIV/AIDS, malaria, FP/RH, maternal, newborn and child health (MNCH) and other public health threats.

B1. HIV/AIDS

GHSC-PSM has delivered enough antiretrovirals (ARVs) to provide nearly **16.5 million patient-years of HIV treatment over the life of the project**, including nearly **846 thousand patient-years of treatment in Q1**.

To date, GHSC-PSM has delivered over **64.4 million bottles of tenofovir/lamivudine/dolutegravir (TLD)** to 29 countries, which would provide nearly **11.6 million patient years of treatment**.

Multi-month dispensing packages of TLD first-line treatment accounted for **98 percent of all quantities delivered** in Q1.

In Q1, **a total of 37 countries procured HIV/AIDS medicines and commodities and received health supply chain systems strengthening** with HIV/AIDS funding.

Thanks to multi-month dispensing (MMD), patients likely saved **over 6.7 million trips** to the pharmacy in Q1 and **more than 74.5 million over the life of the project, saving patients time and money**.

As of Q1, GHSC-PSM delivered nearly **37.2 million viral load tests** to **25 countries** to support testing scale-up, while viral-load and early infant diagnosis contracts have generated estimated **$4 million in savings in calendar year 2021.**

GHSC-PSM supports PEPFAR's goal of controlling the HIV/AIDS epidemic by procuring and delivering medicines and commodities to prevent infection and treat people living with HIV (PLHIV), including commodities used to support viral load testing to monitor treatment efficacy. This requires global collaboration with suppliers, other donors (Global Fund), USG and supported country governments.

GHSC-PSM is also implementing data visibility initiatives that support appropriate procurement and distribution of ARVs and diagnostics to link patients with the health commodities they need. Project activities support USAID's efforts to achieve its 95-95-95 goals: 95 percent of HIV infected people know their status, 95 percent of these are on HIV treatment and 95 percent of these have no detectable virus.

Procurement

GHSC-PSM has procured nearly $3 billion in HIV commodities over the life of the project. Adult ARVs made up 59 percent of all procurements by value over the past FY.

OTD and OTIF

GHSC-PSM has delivered nearly $2.6 billion in HIV commodities to countries over the life of the project. Timeliness of GHSC-PSM deliveries remained consistently strong for standard on-time delivery (OTD) in Q1, as shown in Exhibit 8. OTD was at 86 percent for HIV (75 percent COVID-impacted). GHSC-PSM's on-time in-full (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 delivery of split shipments, which helps explain the difference between OTD and OTIF rates. For OTIF, project performance continued to exceed the target of 80 percent, with a rate of 84 percent in Q1 (76 percent COVID-impacted). See Annex for further details.

COVID-19 impacts continued to affect the logistics market in Q1 with many Chinese cities imposing stringent Zero COVID policy regulations. COVID-19 was an ongoing concern in India. There also continues to be a high degree of uncertainty, and extreme volatility around freight costs caused by the pandemic and exacerbated by adverse weather, civil strife in countries and port congestion, which impacted a large number of orders in Q1 (such as condoms, essential medicines, and voluntary medical male circumcision (VMMC) commodities). Shipping lanes continue to be backlogged, and unloading of containers at ports was delayed due to trade imbalances and a vessel schedule reliability of about 33 percent and vessel cancellations of about 11 percent.

Exhibit 8. HIV Commodities, OTD

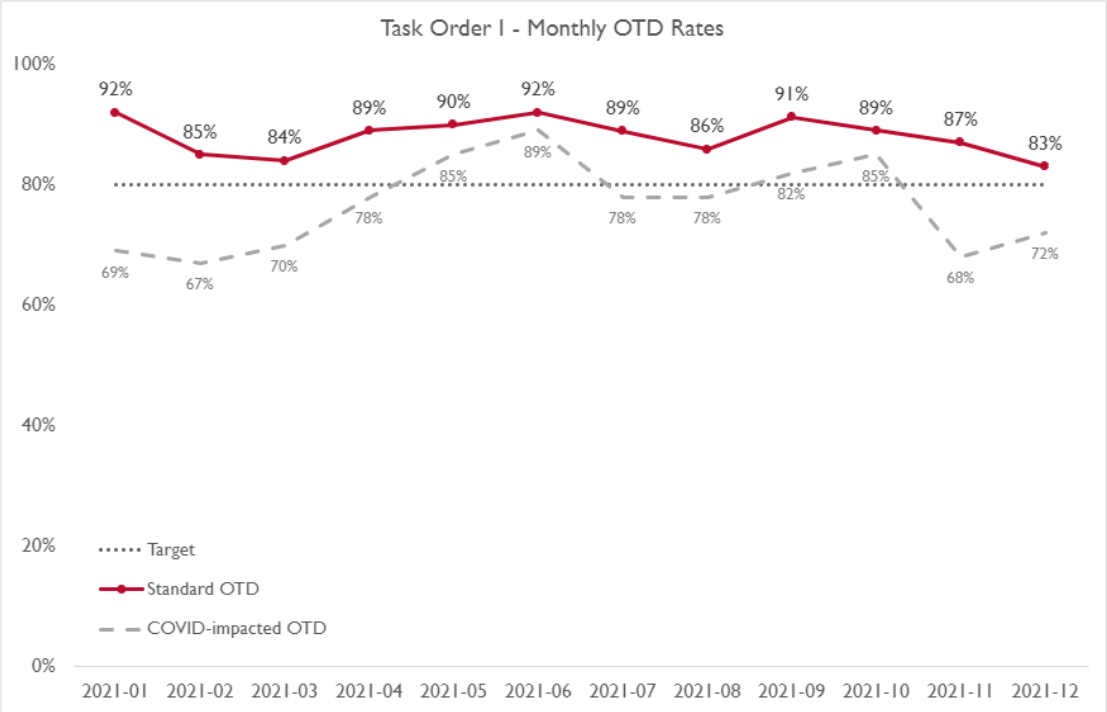
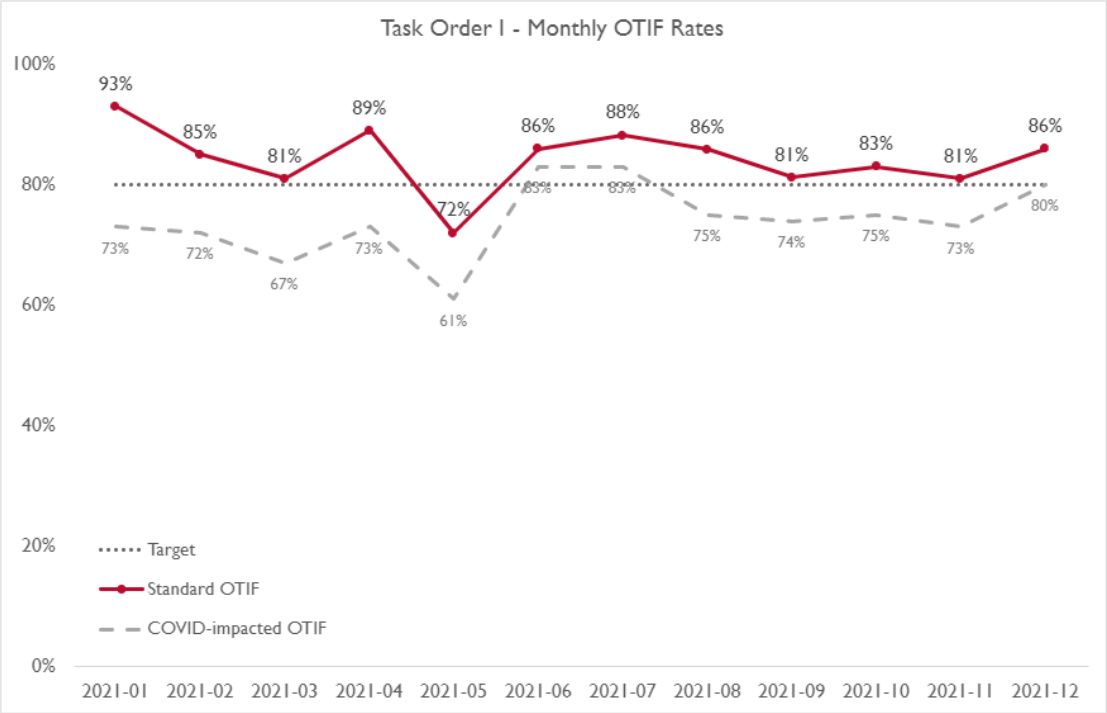


Exhibit 9. HIV Commodities, OTIF



Support for PEPFAR's HIV prevention agenda

Pre-exposure prophylaxis (PrEP)

Daily oral PrEP using the antiretroviral medicines tenofovir/emtricitabine (TE) or tenofovir/lamivudine (TL) dramatically reduces the risk of HIV infection in people who take it as directed. Through its annual sourcing event, GHSC-PSM secured an average 9 percent decrease in the price of TE and TL for FY 2022. GHSC-PSM updated the regional distribution center (RDC) stocking strategy to include TE and TL as stocked products to support PrEP scale-up in countries. Stocking of the products enabled 40 percent of PrEP orders to be procured ahead of country order placements, resulting in product deliveries in line with transition plans. In Q1 FY 2022, GHSC-PSM delivered $6 million worth—more than 1.5 million PrEP bottles—to nine countries: Eswatini, Kenya, Mozambique, Namibia, Panama, Tanzania, Vietnam, Zambia and Zimbabwe.

As more countries initiated and stabilized their PrEP scale-up, GHSC-PSM and USAID agreed to move from monthly to quarterly analysis of PEPFAR-funded PrEP commodity deliveries and of the impact of in-country scale-up on the PrEP program. The analysis is derived from qualitative and quantitative data from 24 countries to monitor stock levels and scale up progress. GHSC-PSM's regular communication with countries assisted them in adapting to the dynamics of their PrEP scale-up programs by advancing or delaying shipments when necessary.

Condoms

In Q1, GHSC-PSM completed an annual pricing refresh activity with male condom and lubricant suppliers to better anticipate projected raw material price increases. The activity resulted in a 7 percent average price increase, which was lower than forecasted. GHSC-PSM is also monitoring natural rubber latex and silicone oil prices (primary raw materials for condom formulation) and collaborating with other international procurement entities to better understand market trends. Based on suppliers' feedback and available market data, raw material cost increases could push prices higher in the future; however, currently, the project does not foresee risks to condom demand despite a dynamic commodity market. In Q1, GHSC-PSM leveraged the Dubai RDC and made-to-stock supplier volumes to fulfill multiple USAID emergency order requests (Angola, Benin and Botswana) while rotating stock to maintain optimal shelf life product.

Also, to facilitate country operational plan (COP) 22 planning, GHSC-PSM developed a two-page brief on condoms and lubricants outlining estimated pricing and lead time information.

VMMC kits

GHSC-PSM received internal Sourcing Governance Board (SGB) approval in Q1 for a price refresh for eligible VMMC kit suppliers. Following the approval, the project released a request for proposal (RFP) and shared results with key stakeholders in Q1. The project will issue fixed-price awards for three VMMC kits. New requisition orders processed will include the newly awarded prices.

Essential medicines

Driven by an increased need for visibility around the market availability and pricing of two specific Advanced HIV Disease essential medicines (flucytosine and amphotericin B liposomal), GHSC-PSM worked with USAID and the USAID Global Health Supply Chain-Quality Assurance (GHSC-QA) Program to determine whether an alternate strategy was required for sourcing these products. After internal discussions with the SGB, the project received approval to proceed with investigating the feasibility of sourcing these products directly from manufacturers allowing for GHSC-PSM and PEPFAR to receive a lower market access price. For amphotericin B liposomal, GHSC-PSM and GHSC-QA started contract negotiations and shared quality assurance (QA) questionnaires to be completed. Negotiations are expected to be concluded in Q2 and the product to become QA-eligible for order placement. For flucytosine, GHSC-PSM began initial discussions with the manufacturer, and with QA eligibility already granted, a contract modification is in process with the manufacturer. Also, GHSC-PSM supported GHSC-QA in evaluating local wholesalers in Malawi and Mozambique to be considered for auditing in Q2 or Q3.

Tuberculosis preventive treatment (TPT)

As the leading cause of morbidity among PLHIV, tuberculosis (TB) continues to cause over a third of all AIDS-related deaths. The World Health Organization (WHO) recommends that PLHIV who are unlikely to have active TB should receive TPT as part of a comprehensive package of HIV care, including pregnant women and those who have previously been treated for TB, regardless of the degree of immunosuppression, even if latent TB infection testing is unavailable.

Three months of weekly high-dose isoniazid and rifapentine (3HP)

GHSC-PSM delivered orders of rifapentine/isoniazid 300 mg/300 mg fixed-dose combination tablets to eight countries in Q1: Burundi, Ethiopia, Kenya, Mozambique, Namibia, Uganda, Zambia and Zimbabwe. [4] By the end of Q1, the ARV/3HP Procurement Working Group (APWG) confirmed an updated allocation for January and February 2022 production from the sole-source supplier of this commodity, which enabled GHSC-PSM to continue to fulfill PEPFAR's FY 2022 demand. GHSC-PSM is working with the supplier to confirm committed goods availability dates (GADs) for these orders. Also, GHSC-PSM delivered an order of 5,539 packs of rifapentine 150 mg tablets to Haiti in Q1.

GHSC-PSM also continued conducting an analysis of TPT shipments and country stock projections to provide better visibility into the transition to, and scale-up of, 3HP for TPT-supported countries.

Isoniazid preventive therapy (IPT)

GHSC-PSM delivered orders of isoniazid 300 mg tablets to Haiti, Kenya, Nigeria and Zambia in Q1. [5] The project also completed the first order of isoniazid 100 mg dispersible tablets to Zimbabwe.[6] With most

[4] Burundi received 4,500, Ethiopia 23,148, Kenya 37,548, Mozambique 38,067, Uganda 30,834, Zambia 44,400 and Zimbabwe 45,705 packs of rifapentine/isoniazid 300 mt/300 mg film-coated 3x12 blister pack tablets.

[5]Haiti received 1,000, Kenya 4,000, Nigeria 46,815, and Zambia 29,941packs of isoniazid 300 mg 24x28 blister pack tablets.

[6] Zimbabwe received 15,000 packs of isoniazid 100 mg dispersible tablets, 10x10 blister pack tablets.

GHSC-PSM-supported TPT countries transitioning to 3HP in FY 2022, GHSC-PSM continued to support these countries implementing IPT with the procurement of isoniazid.

Supporting the First 95: Testing

To support rapid test kit (RTK) availability and reach the first 95 (HIV diagnosis), GHSC-PSM provides forecasting and supply planning as well as in-country logistics support to the USAID Global Health Supply Chain Program-Rapid Test Kit (GHSC-RTK) project (implemented by Remote Medical International), which undertakes the procurement and international freight. The project promotes better management of RTK orders and deliveries through regional- and central-level stock data collection through the HIV/AIDS Data Visibility Dashboard. GHSC-PSM shares these data monthly with GHSC-RTK to guide RTK procurement planning and triangulate data, reviewing HIV testing targets against RTK stock in countries with PEPFAR-supported HIV testing programs.

Supporting the Second 95: Treatment

ARVs Delivered at Place (DAP)

In Q1, GHSC-PSM expanded the DAP program by awarding allocations across seven suppliers and increasing the number of DAP targeted countries to 10. To improve cycle times for DAP orders, GHSC-PSM established ceiling pricing tables by weight band, ensuring price reasonableness and timely order processing. The project established country-specific RACI (Responsible-Accountable-Consult-Inform) matrices—an integral tool of supply chain management to assign, monitor and manage milestones and activities—to ensure ARV suppliers, their 3PLs and country staff understand roles and responsibilities during shipment. Participating suppliers are also testing external order management portals to give GHSC-PSM partners the ability to track real-time order status while under supplier custody. This will save significant time as team members will not need to rely on email or manual updates from the supplier on delivery status during order transit. A fully fledged DAP ARV program will be initiated in early Q2 and TLD ceiling prices will be added to contracts.

Supplying TLD

To date, the project has delivered **64.4 million bottles of TLD** to **29 countries**.

This is enough to provide almost **11.6 million patient-years of TLD treatment**.

As of Q1, GHSC-PSM has delivered **35.4 million bottles of TLD 90** to 27 countries.

TLD and multi-month dispensing

To help achieve HIV treatment goals, GHSC-PSM continued to support PEPFAR countries' transition to TLD, the preferred first-line ARV. In Q1, GHSC-PSM processed $68 million in one-off procurements for

TLD 90 and 180 for 10 countries; 24.6 percent of these procurements were related to emergency orders for Kenya ($16.2 million) and the Dominican Republic ($504k). The project also processed a $24 million RDC restocking order for TLD. Seven eligible ARV suppliers submitted TLD bids. GHSC-PSM secured all products with a minimum 36-month shelf life from five suppliers. Also, the average treatment cost per patient for TLD decreased from $54.16 to $50.83 (6 percent) in Q1, resulting in cost savings in excess of $1.9 million compared to historic pricing.

To ensure close coordination with key stakeholders on TLD uptake, the project regularly shares data and facilitates technical coordination meetings.

Pediatric ARVs

In Q1, GHSC-PSM delivered more than 181,000 bottles ($815,000) of dolutegravir (DTG) 10 mg—the optimal pediatric ARV—to Côte d'Ivoire, Kenya and Mozambique. These deliveries will ensure that each country can initiate their DTG 10 mg transition in line with approved transition plans. The project also negotiated for one DTG 10 mg supplier to make available a 30-tablet presentation bottle to support the Mozambique program. Also, the DTG10 technical working group (TWG) continues to analyze orders and supply plan data monthly to increase USAID and other stakeholder visibility into the pace and progress of country transitions.

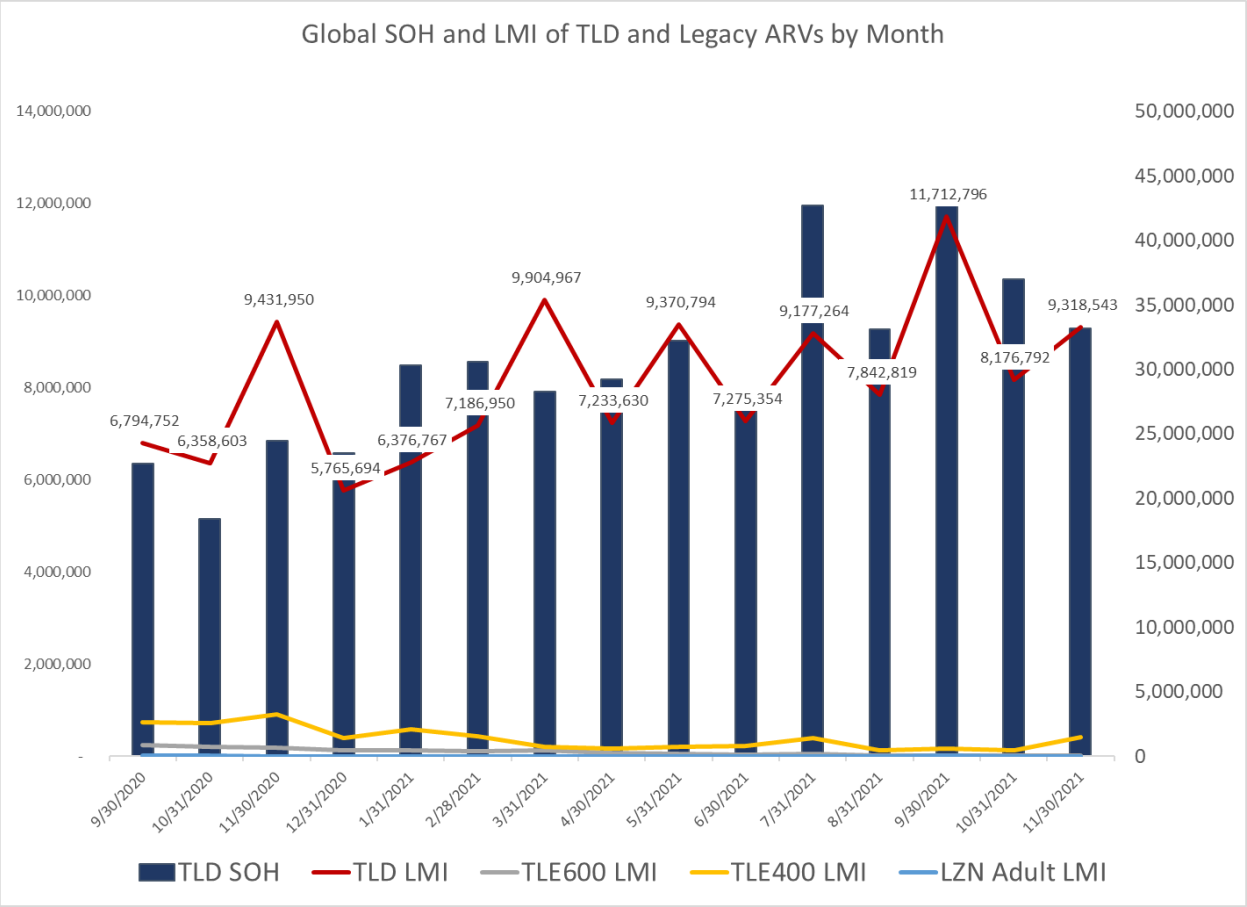
GHSC-PSM also continued collaboration with the APWG to track overall demand for pediatric ARVs. The project consolidated demand for zidovudine oral solution for Eswatini, Kenya and Namibia from one supplier to another to ensure orders aligned with minimum batch levels and to reduce lead times. Lastly, GHSC-PSM proactively converted existing orders of ABC/3TC 120/60 for Angola, Democratic Republic of Congo (DRC), and Mozambique from 60-count bottles to 30-count bottles to simplify co-dispensing with DTG 10 mg and align with expected revisions to COP guidance.

Legacy ARV drawdown

To support efficient transition to more effective treatment regimens (TLD), and minimize remnants of less-effective, older first-line ARV regimens (legacy ARVs), GHSC-PSM collects, reviews and compiles monthly ARV inventory data from 31 central and 80 regional warehouses in 22 countries through First-Line ARV Reporting and Evaluation (FLARE) reports. These reports are submitted in Excel and PowerPoint every month, but can also be accessed on the TO1 Data Visibility Dashboard. Per PEPFAR guidance, GHSC-PSM halted procurement of legacy ARVs containing nevirapine, such as lamivudine/zidovudine/nevirapine (LZN), and actively supported the transition of patients to new regimens. GHSC-PSM aligned ARVs in the project's product catalog with the PEPFAR formulary to promote optimal ARV regimen ordering. The project submits weekly reports to USAID outlining any second-line or suboptimal products ordered by partner countries so that both parties can engage country counterparts to determine if a better product is available.

According to the data collected in the FLARE reports, global issues of LZN, TLE600, and TLE400 decreased by 100 percent, 94 percent and 55 percent, respectively, since November 2020. (See Exhibit 10.)

Exhibit 10. Drawdown of stock on hand and reduced consumption of LZN from September 2020 to November 2021[7]



The analysis above shows successful drawdown of efavirenz- and nevirapine-based regimens and an overall increase in TLD stock on hand each month from September 2020 to November 2021.

Supporting the Third 95: Viral Load Testing

Implementing viral load awards

Preliminary data analysis shows that from January through December of 2021, GHSC-PSM and designated non-project buyers (e.g., Global Fund, Ministries of Health and national procurement agencies) placed orders for 12.6 million viral load (VL) and early infant diagnosis (EID) tests and that the project achieved approximately $34 million in savings (compared to the pre-global RFP prices) under the

[7] Countries included in this analysis were Botswana, Burundi, Cameroon, Côte d'Ivoire, DRC, Eswatini, Ethiopia, Ghana, Haiti, Lesotho, Mali, Mozambique, Namibia, Nigeria, Rwanda, Uganda, Zambia and Zimbabwe.

terms of global service-level agreements with the three VL/EID manufacturers. The total spent on these orders amounts to approximately $147 million.

In Q1 FY 2022, GHSC-PSM worked closely with Laboratory Technical Working groups (TWGs) in six Wave-1 countries[8] and secured renewed global and country-level VL/EID volume commitments from global manufacturers for calendar year 2022. These new volume commitments will further lower the overall cost of VL commodities and services in PEPFAR-supported countries.

GHSC-PSM added two new modules to the global VL dashboard in Q1: A *Consumption Forecast Report* to detect the consumption trends and visualize the data in the report, and *Anomaly Detection Report* to identify anomalies in test and error data and visualize the results for analytical use. Next on the dashboard development agenda are modules with VL procurement order data and VL commodity and service savings.

A highlight of continuing collaboration among PEPFAR, GHSC-PSM, and VL manufacturers is the transition of older-generation testing platforms and the introduction of new machines, reagents and consumables across a range of PEPFAR-supported countries, which is crucial in meeting PEPFAR's VL testing goals. To manage the process, the project co-created phased work plans with global stakeholders and led country engagements. In Q1, GHSC-PSM organized a webinar to align and coordinate with PEPFAR stakeholders in 16 countries with more than 100 participants from Africa and Asia.

Procurement of viral load and laboratory supplies

Lab consumables such as pipettes and pipette tips, and consumables used for VL and COVID-19 tests remained in short supply globally due to the pandemic. Deliveries of VL/EID reagents and consumables remain impacted by COVID-19 as vendors struggled to meet demand and 3PLs, to identify appropriate flight availability.

Data-driven lab optimization using Opti-Dx

Through historical procurement data, forecast data, instrument coverage, utilization rates and global positioning system data, the Opti-Dx web-based tool guides appropriate laboratory instrument selection. The lab optimization pilot using Opti-Dx started in Uganda and Burundi in Q1. For more information, see section C.2 Systems Strengthening Technical Assistance.

HIV/AIDS supply chain data visibility and commodity security

GHSC-PSM improves data visibility and analysis of HIV commodity inventories at all levels of the supply chain. The project reviews inventory data each month for more than 108 HIV medicines and commodities at the central and regional warehouse levels in 22 PEPFAR countries to identify stock imbalances. New in Q1 is an interim data collection solution for VL and EID testing information. Completed data for VL and EID tests are collected each month from 10 countries; seven of these

[8] Kenya, Mozambique, Nigeria, Tanzania, Uganda and Zambia.

countries can now share tests completed by 123 lab facilities. This data collection will be phased out as the visibility in the VL dashboard increases.

Data generated include the status of first-line ARV drawdown, the transition to DTG-based regimens, and HIV commodity stockout risk. These reports help mitigate imbalances and avoid rationing and waste, where possible, by raising awareness, identifying opportunities to shift GHSC-PSM shipments and supporting redistribution within a country.

In Q1, through data collection and analysis at central and regional warehouses, GHSC-PSM identified and reported 42 unique HIV commodity stockout risks across 16 countries. The most common causes of stockout risks were funding gaps (including unfunded shipments and delays in the release of funding) and the late delivery of shipments funded by other donors. Other causes included higher than anticipated consumption, due to commodity transitions and program rollouts, and government bottlenecks, such as waiver, regulatory constraints, and treatment guideline updates. Most stock risks were mitigated due to active donor and supplier coordination and bilateral data sharing. At times, borrowing stock (redistributing facility stock and inter-warehouse transfers) and using alternative treatments were necessary. GHSC-PSM reported on 20 commodity risks resolved during the same period.

GHSC-PSM continued to host monthly Proactive Stock Risk Management (ProStock) meetings in Q1. Building on the project's HIV/AIDS data analysis and reporting noted above, this meeting is a forum for GHSC-PSM and USAID to discuss actual and imminent gaps in HIV commodity access and implement action plans to address them. Also, potential future HIV commodity stock risks are presented in this forum, which has allowed for early action and mitigation on numerous longer-term stockout and expiry risks across all categories of HIV products, including adult and pediatric ARVs, PrEP, and VL/EID products.

Global collaboration

To better share approaches, challenges, successes, and lessons learned around GHSC-PSM's laboratory experiences, the project hosted and participated in conferences in Q1. During the African Society for Laboratory Medicine (ASLM) Conference, USAID and GHSC-PSM held a satellite session on *Beyond DNO: The Changing Landscape of Laboratory Medicines*. The session provided a brief introduction to diagnostic network optimization (DNO), what it is, and what it entails. The highlight of the event was hearing from Lesotho and Nigeria's MOH representatives on their DNO experiences. Following its success, USAID requested the session be held as a webinar for all USAID staff in December.

In Q1, GHSC-PSM participated in the annual ARV Buyer/Seller Summit hosted virtually by USAID, the Global Fund, and the South African National Department of Health. GHSC-PSM shared approaches to and lessons learned from managing the ARV supply chain under the prolonged COVID-19 pandemic. Also, the project highlighted ARV market trends and the project's evolving ARV procurement strategy,

whose FY 2022 focus is on advancing end-to-end visibility and increasing private sector engagement through expanded DAP use and exploration of vendor-managed solutions at country/regional levels.

At the International Conference on AIDS and STIs in Africa, GHSC-PSM shared successes and lessons learned through implementing the VL scale-up initiative through a poster presentation on " Strengthening HIV Viral Load Laboratory Supply Chains and Network Performance through a Sustainable, Replicable, Data-driven Approach."

The project presented two additional posters at the conference that highlighted the Quality Management Improvement Approach in Rwanda and approaches applied to ensure essential HIV services during COVID-19 in Ethiopia.

Country support

The HIV/AIDS task order funds supply chain systems strengthening in 36 countries.

In **Namibia**, GHSC-PSM supported the Ministry of Health and Social Services (MoHSS) in upgrading the Electronic Dispensing Tool (EDT) to facilitate dispensing and patient management of DTG 10 mg. In Q1, the project worked closely with the MoHSS to address outdated pediatric regimens at health facilities and worked with the MoHSS and IT staff in modifying the EDT to include DTG 10 mg. The upgraded tool will assist health facility staff in dispensing the new medicine, maintaining accurate records, reducing manual processes, and serving patients faster.

Earlier in 2021, **Lesotho's** MOH requested that the MOH Supply Chain Unit and GHSC-PSM conduct a stock assessment of isoniazid (INH) 300 mg, used to treat TB. The assessment showed a high level of overstocking of INH 300 mg and, as a result, the project recommended that the MOH donate some of the medicine to countries with shortages. GHSC-PSM helped identify **Haiti** and **Zambia,** which were in need of the product, and in Q1 the project successfully facilitated the donation of 7,941 blister packs (24x28) INH 300 mg tablets to Zambia and 1,000 blister packs (24x28) to Haiti. The donation helped Lesotho avoid expiries and wastage of product while assisting Haiti and Zambia in mitigating their shortages.

B2. Malaria

Delivered enough artemisinin-based combination therapies (ACTs) to treat over **406.4 million infections over the life of the project**, including **19.5 million** in Q1.

A total of 30 countries procured malaria medicines and commodities, and **25 countries received health supply chain systems strengthening** with malaria funding over the life of the project.

Delivered enough long-lasting insecticide-treated nets (LLINs) to provide **protection from malaria for nearly 19.8 million people in Q1 and 425.8 million people over the life of the project**.

Investigated upstream markets of key starting materials for artesunate, lumefantrine, and sulfadoxine to evaluate **malaria commodity market health** and mitigate risks for commodity security and quality.

The U.S. President's Malaria Initiative works with its global partners to scale up proven interventions and increase the capacity of health systems to move countries closer to their goals of eliminating malaria. Under the PMI-funded Malaria task order, GHSC-PSM supplies lifesaving prevention and treatment medicines for malaria, malaria rapid diagnostic tests (mRDTs), LLINs, and lab supplies. The project offers partner countries new approaches to strategic planning, logistics, data visibility, analytics, and capacity building in line with PMI strategies. GHSC-PSM provides technical guidance to strengthen global supply, demand, financing, and the introduction of new malaria medicines and commodities. The project provides continuous support to USAID Missions to ensure they have the necessary malaria commodity data, analysis, and forecasting models to directly inform decision making for PMI's malaria operational plans. Since early 2020, GHSC-PSM has monitored sourcing, procurement, and delivery challenges related to COVID-19, informing mitigation efforts and providing technical support to in-country supply chains.

Commodity sourcing, procurement, and delivery

GHSC-PSM regularly assesses the viability of existing sources of critical commodities, including key starting materials (KSMs) and active pharmaceutical ingredients (APIs). The project uses these assessments to

develop strategies that ensure that products are available and accessible, despite constrained supply and limited transit options due to COVID-19.

Commodity risk profiles

Commodity risk profiles capture the latest supplier and market intelligence regarding malaria commodities, including the status of supplier production and sourcing of APIs, KSMs, and packaging materials, as well as logistics constraints. Commodity risk profiles examine currently sourced order volumes by supplier and geographic region against COVID-19 impact to inform potential risk for future orders.

Suppliers across the various malaria pharmaceutical commodity groups experienced minor GAD delays in Q1, while mRDTs and LLINs continued to be manufactured with limited disruption. The project experienced an uptick in notifications on raw material challenges from pharma suppliers, largely attributed to production constraints due to tightened, government-imposed environmental restrictions in China, the main source of KSMs.

Compounding COVID impacts on human resources at factories, transportation backlogs, power outages, and warehousing constraints were additional challenges. Lead times for lab commodities remained high, given competing demand for their use in the global COVID-19 response. The project continues to monitor and mitigate supply chain disruptions by soliciting biweekly updates from suppliers at the order-line level to understand near-, medium-, and long-term impact on its ability to meet country needs. GHSC-PSM obtains updates from suppliers through regularly scheduled business review meetings, eight of which were held in Q1, as well as bi-weekly global donor collaboration calls. The project is processing method transfers for three products—artesunate injectable, artesunate-amodiaquine and artemether-lumefantrine (ALu) hard tablet—to broaden its supply base and further ease constraints.

Strategic sourcing

In Q1, GHSC-PSM strategic sourcing of malaria commodities focused on:

- **Issuance of strategic tender for provision of sulfadoxine/pyrimethamine (SP).** The project evolved its SP sourcing strategy to address current market conditions that have been impacted by the ongoing pandemic and other factors contributing to supply shortages of KSMs for SP. The primary objectives of the new tender include enabling suppliers to offer sustainable pricing, reflective of the current market conditions, and highlighting how important it is for vendors to ensure ongoing supply of this critical commodity.

- **Enhancement of inventory strategies involving key pharmaceuticals.** GHSC-PSM continued efforts to better serve end users through sourcing and storage of artemether-lumefantrine to fulfill urgent needs and mitigate the effects of unavoidable supply constraints. Efforts in Q1 focused on improving processes and tools used to increase accurate inventory tracking, reduce the risk of product expiry, inform future sourcing decisions, and

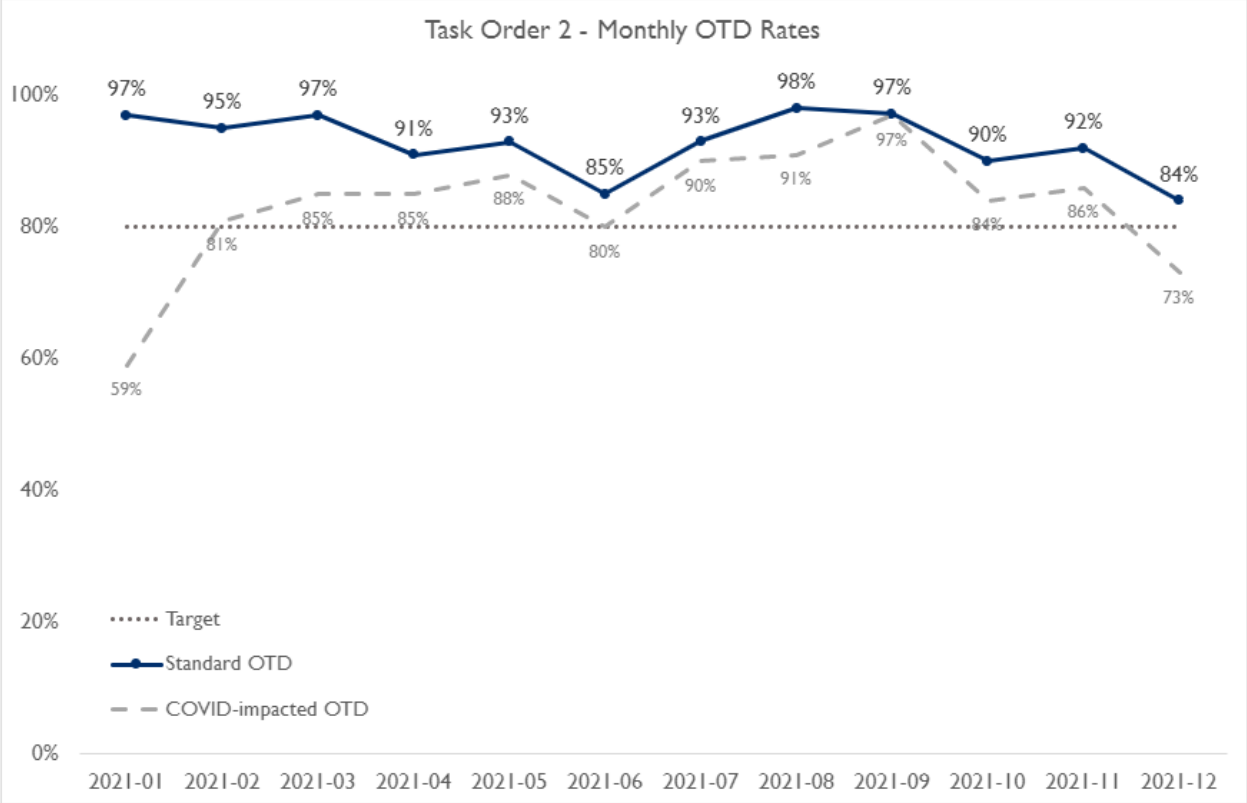
establish a consistent process that minimizes the impact on overall cycle time, while achieving the inventory strategies' objectives.

Procurement and deliveries

In Q1, GHSC-PSM procured malaria commodities[9] for 25 countries with a total value of $68.1 million.

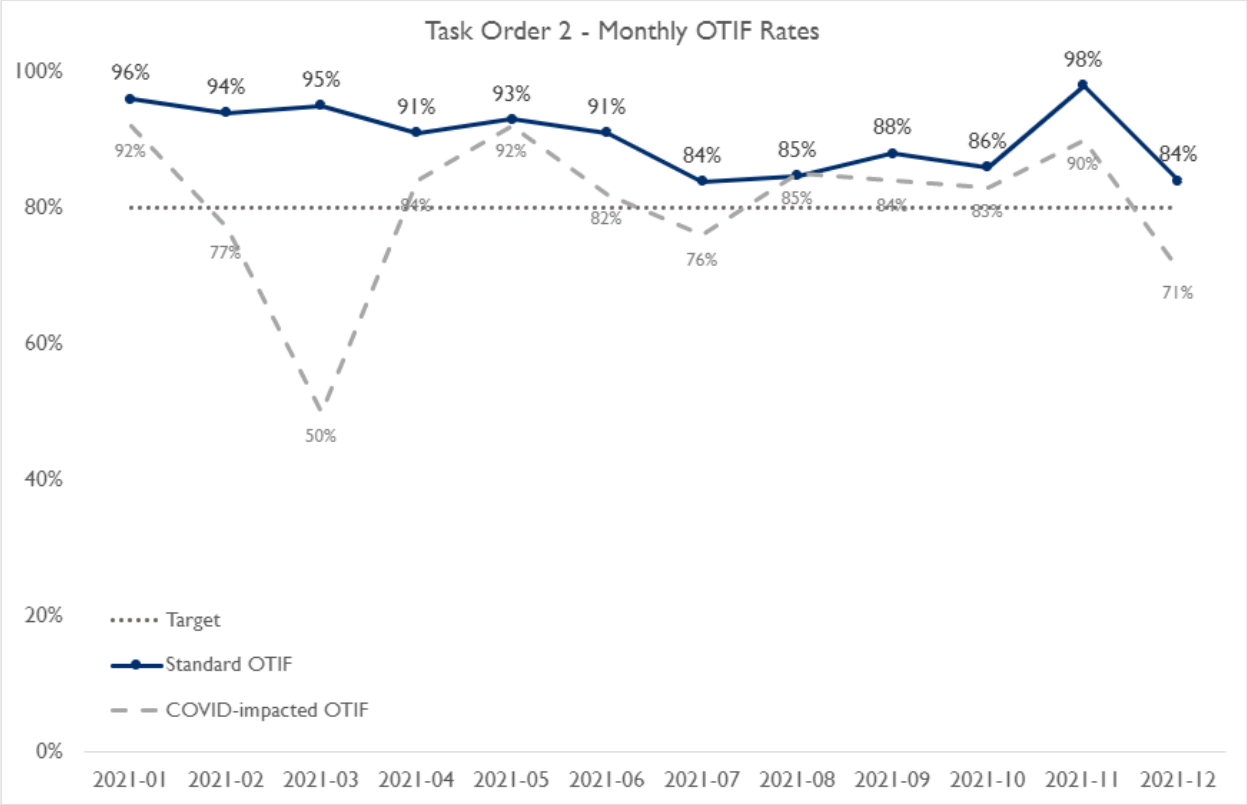
OTD and OTIF. Timeliness of GHSC-PSM deliveries remained consistent and strong for standard OTD and OTIF in Q1 for malaria commodities, with a OTD rate of 89 percent (81 percent for COVID-impacted) (see Exhibit 11). The OTIF rate in Q1 was 89 percent (82 percent for COVID-impacted). This is despite the high degree of uncertainty and the extreme volatility in global supply chains caused by the pandemic.

Exhibit 11. Malaria Commodities, OTD



[9] GHSC-PSM procured malaria commodities for the following countries: AFRICA: Angola, Benin, Burkina Faso, Burundi, Cameroon, Côte d'Ivoire, DRC, Ethiopia, Ghana, Guinea, Kenya, Liberia, Madagascar, Malawi, Mali, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Tanzania, Uganda, Zambia, Zimbabwe; ASIA: Thailand.

Exhibit 12. Malaria Commodities, OTIF



Global sourcing collaboration

GHSC-PSM participates in the Malaria Pharma Task Force,[10] mRDT Task Force,[11] and Indoor Residual Spray/Insecticide Treated Nets (IRS/ITN) Task Force.[12] These task forces provide a valuable forum for exchanging information on market risks and promoting better collaboration across the global malaria community. They are supplemented by one-off working sessions and communications to discuss acute risks, issues, and opportunities.

[10] Pharma Task Force members include CHAI, the Bill & Melinda Gates Foundation (BMGF), GHSC-PSM, the Global Fund, Impact Malaria, the Malaria Consortium, Medicines for Malaria Venture (MMV), Médecins Sans Frontières (MSF), Pan-American Health Organization, PATH, PMI, UNICEF, and WHO.

[11] mRDT Task Force members include CHAI, Foundation for Innovative New Diagnostics, BMGF, the Global Fund, the Malaria Consortium, MSF, PATH, PMI, GHSC-PSM, UNICEF, United Nations Development Program, Unitaid, and WHO.

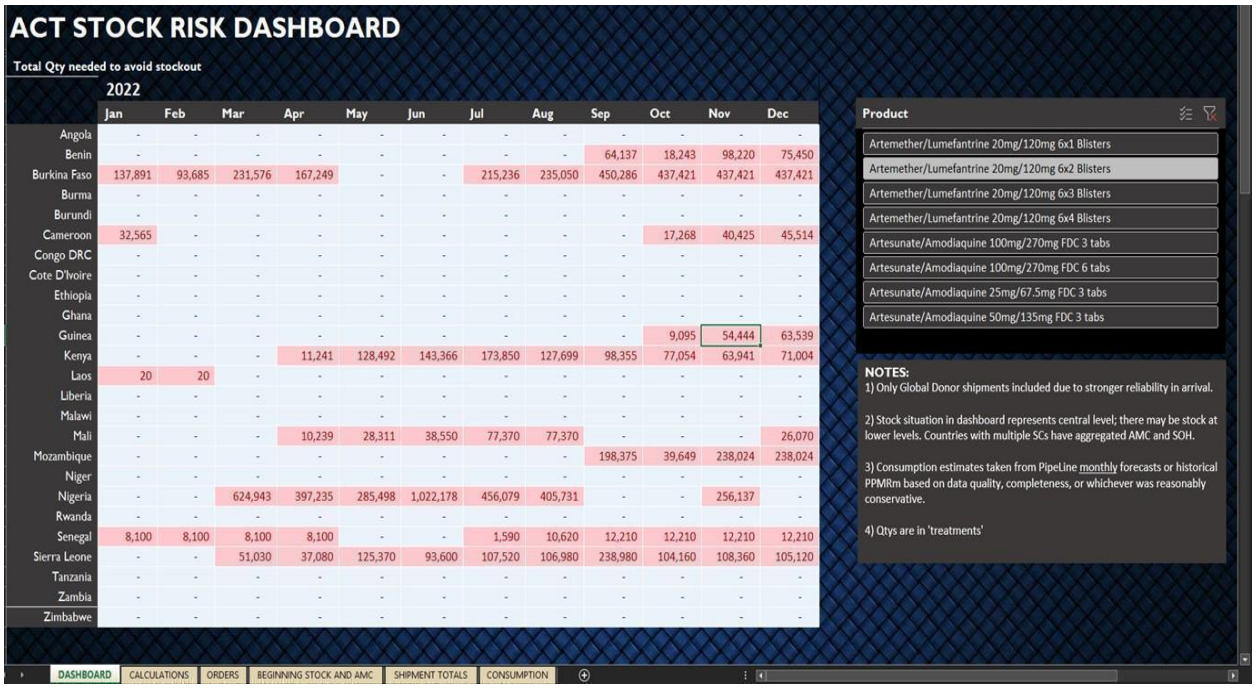
[12] ITN/IRS Task Force members include the Against Malaria Foundation (AMF), CHAI, BMGF, GHSC-PSM, the Global Fund, Innovative Vector Control Consortium, International Federation Red Cross, MMV, MSF, PMI, Population Services International, Results In Health, UNICEF, Unitaid and WHO.

GHSC-PSM plays a leading role in the Malaria Pharma Task Force and KSM/API working group, which increase visibility of, and identify and mitigate risks related to, the upstream supply chains of finished malaria pharmaceutical products. In Q1, the working group focused on discussing, tracking and validating activity in the artemisinin market surrounding a KSM used in all ACTs as well as rectal and injectable artesunate, among others. As suppliers continued to communicate increased prices and challenges in sourcing vegetal artemisinin, the working group renewed discussions on the use of semi-synthetic artemisinin as an alternative. Further collaboration meetings and analysis are scheduled in Q2.

While the mRDT market faced challenges from COVID-19 and the temporary exit of a key supplier from the market, conditions steadily improved since these impacts began in 2020. In light of these improvements, in December 2021, GHSC-PSM, along with PMI, Global Fund, and United Nations Children's Fund (UNICEF), decided to discontinue the monthly working group calls for mRDT procurements, supplier engagement and stockout prevention. Ad hoc meetings will be scheduled as needed to discuss any new emerging challenges within the mRDT market.

Proactive procurement strategy

GHSC-PSM invests in and adapts a proactive procurement strategy for key malaria commodities, such as artesunate injectables and sulphadoxine-pyrimethamine + amodiaquine (SPAQ). Since the onset of COVID-19, the project has executed several of these strategies that are designed to move rapidly by leveraging a rotating emergency loan fund to secure large volumes of supplier production capacity in markets where supply is particularly constrained. The project places orders based on data-driven demand signals, which enables the securing of production capacity far earlier in the ordering process—often well in advance of receiving actual orders. The intent of these proactive procurement strategies is to ensure access to supply of critical commodities when countries need them, to reduce fulfillment lead times and to hedge against considerable uncertainty and disruption in these markets. These strategies are enabled in part by use of demand data—derived from country supply plans and the Procurement Planning and Monitoring Report for malaria (PPMRm)—which the project translates into country stock risk dashboards that illustrate the timing and scope of upcoming stock risks. These strategies are designed in part to mitigate future stock risks.



An ACT Stock Risk Dashboard presents the total quantity of a presentation of ACT needed to avoid stockout for each country in each month.

Despite experiencing minor GAD delays in Q1, most of the malaria pharma markets returned to a pre-COVID state in terms of supply, with the exception of SP. In the SP market, the project is re-tendering to include additional sources that should ease SP supply constraints. Therefore, the project determined that continued use of routine fulfillment without the need for any proactive planning or intervention would be the best method for procuring SP during this period.

In Q1, the project began planning for the implementation of vendor-stored inventory for ALu. This strategy will entail proactive procurement of ALu based on forecasts, and contracting the vendor to store produced goods on-site until firm purchase orders are placed against manufactured stock. Also, planning began for a small proactive procurement of ALu until vendor-stored inventory becomes fully operationalized.

Quality assurance

Strategies and innovations

In Q1, GHSC-PSM continued its efforts to implement more robust QA and quality management systems (QMSs) within the various product types procured by the project through investigations and collaborations with other external partners and global donors.

Following the third-party laboratory RFP, which had a goal of expanding testing capacity for testing pharmaceutical and LLINs commodities, the project onboarded new laboratories for LLINs and for pharmaceuticals, and initiated the use of these laboratories for product testing.

GHSC-PSM generates quality control (QC) process efficiencies by creating flexibility in the project's testing capabilities. In Q1, these efficiencies were accomplished through performing method transfers and validation at additional pharmaceutical testing laboratories for two ALu hard-tablet products. The method transfer has allowed the project to broaden the number of laboratories capable of testing key high-volume products.

Collaboration

GHSC-PSM continues to chair the LLINs Quality Assurance Group (LQAG), a global working group of procurers focused on LLIN QA and QC. In Q1, the project presented on the topic of Quality in LLINs for Procurers at the Raising the Floor Nets: ITN Quality Convening in a webinar hosted by the 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.

GHSC-PSM provided the Uganda National Bureau of Standards with comments solicited through the LQAG on the Draft East African Standards (DEAS) for LLINs, DEAS 455:2021. The DEAS 455:2021 outlines harmonized requirements governing quality of products and services in the East African community. The scope of DEAS 455:2021 is to specify the requirements for sampling and the test methods for treated LLINs. This level of advisory review will help to ensure that the East African Standards align with World Health Organization (WHO) prequalification (PQ) and supplier specifications.

The project successfully finalized a quality agreement among GHSC-PSM, the Rwandan government, and LLIN suppliers. Rwanda needed stock; however, due to country-level differences in quality control requirements and methodology, specifically for the post-shipment inspection of LLINs, the country was unable to receive LLINs procured by the project. GHSC-PSM facilitated negotiations between the Rwandan government and respective suppliers to arrive at a quality agreement that was signed by all parties. Completion of the quality agreements was critical to the placement of purchase orders for the country and subsequent procurement of LLINs.

Key performance indicators

GHSC-PSM reports on two key performance indicators for quality assurance:

- The project exceeded the 80 percent QA lead time target with an on-time completion rate of 83.56 percent for QA activities in Q1.

- There were 0 batches of products showing nonconformity in Q1 (target is less than 1.0 percent).

Cost savings

- In Q1, continuation of the risk-based testing along with the adjusted QA/QC protocol resulted in a cost savings of $77K.

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 Q1, 1,000 tablet jars of SP were added to the Restricted Commodity Waiver list governed by USAID Automated Directives System 312.

The project completed method transfers for ALu hard tablets produced by two suppliers at a second GHSC-PSM–approved third-party laboratory.

Team activity in fostering greater product quality and a more robust QMS

GHSC-PSM's robust, risk-based QA testing strategy identified out-of-specification, non-conforming results in an artesunate injectable product during sterility testing. The project initiated an investigation to determine the validity of the test results and placed a hold on product distribution.

In Q1, the project engaged an LLIN supplier and the LQAG to discuss the potential impact of the supplier's new baling system on the quality of the LLIN product. The new system was implemented by the supplier as a potential means of saving around 15 percent of freight space for the LLINs. As a result of the discussions, WHOPQ and GHSC-PSM asked the supplier to stop using this system for our products until they completed the required paperwork for prequalification.

Adoption of standards-based identification, barcoding, and data sharing

In Q1, GHSC-PSM continued to see a positive trend in compliance of in-scope malaria suppliers with identification, barcoding and data-sharing requirements of products procured. These requirements involve a phased implementation grounded in GS1 Healthcare Standards, with the objective of creating an enabling environment for data exchange and visibility. Highlights and milestones associated with these standards in Q1 are included in Section C.

Prioritizing and transferring orders

In FY 2022, to address country needs and market constraints, GHSC-PSM is working closely with USAID to prioritize orders based on need and is conducting commodity order transfers to improve stock status. Below are examples of how the project continued these strategies in Q1 to ensure that countries could avoid stockouts.

In Q4 FY2021, Burundi, Uganda, and Zambia agreed to receive disbursements from the ALu emergency stockpile to mitigate stockouts in their countries. In Q1, these orders were placed with the RDC for delivery in Q2.

In FY Q1, 29 countries submitted data to the PPMRm. The PPMRm collects and reports information on stock status and on host governments' and other donors' shipments. Visibility into stock status and shipment information enables PMI, the project and countries to make decisions on prioritizing, expediting, or delaying procurements or shipments, and facilitates review of forecasts and supply plans to optimize procurements. Examples in Q1 are as follows:

Through the review of PPMRm, Malawi identified a potential stockout risk of mRDT and ALu 6x3, with the risk for mRDT shortages more immediate than that of ALu 6x3. GHSC-PSM began the process of expediting an mRDT PMI shipment scheduled for June 2022 delivery. The new target delivery for the shipment is anticipated to be in May 2022 to ensure full coverage of the second quarter distribution. Also, to ensure full availability in the second half of 2022, GHSC-PSM is working with the National Malaria Control Program (NMCP) to identify sources to fill the funding gap for mRDTs and ALu 6x3 orders. With the stockout risk for ALu 6x3 being in the second half of CY 2022 and deliveries scheduled to arrive in February and April 2022 the stockout risk during the first half of the year is minimal; however, the risk increases as the year progresses into the second half, hence the need to work with the NMCP to identify funding.

In Zimbabwe, the ASAQ 25 mg/67.5 mg/3tabs was found to be overstocked and the ASAQ 50/135 mg was understocked. To avoid an overstock of ASAQ 25/67.5 mg the project worked with partners to delay an incoming shipment, while simultaneously working with partners to expedite the next shipment of ASAQ 50/135 mg. Before this shipment arrives, the project and in-country partners will use the overstocked ASAQ 25/67.5 to fill any gaps.

LLIN distribution support

In Q1, GHSC-PSM delivered 9.9 million LLINs to countries for onward distribution as a malaria prevention measure (Exhibit 13). Many countries deliver LLINs from the central level to health facilities for continuous distribution. Other countries plan, launch, or continue large-scale LLIN distribution campaigns as a key malaria prevention strategy. These massive initiatives ensure beneficiaries receive the nets they need, particularly in high-impact areas. While the actual distributions take just a few weeks, logistics, supply planning, procurement, and pre-positioning the nets can take months. In addition to procurement, planning, and capacity building, GHSC-PSM provides in-country logistics support, including warehousing and transportation of LLINs to lower level warehouses or health facilities. In some countries, GHSC-PSM also supports distribution to recipients.

In Q1, GHSC-PSM supported LLIN distribution activities, including:

- **Ethiopia:** Worked with the MOH/National Malaria Elimination Program (NMEP) on the following activities:

    - Supported MOH/NMEP to conduct a central workshop to refine the LLIN distribution plan and build consensus with four regional health bureaus (RHB) and the zonal health department. Detailed implementation plans were developed with each RHB (Southern Nations, Nationalities, and People's Region (SNNPR); Amhara; Oromia and Southwest Ethiopia Peoples) for distribution of 2.9 million LLINs. Participants were also oriented on the campaign strategy in the context of COVID-19.

    - Supported distribution of 21,219 LLINs in two woredas in Somali region covering 7,204 households with an estimated 42,914 people living in malaria risk areas. As part of the campaign implementation, 48 professionals were oriented and five woreda-level campaign coordinators and health post level supervisors were deployed to facilitate distribution. The project also supported the two woredas in contracting and availing delivery vehicles to the health post level, providing LLIN distribution registration pads, reporting formats, and availing personal protective equipment (PPE) for prevention of COVID-19.

- **Liberia:** GHSC-PSM in collaboration with the NMCP, PMI, Ministry of Education, Read Liberia, and Breakthrough Action launched the School-based ITNs Campaign in Montserrado County at Matadi elementary school. The launch was geared toward delivering 100,000 LLINs to more than 156,000 children in 412 schools in Bong, Nimba, and Montserrado counties. The distribution of LLINs to schools started on December 8, 2021, with schools in Montserrado County. As a key partner, GHSC-PSM was solely responsible for providing the supply chain components, which entailed quantifying LLIN needs for each school and ensuring that LLINs were delivered to designated counties and schools. To ensure that LLINs allotted for each school within the selected counties are secured under good condition, GHSC-PSM collaborated with implementing partners to conduct storage verifications in three counties (Bong, Nimba, and Montserrado). A key focus of the exercise included mapping all existing hubs (warehousing and transportation resources) and addressing any capacity gaps through permanent or temporary storage.

- **Malawi**: The project provided technical support to the NMCP to facilitate LLIN distribution process trainings for district and health facility supervisors in selected districts, and support for the mass LLIN distribution activity following its launch in Q1. Of the more than 9 million LLINs that are planned for distribution by the end of the activity, which is due to be completed in mid-2022, more than half (4.5 million) were distributed across the country by the end of Q1.

- **Zambia:** GHSC-PSM continues to support the National Malaria Elimination Centre (NMEC) to improve availability of malaria commodities, including LLINs. Based on updated household

estimated population information for 2023, forecasting and quantification and a review of partners' contributions, NMEC and the partners identified a gap of 7,491,258 LLINs for the 2023 mass distribution campaign, with potential funding from PMI translating to 310,735 LLINs pending approval of FY 2021 reprogrammed funds. GHSC-PSM is part of the steering team working ahead of the 2023 LLIN mass campaign with various stakeholders that has produced a concept note seeking early involvement of other partners to help cover the gap. The concept note was shared with NMEC leadership for consideration in engaging AMF.

Exhibit 13. GHSC-PSM delivered LLINs to six countries in Q1. Examples include:

Countries	**Number of LLINs**
Benin	550,000
Cameroon	347,042
Congo DRC	380,561
Kenya	1,663,576
Nigeria	6,799,633
Tanzania	153,984
Total	**9,894,796**

These LLINs are enough to protect nearly 19.8 million people.

Country Support

GHSC-PSM provided supply chain systems strengthening support for malaria medicines and commodities in 22 countries in Q1,[13] including:

- **Burma:** Collaborated with its service delivery implementing partner Defeat Malaria (DM) to help implement mSupply, an electronic logistics management information system (eLMIS), with dashboard management capabilities using Power BI. The project trained 35 DM staff to use mSupply/Power BI. This new management system is improving supply chain visibility into malaria commodities, down to the township level, for better decision making and integration with the national eLMIS. By working with DM to implement mSupply/Power BI, the supply chain infrastructure is significantly bolstered to enable the delivery of lifesaving health malaria commodities to the people of Burma.

- **Malawi:** Rolled out integrated PMI and Global Fund malaria distribution plans in October 2021 through September 2022, following the pilot distribution exercise in Q4 FY 2021. As a result, PMI, through GHSC-PSM, jointly with Global Fund, supported the NMCP in distributing malaria commodities to health facilities across the country. This integration aims to provide greater efficiency in the supply chain management of malaria commodities in the country through a strategic division of labor and distribution to target areas of the country, ensuring maximum coverage in the planned delivery of malaria commodities.

- **Mali:** Partnered with the National Malaria Control Program (PNLP) to set up a call center to track the current stock of antimalarials in community health centers (CSCOMs) in Gao, Kayes, Koulikoro, Mopti and Timbuktu regions. The goal is to improve the availability of antimalarials and reduce health facility stockouts.

As part of the surveillance system established by the PNLP, each CSCOM provides a weekly report of their current stock of antimalarials to the PNLP to identify any stock out or overstock risks. Unfortunately, this passive data collection system has not worked and suffered from poor data quality transmitted by the CSCOMs to the PNLP. To address these challenges, the PNLP decided to invest in the call center designed by GHSC-PSM, given its success in significant health product stock out rate reduction in South Sudan and Niger, where it has been implemented. The call center is an online platform that is integrated with the local telephone network to make calls online for the purpose of tracking inventories and improving the quality of logistics data entered into the DHIS2/OSPSANTE eLMIS.

[13] GHSC-PSM provides technical assistance to countries with malaria funding: Angola, Burkina Faso, Burma, Burundi, Cambodia, Cameroon, Ethiopia, Ghana, Guinea, Laos, Liberia, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Sierra Leone, Thailand, Uganda, Zambia, and Zimbabwe.

As agreed to with the PNLP, the call center will be implemented first in areas where health facilities face security threats and data quality issues, including areas of Gao, Kayes, Koulikoro, Mopti and Timbuktu regions, to be part of the small-scale implementation, before fully transitioning the paper-based surveillance system to the call center nationwide.

As of Q1, the call center has been launched for the health facilities of Mopti, Gao and Timbuktu, and will be installed in the facilities of Kayes and Koulikoro in Q2.

Screenshot of our online training for Central Warehouse participants on how to use PSM Online. Photo by GHSC-PSM.

- **Thailand:** Supported the Ministry of Public Health (MOPH) Division of Vector Borne Diseases (DVBD) in establishing PSM Online, an application that tracks movement of malaria commodities, analyzes and reports stock status in warehouses and reports consumption data. The system went live at the central warehouse in September 2021 and on November 30, 2021, the project trained thirteen participants from warehouses in five provinces, (Chantaburi, Chonburi, Rayong, Sakaw and Trat) to use the system.

Thailand has an effective malaria surveillance system called Malaria Online, but commodity stock reports, especially from service delivery points (SDPs), remain paper-based, and no system is in place to routinely capture, analyze and monitor logistics data in real-time across the supply chain. The lack of data visibility can potentially lead to inaccurate forecasting of needs and supply planning, ultimately negatively impacting resupply decisions. This can in turn lead to stockouts of lifesaving commodities at the health facility level and cause a delay in diagnosing and treating malaria patients. PSM Online's goal is to improve malaria commodity data visibility and mitigate these risks.

B3. Family Planning and Reproductive Health

To date, the GHSC-PSM project has delivered enough contraceptives that, when combined with proper counseling and correct use, are estimated to provide **94.5 million couple-years of protection**, including **4.3 million in Q1.**

Procured FP/RH commodities for 23 countries[14] and provided **health supply chain systems-strengthening support** to **23 countries** with FP/RH funding.

Continued to successfully fulfill USAID-supported countries' orders in a timely manner, **achieving 98 percent (91 percent COVID-impacted) OTD** in Q1.

Presented findings on the depot-medroxyprogesterone acetate (DMPA)-IM focused packaging harmonization and green packaging efforts from FY 2019 to FY 2021.

Participated in the 10th Annual Meeting of the Ouagadougou Partnership. The partnership includes **nine West African countries** with the goal to accelerate progress in the use of FP services.

Published an analysis on contraceptive security in South Africa in the Frontiers in Women's Health Journal.

GHSC-PSM Senior Forecasting and Supply Planning Advisor John Durgavich selected as Chair of the Reproductive Health Supplies Coalition (RHSC) Systems Strengthening Working Group (SSWG).

The FP/RH task order serves as the primary vehicle through which USAID procures and provides FP/RH commodities for its voluntary FP programs; offers technical assistance to improve supply systems and

[14] Per USAID guidance, all condom procurements are counted under the HIV/AIDS task order.

contraceptive security in partner countries and provides technical leadership to strengthen the global supply, increase financing, and introduce new FP/RH commodities.

Addressing FP/RH priorities

With USAID's FP/RH priorities in sight, GHSC-PSM continued to strengthen its global supply operations and collaborated with countries to continue building self-reliant supply chains. In Q1, COVID-19 challenges continued to hinder project staff travel to conduct trainings or join in-person workshops. Despite these restrictions, GHSC-PSM worked with activity leads and country offices through virtual workshops or other approaches to ensure program continuity.

Securing reliable supply and maintaining high on-time performance

Despite the COVID-19 pandemic and persistent and severe global supply shortages of injectable and implantable contraceptives, in Q1, GHSC-PSM ensured countries had access to a continuous and reliable supply of FP/RH commodities. While COVID-19 disrupted the DMPA-IM market, restricting the current offering of products, GHSC-PSM had secured a supply of DMPA-IM by onboarding the first generic supplier in 2018 and two additional generic suppliers in 2020. The project leverages RDCs and regularly analyzes allocation of production to ensure countries receive adequate supply to avoid any stockouts. The impact of the pandemic on logistics continues, however, including reduced global shipping capacity, difficulty in confirming bookings and moving cargo, a global container shortage, and decreased availability of air freight capacity.

Commodities Procured for FP/RH Programs

- Consumable kits for implants
- Contraceptive implants
- Cyclebeads®
- Injectables
- Intrauterine devices
- Oral contraceptive pills

Timeliness of GHSC-PSM deliveries remained strong for standard OTD in Q1 for FP/RH commodities at 98 percent (91 percent COVID-impacted). OTIF numbers remain high at 89 percent (81 percent COVID-impacted). During FY 2020, the number of COVID-impacted orders started to increase significantly and, as predicted in previous reports, has since continued to challenge OTD performance. Freight costs in global supply chains remain highly volatile and the degree of unpredictability caused by the ongoing pandemic continued to impact orders in Q1. This impact is expected to continue throughout FY 2022.

Exhibit 14. FP/RH commodities, OTD

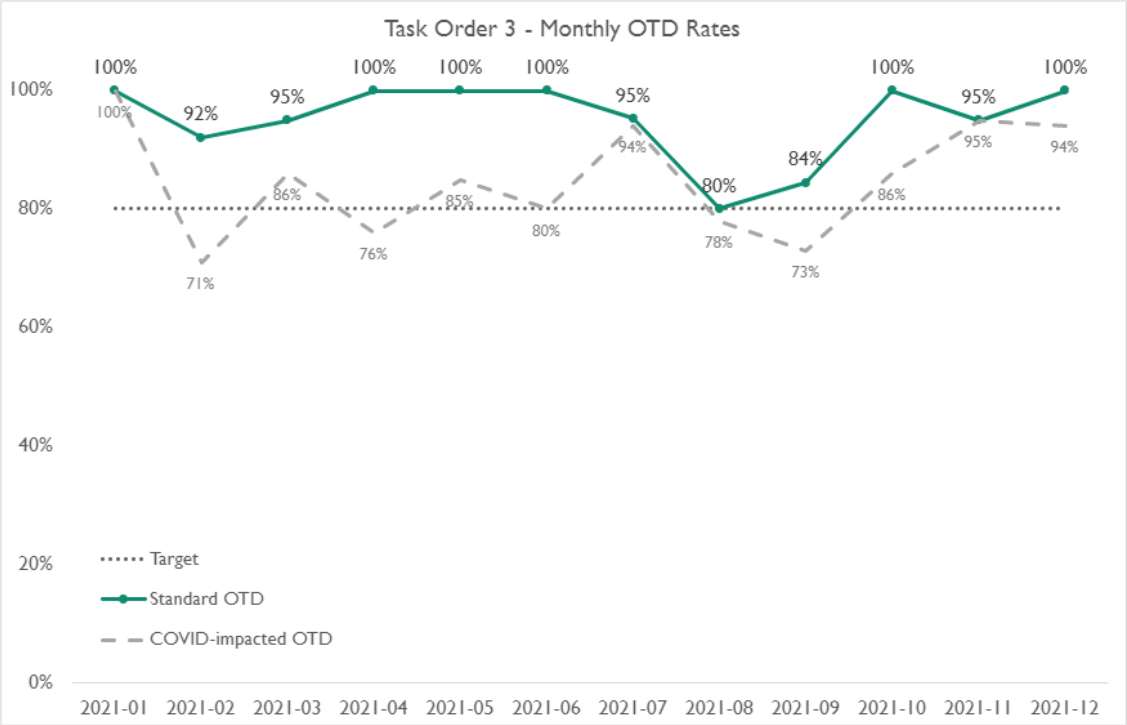
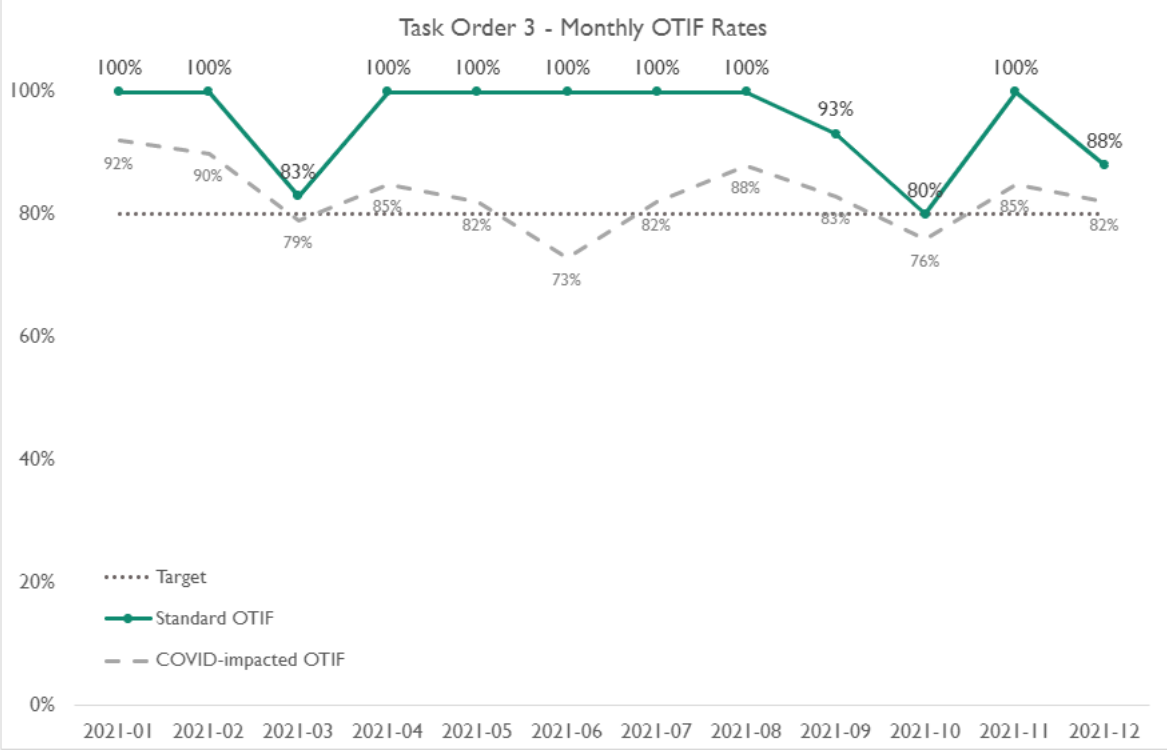


Exhibit 15. FP/RH commodities, OTIF



Contributing to resources on new long-acting family planning methods

In Q1, GHSC-PSM continued to actively participate in the Hormonal Intrauterine Device (IUD) Access Group, conducting "Year-in-Review" calls with hormonal IUD suppliers to reflect on the successes and lessons learned to date and plan for continued collaboration in 2022. Also, GHSC-PSM, along with other members of the Hormonal IUD Access Group, drafted and submitted a manuscript titled "Five Years Later, What Have We Learned? Implementation of a Global Learning Agenda for the Hormonal Intrauterine Device" to the peer reviewed *Global Health: Science and Practice* journal. The manuscript synthesizes evidence generated in LMICs over the past several years, and provides an overview of the Hormonal IUD Access Group's efforts to support expanded access to the method.

Transitioning to combined oral contraceptives with non-ferrous fumarate placebo pills

In Q2 FY 2021, GHSC-PSM began to transition from providing combined oral contraceptives (COCs) with ferrous (Fe) fumarate placebo pills to COCs with non-ferrous fumarate placebo pills. This transition, due to market health considerations and evidence demonstrating Fe placebo pills do not provide clinically significant improvements in blood iron levels, continues as countries place new orders of COCs with non-Fe placebo pills. In Q1 FY 2022, GHSC-PSM continued to work with social marketing organizations (SMOs) to maintain healthy stock levels of Combination 3 in preparation for the discontinuation of Combination 3 procurement that was announced in Q3 FY 2021.

This is an ongoing transition that will continue through FY22, so I am unsure how else to address. I have shortened the intro and kept what has been done in Q1. Will likely look much the same in Q2, since this is ongoing. We will need to discuss this in all quarterly reports in terms of transition until all countries have moved to non-ferrous placebo or away from C3.

Effective Q4 FY 2021, GHSC-PSM is fulfilling all new COC orders with COCs containing a non-Fe placebo, taking into account project countries' local regulatory restrictions and requirements on overbranding and the registration status of the COCs containing non-Fe placebo. GHSC-PSM continued to support countries to make this transition for SMOs engaging in overbranding, including facilitating marketing authorization from suppliers, where applicable.

Supporting social marketing engagement activities

In Q1, GHSC-PSM continued to actively support SMOs toward fully transitioning from iron-based COCs to non-Fe placebo products. This support included helping SMOs navigate supplier regulatory requirements, review social marketing brand artwork for compliance with USAID and supplier overbranding requirements, obtain supplier market authorizations to enable in-country overbranding and compliance to local regulations, monitor in-country stock levels and advise on fulfillment. Details of these activities are further highlighted in corresponding sections of this report.

Throughout FY 2022, GHSC-PSM will continue to monitor social marketing activities to provide critical visibility that supports strategic and operational discussions, aimed at stabilizing the social marketing

supply chain. For instance, in Q1, GHSC-PSM and USAID facilitated ongoing discussions on overbranding restrictions and their impact on USAID-funded social marketing activities.

Implementing packaging harmonization

In December 2021, GHSC-PSM presented to USAID and United Nations Population Fund (UNFPA) the results of the FY 2021 DMPA-IM focused packaging harmonization and green packaging efforts. The goal of these efforts was to explore opportunities for optimum packaging of DMPA-IM that can benefit both global and in-country supply chains, reduce environmental impact, and provide potential cost savings. The presentation also included recommendations for logo use across all product categories with a focus on environmental impact. Under the FY 2022 Progressive Packaging Activity, GHSC-PSM will continue this work by conducting a follow-on green packaging assessment to align other product categories, such as oral contraceptives, contraceptive implants (two-rod) and DMPA-subcutaneous. GHSC-PSM will also continue close collaboration with USAID, UNFPA and GHSC-QA to reach consensus and ensure alignment on green packaging implementation.

Assessing stockouts of contraceptives in South Africa

In FY 2019, GHSC-PSM contracted IQVIA to conduct a market analysis and provide a picture of the total market contraceptive landscape in South Africa. As a follow-on to this research, in Q1 the peer-reviewed *Frontiers in Women's Health Journal* published an analysis on contraceptive supply in South Africa. The publication concluded that the public and private sectors were significantly impacted following the end of a public sector contract for injectable contraceptives and COCs in 2017.

Conducting a landscape survey of SSA manufacturers' capacity to produce hormonal contraceptives

In FY 2021, GHSC-PSM contracted IQVIA to determine if there is a business case for a local Sub-Saharan African (SSA), WHO PQ manufacturer to manufacture hormonal contraceptives.). The analysis concluded that while local manufacturing of injectable and oral contraceptives may not be sustainable even if the facility exports to South Africa, it may be profitable to manufacture DMPA IM, if the facility exports to South Africa as well as to FP2020 SSA countries. The manufacturer would need to capture 10 percent of the South African market to be sustainable. GHSC-PSM/IQVIA presented these conclusions to the USAID Office of Population and Reproductive Health during a Topical Tuesday forum in Q1 and will further explore the conclusions in FY 2022.

Updating the Registration Tool to include Global Data Synchronization Network (GDSN) data as a data source

In FY 2021, GHSC-PSM enhanced the Registration Tool to support the transition to the GDSN as the source of supplier registration. These enhancements serve to make data more reliable and minimize the risk of errors due to manual entry. GHSC-PSM presented updates to the tool to USAID in Q1, including recommendations for future enhancements and sustainability.

Collaboration with global stakeholders

GHSC-PSM builds global partners' awareness of and support for the USG's FP/RH priorities and programs and supports USAID's leadership in contraceptive security through the following activities.

Supporting RHSC SSWG

In Q1, GHSC-PSM Senior Forecasting and Supply Planning Advisor John Durgavich was selected as chair of the RHSC SSWG. Following his appointment, the SSWG held an introductory meeting to review the FY 2022 work plan and reestablish activity leads, timelines for implementation and dissemination plans. Several GHSC-PSM staff volunteered to lead or support workstreams identified in the work plan for the coming year.

Participating in the Ouagadougou Partnership Meeting

GHSC-PSM participated in the 10th Annual Meeting of the Ouagadougou Partnership. Launched in 2011, the partnership includes nine West African countries with the goal to accelerate progress in the use of FP services. While a small delegation met in person in Burkina Faso, many participants, including GHSC-PSM, joined virtually. The theme of the meeting was addressing FP challenges in the context of humanitarian crises given the COVID-19 pandemic and ongoing security issues in the region. Countries reported on progress made in the areas of youth and adolescents and advocated for decision-makers to design policies to enable youth to better access FP services. Participants included staff from ministries of health, USAID, UNFPA, BMGF and other stakeholders.

Tracking contraceptive security

GHSC-PSM is finalizing data validation for the 2021 round of the Contraceptive Security Indicators survey. This year's survey includes several updates, including questions to assess the quantity of contraceptives purchased and forecast (measured in couple years of protection) to further gauge the visibility of contraceptive commodities within a country's LMIS, and to understand countries' plans to make an FP2030 commitment. The survey also includes a new section about COVID-19's impact on several aspects of contraceptive security and the measures countries are taking to mitigate challenges.

Enhancing data quality for the stockout indicator

A constant challenge in calculating health facility stockout rates is the interpretation of whether a facility is actively offering a product and tracking those facilities over time. To address this challenge, GHSC-PSM and USAID developed the Active Site Rule. This business rule uses available logistics data to better understand the stock status of FP methods at health facilities. An "active site" for an FP method is defined as a health facility that has had the method in stock, issued it to clients or ordered it at any point in the previous 12 consecutive months. Facilities deemed inactive for the FP method are removed from the stockout rate calculation for that method and for that reporting period—whether for the average stockout rate indicator for USAID's annual Performance Plan and Report or for quarterly or monthly stockout reporting.

In Q1, GHSC-PSM finalized a white paper, *The Active Site Rule for Contraceptive Stockout Rates: Assessing the Use of a Business Rule Approach for Health Facility Stock Status*. The paper, which examines the rule's impact on data quality and the implications for its rollout through two case studies in Nepal and Malawi, is posted alongside the Active Site Rule video series. Both parts of the series are posted to the GHSC-PSM website and are available in English and French, along with full transcripts.

Enhancing visibility of FP supply data

GHSC-PSM serves as a key contributor in supporting strategic development and scale-up of the Global Family Planning Visibility and Analytics Network (VAN) platform and processes. VAN is the RH community's pioneering undertaking to increase supply chain visibility and improve collaboration across stakeholders. In Q1, GHSC-PSM continued to focus on enabling the project to realize the benefits of the tool by supporting and onboarding users; validating new features, processes, and data integrated with the VAN and engaging in strategy sessions for use of the VAN in FY 2022.

Specifically, GHSC-PSM staff:

- Managed the ARTMIS-VAN data integration and implemented a major change request to incorporate requisition order data into the VAN, providing even greater visibility, from order entry to users. Also, new processes for issue identification were put in place to ensure a high level of data integrity.

- Sat on the VAN Steering Committee (GHSC-PSM is a non-voting member) and participated in the annual meeting, which culminated in strategic recommendations on use of constrained resources in FY 2022, including funding diversification through engaging other international donors and partnerships.

- Participated in regular VAN working groups, including the Data Management Task Force, the Technical Management Force, the Data Sharing Task Force, and the Super User and Analytics Task Force.

- Continued participating in country-specific working sessions as eLMIS integrations with VAN are completed, including sessions in Burkina Faso, Ghana, Malawi and Nigeria.

- Participated in meetings with RHSC on identifying a cohesive strategy for use of the VAN in in-country health systems strengthening work.

Analyzing FP supply chain digital ecosystems

In Q1, GHSC-PSM hosted a workshop series to culminate almost one year's worth of research on the FP digital supply chain ecosystems in Ghana and Malawi. The analysis is designed to understand and map the FP digital supply chain ecosystems of these countries to identify processes and the existing level of use of digital platforms, such as the VAN, and how these e-health and digital strategies can advance countries' FP2030 commitments and strengthen sustainable country procurement, supply/demand

planning, forecasting and data visibility. The workshop series, titled "VAN: From Global to Local Leveraging the VAN to Support in-Country Health System Strengthening," was broken down into four days; the first two days focused on the global perspective of VAN use and opportunities, while the third and fourth days provided unique opportunities for Malawi and Ghana, respectively, to provide feedback on findings, use of the VAN in country, and how it fits into the country's broader digital strategy. The ecosystem analyses and workshop reports can be accessed here.

Presenting at the public health supply chains Post-Black Swan Event

In Q1, GHSC-PSM created a short video as part of a virtual poster presentation at the Global Health Supply Chain Summit's virtual conference on Guidelines: Recovery Strategies for Public Health Supply Chains Post-Black Swan Event. This year's summit focused on "Building for the Future: Review, Recovery, and Refocusing." The guidelines use scenario mapping—predicting what might happen in the future and how a program/supply chain might operate—to help decision makers plan for recovery from the consequences of the pandemic and other catastrophic events, weigh the information and advice they have received and make informed decisions. The video was well received; some of the attendees commented on the importance of using scenario mapping and the inclusion of private sector concepts in mitigating risks within a public health context.

Country support

Below are examples of the technical assistance that GHSC-PSM provided to strengthen in-country[15] supply chains for FP/RH commodities in Q1.

Burkina Faso

In the Center-West region, the regular analysis of logistics data with the support of GHSC-PSM, revealed imminent stock shortages of Microlut pills in certain SDPs. An investigation revealed that there was not only a shortage of the product at the central level, but the stock in the region was concentrated in two districts (Sabou and Ténado). Based on this information, some 3,160 cycles of stock were redeployed to avoid stockout and expiry risks and reduce the stockout rate of Microlut from 28.54 percent in September to 19.28 percent in December 2021.

In the Southwest region, during a supportive supervision visit, GHSC-PSM noted challenges in the organization of the health commodity orders between health facilities and district distribution depots. This results in an apparent work overload, especially for the district distribution depot actors who lack

[15] GHSC-PSM procured FP/RH commodities for the following countries: AFRICA: Angola, Benin, Burkina Faso, Burundi, DRC, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Tanzania, Togo, Uganda, Zambia; LAC: Haiti; ASIA: Bangladesh, Nepal. The countries for which GHSC-PSM provides technical assistance with FP/RH funding are: AFRICA: Angola, Burkina Faso, Burundi, Ethiopia, Ghana, Guinea, Liberia, Malawi, Mali, Mozambique, Nigeria, Rwanda, South Sudan, Uganda, Zambia; LAC: El Salvador, Republic of Guatemala, Haiti, Republic of Honduras, Nicaragua, Panama; ASIA/NEAR EAST: Nepal, Pakistan.

time to carry out important tasks, such as correctly filling out the reporting tools and conducting data analysis and supportive supervision.

To overcome this challenge, GHSC-PSM proposed a scheduling model for processing health facility orders. In this model, health facilities in each district are subdivided into five groups, and each group has three days at the end of each month to place their routine orders with the district warehouses.

Ghana

To help improve the availability of FP products at SDPs, GHSC-PSM is collaborating with the Ghana Family Health Division (FHD) to pilot an informed push model in the Eastern, North East, Northern and Savannah Regions.

This initiative aims to ensure that trained logistics operators deliver supplies to SDPs on a regular schedule, restocking where necessary and recording quantities of products sold for facilities that do not regularly request them from the regional medical stores (RMSs). Also, the arrangement will be used to strengthen ordering, review, and supply processes for facilities that do routinely place orders from the RMS. To move this forward, GHSC-PSM and the FHD organized orientation programs for service providers in the pilot regions to build their capacity on the framework tools and processes involved in the informed push model. The framework will cover:

- Review of facility-level logistics data by districts and the RMS to inform the supply of FP commodities for SDPs.
- Full adherence to the last-mile distribution schedule by health facilities and the RMS.
- Effective coordination among stakeholders to ensure rapid resolution of identified challenges.
- Effective application of the Ghana Integrated LMIS and other logistics tools (worksheet, report, requisition issue and receipt voucher, stock cards) to enhance supply processes and distribution to SDPs.
- Review of requisition to ensure inclusion of the various method mixes.

GHSC-PSM will continue to provide technical assistance to the FHD to improve the availability of FP commodities at SDPs.

Nigeria

Following a QAT training, GHSC-PSM provided technical assistance in support of an FP quantification exercise for the Government of Nigeria to determine commodity and funding requirements for 2022. A total of 23 representatives from USAID, GHSC-PSM, the Federal Ministry of Health, the State Ministry of Health, UNFPA, CHAI and other implementing partners attended the meeting onsite and online.

The activity included assumption building and forecast generation using demographic and consumption data. Using these indices, the participants quantified national FP commodity needs for the next five years (2022–2026). They also identified funding gaps for procuring the quantified commodities. The Family Health Department is to submit a memo to the Federal Ministry of Health for FP commodities for 2022, a key outcome of this meeting.

South Sudan

When it comes to increasing data visibility through the integrated call center (ICC), GHSC-PSM in South Sudan focuses on building relationships with facility-level staff to receive stock information at SDPs. In June 2021, GHSC-PSM developed a monthly stock bulletin to actively engage stakeholders at the central level on FP and present the information in an easily digestible way.

The bulletin serves as a predictable and reliable source of information, as well as a driver for behavior change through structure, routine, and positive reinforcement. It features FP-related updates for the month, highlights stock challenges and shares efforts related to routine distribution cycles. Through the ICC data collection tool, coupled with the regular dissemination of the bulletin, GHSC-PSM serves as the conduit between central-level decision makers and implementing partners at SDPs, where the rich qualitative and quantitative FP information is housed and often remains.

Over time, partners have become more trusting and receptive of the reporting platform. On November 17, 2021, the GHSC-PSM team held the first quarterly FP data meeting to reintroduce the data visibility efforts through the ICC and how these efforts link to the monthly bulletin. The meeting provided participants with a summary of the ICC, a walkthrough of the bulletin and most importantly an opportunity to talk through the changes that were made thanks to direct feedback from partners. The project also opened a discussion at the end of the meeting for partners to note any issues they were experiencing (with the ICC, FP stock or otherwise). Those who attended were engaged, demonstrating a wealth of knowledge and providing key feedback. At that point, the project team could troubleshoot some immediate fixes as well as take things into consideration for future adjustments.

Partners provided multiple examples of actionable and useful feedback. For example, Momentum asked if GHSC-PSM could add a section highlighting expiries and include distribution information. Starting in November 2021, the project added these features and expanded them to include projected FP kit needs at each location so that partners can gain visibility into how the ICC data are used to generate the distribution plans. Overall, the project plans to build on these early successes, regularly releasing the bulletin, promoting use of the ICC and improving the FP data visibility efforts with stakeholder input and engagement.

B4. Maternal, Newborn, and Child Health

14 countries received MNCH health supply chain strengthening support in Q1 FY 2022.

Seven countries procured MNCH medicines and commodities in Q1. Since its beginning, the project has procured a total of **$23.8 million in MNCH commodities.**

Delivered 190 refrigerators to health facilities **across Ghana** to appropriately store the maternal health commodity oxytocin so it is safe to administer.

Kicked off **technical meetings with global partners,** including UNICEF, BMGF, PATH, Promoting the Quality of Medicines Plus (PQM+) and Medicines, Technologies and Pharmaceutical Services (MTaPS) aimed to **avail key child health commodities** for treating pneumonia and possible serious bacterial infection (PSBI), leading causes of childhood mortality.

GHSC-PSM supports USAID's efforts to prevent child and maternal deaths by increasing access to quality-assured medicines and supplies under the MCH task order. The project provides global technical leadership on MNCH commodities and ensures that supply chain management considerations are included in global dialogue and initiatives.

This section of the GHSC-PSM quarterly report summarizes achievements under the MCH task order objectives in Q1, including those of the core work contributing to the global dialogue on priority MNCH issues, and the performance of the project's global supply chain and country offices. The MCH task order objectives are as follows:

- **Objective 1. Provide international MNCH supply chain leadership and guidance**: GHSC-PSM contributes to the global MNCH commodity and supply chain knowledge base, engages with technical coordination bodies, and promotes international MNCH and supply chain best practices.
- **Objective 2. Support data-informed health supply chain decision making for MNCH commodities**: The project implements and trains staff to use MNCH data collection and

analysis tools; advocates for data system investments; and works with countries to demonstrate the value of timely and accurate data for commodity management.

- **Objective 3. Improve adherence to globally recognized best practices in MNCH commodity management**: The project develops procurement, storage and distribution resources and partners with national governments to implement MNCH commodity management best practices.

- **Objective 4. Enhance in-country MNCH supply chain coordination and collaboration**: GHSC-PSM guides national governments as they lead and institutionalize coordination among sub-national partners, programs, and donors involved in MNCH service delivery and commodity selection and management.

- **Objective 5. Conduct ad hoc strategic procurement and delivery to increase availability of quality-assured MNCH commodities** in project-supported countries.

Provide international MNCH supply chain leadership and guidance

Improving the management of postpartum hemorrhage commodities

Postpartum hemorrhage (PPH) continued to be the global leading cause of maternal mortality in FY 2021. Since 2017, WHO and other global partners have updated clinical recommendations for the prevention and treatment of PPH, including heat-stable carbetocin to prevent PPH and to broaden the use of existing legacy health commodities, including oral misoprostol and tranexamic acid. In response, GHSC-PSM continues to engage project staff, local implementing partners and national government stakeholders to call attention to updated PPH global guidance and improve procurement and supply chain management of context-appropriate PPH commodities.

PPH activities in Q1 were focused in the following countries:

- In **Ghana,** GHSC-PSM is working to strengthen the supply chain for oxytocin. The project supported Ghana Health Service (GHS) by procuring and distributing 190 refrigerators to health facilities that were selected due to their gaps in cold storage for oxytocin. The handover ceremony, held in December 2021, to present the refrigerators to GHS's Family Health Division was attended by representatives from USAID/Ghana, GHSC-PSM and GHS. The refrigerators are expected to be kept at maternity and delivery wards in Ahafo, Bono, Bono East, Central, North East, Northern, Volta and Western North Regions to improve access to high-quality oxytocin in health facilities. GHSC-PSM will continue to provide technical assistance to GHS to strengthen the supply chain for oxytocin and other MNCH products.

- In **Malawi,** GHSC-PSM conducted an assessment of Malawi's public sector supply chain in FY 2021, to identify high-risk procurement and supply practices that may compromise PPH commodity quality and availability. Oxytocin, the current first-line medication to prevent and treat PPH, is sensitive to heat and should be stored between 2° and 8°C in countries with tropical climates. GHSC-PSM analyzed local supply chain and temperature data to identify where excessive heat exposure may occur and how current procurement and inventory management policies may contribute to the presence of poor-quality PPH commodities at the point of care. The assessment included recommendations to:
    - Exclusively procure oxytocin labeled for storage between 2° and 8°C and store it accordingly
    - Expand the use of oral misoprostol for PPH in health facilities where oxytocin quality cannot be guaranteed due to lack of refrigerators
    - Adjust inventory min and max policies and distribution schedules to ensure that adequate supply of context-appropriate PPH commodities are always available

In Q1, GHSC-PSM in collaboration with Monash University held a two-day stakeholder engagement session to share assessment findings and to host a capacity-building session on oxytocin and misoprostol quality issues. The sessions hosted 13 total attendees, including supply chain and maternal health officials. As an immediate follow-up action, GHSC-PSM in Malawi and Malawi's Directorate of Reproductive Health will incorporate oxytocin quality elements into MNCH-focused supportive supervision visits that will take place in Q2.

Supporting domestic wholesalers to improve access to quality MNCH commodities in the private sector

Providing leadership in global dialogue around domestic wholesaler operating context, challenges, and opportunities. To reach health goals in low- and middle-income countries (LMICs), governments must improve the availability of quality health products. Private sector domestic wholesalers are a central actor in health supply chains, often the connection point between manufacturers and points of dispensation. Domestic wholesalers are particularly crucial for MNCH, as they are often relied upon to supply countries' essential MNCH commodities. Due to increased interest from the global health community to improve availability of quality health commodities supplied by private sector domestic wholesalers and thus improve health outcomes, organizations—including GHSC-PSM—have recently engaged domestic wholesalers to improve their ability to source and distribute affordable, quality health products. In previous quarters, the project convened global leaders on this topic and in FY 2022, is working on specific domestic wholesaler activities to improve health outcomes. These are detailed below.

Supporting domestic wholesalers in Zambia. In Q1, GHSC-PSM continued to provide technical assistance to Zambia's national wholesaler association, Zambian Pharmaceutical Business Forum (ZPBF), a non-profit association of pharmaceutical wholesalers, manufacturers and retailers that aims to help members effectively operate as suppliers of health commodities. GHSC-PSM conducted a series of six workshops covering topics including the purpose and structure of the association, how to identify and manage financial and human resources for the association, governance and communications. ZPBF has benefitted from the experiences of GHSC-PSM and its partner organization, the International Federation of Pharmaceutical Wholesalers, and is applying these learnings to set clear goals and objectives as they revise the association's guiding constitution. They also initiated conversations with the MOH to discuss opportunities to address operating challenges in the country. At the beginning of Q2, GHSC-PSM will continue to work with ZPBF to develop a work plan that continues progress toward achieving objectives identified in the workshops.

Documenting wholesaler engagement and lessons learned. In Q1, the project's MCH task order worked in partnership with the FP/RH task order to develop a paper that summarizes information and experiences around the role of domestic wholesalers in improving availability of quality and affordable FP and MCH commodities. This technical paper examines the opportunities for investing in these key actors and providers of commodities and for increasing efficiencies in performance that could drive down costs and lead to savings for governments and clients seeking care through private sector SDPs and pharmacies. The paper considers how partners can help develop tools and systems for national oversight of pharmaceutical wholesalers for provision and proper management of quality commodities. Findings will inform future investments through GHSC-PSM and other partners, and dissemination will begin in Q2.

Co-hosting with MTaPS and PQM+ global technical discussions to improve the availability of commodities to treat childhood pneumonia and PSBI

To improve child health outcomes, skilled health workers must receive the medical supplies they need. In 2010, a global call to action established the U.N. Commission on Life-Saving Commodities for Women and Children. The commission identified 13 commodities that could save the lives of more than six million women and children if they were more widely accessed and properly used. Among them were amoxicillin dispersible tablets (DTs) and gentamicin to treat pneumonia and PSBI in children under five. Unfortunately, many countries have not yet adopted these commodities into their national supply chains.

In Q1, GHSC-PSM met with UNICEF, MTaPS, PQM+, BMGF and PATH, among other collaborators on the Child Health Task Force (CHTF), to plan and determine a process for a series of technical discussions to improve access to amoxicillin DT and gentamicin. The group has prioritized three key barriers to availing these commodities: quantification, use and quality. Following the planning meetings, partners from international and local non-governmental organizations, academic and research institutions, and the private sector began gathering evidence of the barriers and interventions that have demonstrated impact in scaling up amoxicillin DT and gentamicin availability in national systems. In the

coming quarters, GHSC-PSM and its partner USAID supply chain projects will continue to provide leadership to the series, as well as insights from project-supported countries on potential solutions to address the barriers. The series will be held in March and upon culmination seeks to (1) issue a call to action for partners and (2) present next steps to address availability challenges. It will extend support to country teams to implement activities that integrate these commodities into national supply chains.

Conducting end-use verification surveys in project-supported countries

MNCH data and analytics within national LMISs are not always adequate to identify and resolve supply chain issues. To bridge this gap, GHSC-PSM uses the end-use verification (EUV) survey to increase the availability of MNCH commodity data. The survey helps supply chain staff collect data on commodity availability, storage conditions, and factors that affect commodity availability at SDPs. EUV data collection is also an opportunity for GHSC-PSM country teams to provide on-site capacity building for SDP staff and MOHs, gather supplemental qualitative data on reasons for stockouts, and cross-check LMIS data accuracy on stock availability trends.

In Q1, the project supported data collection on MNCH commodities through EUV surveys in six countries (Benin[16], Burkina Faso, Guinea, Liberia, Mali and Zambia) and completed and shared EUV reports with partners including USAID from four countries (Benin, Ghana, Nepal and Nigeria).

Global EUV leadership. GHSC-PSM continued to participate in a series of EUV meetings and trainings, including monthly technical working groups with country offices, to discuss challenges and develop solutions for smooth execution and submission of the EUV. The project also worked in Q1 to revise the EUV based on stakeholder and USAID feedback to improve data usability.

[16] EUV survey support in Benin is facilitated by GHSC-PSM's partner project, GHSC- Technical Assistance Francophone Task Order.

Improving data analytics for MNCH commodity decision making

eLMIS platforms aggregate and help stakeholders analyze an array of national supply chain information. In FY 2020, GHSC-PSM conducted a data use survey in 15 countries and mapped the availability of MNCH commodity data across electronic and paper-based systems. Findings indicated that countries often face the time-consuming challenge of manually entering, consolidating and analyzing logistics data. These challenges often delay decision making and response to supply chain challenges. As a result of these findings and interest within country teams to scale up use of data for MNCH commodity management, in FY 2021, GHSC-PSM cataloged common MNCH commodity management decisions and the corresponding analytics tools that countries use to inform them, housing information about these adaptable and robust tools in a Power BI catalog. The catalog describes each tool, the platform it uses, the data it requires to function and a point of contact for the tool. The catalog will be particularly helpful to countries with nascent eLMISs, providing a blueprint of analytics tools that already exist to support key supply chain decisions.

In Q1, GHSC-PSM launched an activity to operationalize the data catalog in select countries to improve MNCH commodity management through data analytics. The project is supporting Nepal to select, adopt and adapt analytics tools from the catalog based on their supply chain needs. GHSC-PSM held a kickoff meeting to explore the status of Nepal's eLMIS rollout and understand the MNCH supply chain challenges that the country faces. The project is drafting a statement of work, based on the information gathered, for developing context-specific analytics tools for GHSC-PSM in Nepal.

Improve adherence to globally recognized best practices in MNCH commodity management

Providing systems strengthening technical assistance

GHSC-PSM provided MNCH systems strengthening support to increase access to quality-assured MNCH commodities to 14 countries[17] in Q1. Specific country achievements are described below.

Assessing supply chain barriers to availing MNCH commodities in Nepal. In Q1, GHSC-PSM in Nepal conducted a suite of MNCH supply chain assessments at a range of SDPs and central medical stores across all levels of the supply chain (central, provincial, district and local). The research assessed availability of select MNCH commodities (oxytocin, magnesium sulfate, gentamicin, ORS, zinc, amoxicillin and chlorhexidine), storage and distribution practices for oxytocin and barriers to availing quality newborn resuscitation equipment. While assessment reports are still being finalized, initial results indicate that increased financing, improved coordination across supply chain tiers and improved communication and training on management of these specific commodities could improve their availability and help supply chain managers to maintain MNCH commodity quality leading up to the point of administration or use.

[17] GHSC-PSM provided MNCH technical assistance to 14 countries in Q1 FY 2022: Burkina Faso, Ethiopia, Ghana, Guinea,, Haiti, Liberia, Malawi, Mali, Mozambique, Nepal, Nigeria, Pakistan, Rwanda, and Zambia.

Moving Nepal's eLMIS scale-up to the health facility level. To improve supply planning and ensure availability of MNCH commodities in Nepal, health facilities are going digital. Since the beginning of FY 2021, GHSC-PSM has been working with the Ministry of Health and Population to roll out and train users on eLMIS for managing health commodity inventories. By the end of Q1, the project had completed eLMIS scale-up in 1,194 storage and SDPs covering all central, provincial, district and municipal storage facilities. Some local-level governments had implemented eLMIS at their SDPs. The project began a concerted effort in Q1 to scale up eLMIS in an additional 1,800 SDPs, the last tier of the supply chain. This national rollout is improving data accuracy and strengthening the public health supply chain in Nepal.

Advancing Drug Revolving Funds (DRFs) across several states in Nigeria. GHSC-PSM in Nigeria is working to establish DRFs that ensure sustainable management and financing of MNCH commodities in several states, with a successful launch in Bauchi State in FY 2021. Lessons learned in Bauchi are now being applied as the project works to launch in Sokoto State. In Q1, the project facilitated training for 17 master trainers from Sokoto on key concepts, processes and components of the DRF system. These master trainers will cascade the DRF training to other health workers in the state. The training is part of preparation to launch the Sokoto DRF in Q2. The project also held a workshop with stakeholders in Ebonyi State in Q1 to kick off planning for a DRF in the state and develop DRF operational guidelines. A total 24 participants attended the meeting, including directors and representatives from the State Ministry of Health, State Ministry of Budget and State Central Medical Warehouse; traditional leaders; religious leaders; primary and secondary health facilities and the National Council for Women Societies Nigeria. The standard operating procedures (SOPs) developed at this workshop were then presented to the Ebonyi State Commissioner for Health and key members of his team, who confirmed that the activity is aligned with their systems strengthening plans for the state in 2022. Later this fiscal year, GHSC-PSM will work with the government to assess warehouses, establish the DRF committee and quantify essential medicine needs in the state.

Assessing private sector capacity in Ghana. GHSC-PSM in Ghana designed and launched a landscape assessment in FY 2021 to assess MNCH commodity availability in the private sector. The project recruited and trained data collectors who used a quantitative tool and qualitative interviews to obtain information from wholesalers and distributors, hospitals, clinics and retail pharmacies in four regions. Quantitative data were collected on commodity availability, storage conditions and product components, including brand, manufacturer and price. Qualitative data were collected from 15 domestic wholesalers, which focused on MNCH product offerings, contracting processes and barriers to adequately supplying MNCH commodities to public and private sector clients. The goal of this assessment is to identify systemic challenges that impede availability and access to priority commodities at all levels of distribution in the private sector and its supply mechanisms to the public sector.

In Q1, GHSC-PSM completed data collection and analysis and developed data visualizations (e.g., graphs, charts and quote tables) to present the assessment results. Quantitative and qualitative findings demonstrated:

- Higher availability of MNCH commodities at the health facility level as compared to retail pharmacies and wholesalers
- High levels of stockouts for injectable drugs (oxytocin, magnesium sulfate and gentamicin) and child health commodities at the retail pharmacy and wholesaler levels
- A large proportion of prevalent MNCH commodity brands remain unregistered in Ghana
- Wholesalers preferred to supply MNCH commodities to private sector as opposed to public sector facilities as they were more likely to make timely payments, had greater demand and a higher potential for profit

The findings will be used to develop context-specific recommendations with the Ghana Health Service and Family Health Division.

Conduct ad hoc strategic procurement to increase availability of quality-assured MNCH commodities

Over the course of Q1, GHSC-PSM supported six countries[18] in procuring priority newborn and child health products, such as amoxicillin, gentamicin, oral rehydration salts and chlorhexidine. GHSC-PSM also completed procurement and delivery of a large order of essential medicines for DRC in Q1.

[18] GHSC-PSM procured MNCH commodities for seven countries in Q1 FY2022: DRC, Liberia, Mali, Mozambique, Nigeria, Rwanda and Zambia.

PROGRESS BY OBJECTIVE

C1. Global Commodity Procurement and Logistics

Procured $276.2 million in health commodities in Q1. Total values for the life of the project are over **$4.2 billion**.

Delivered 1,343 line-item orders in Q1, with a value of **$201.4 million**.

Delivered 86 percent (75 percent COVID-impacted) of line items on time, based on the defined on-time window (within the period 14 days before or seven days after the agreed delivery date). **Delivered 84 percent (72 percent COVID-impacted) on-time and in-full.**

C1a. Global Supply Chain: Focused on Safe, Reliable, Continuous Supply

GHSC-PSM's procurement strategy focused on three primary objectives in Q1 to appropriately manage the impact of COVID-19 on global supply chains:

1. Maintain on-time deliveries, despite the impact of COVID-19.
2. Balance price, delivery, and quality to achieve the best value.
3. Reduce response/cycle times, lead times, and transaction costs.

In Q1, the project achieved strong OTD and OTIF while operating the global supply chain within the context of the continuing impact of the COVID-19 pandemic by focusing on performance and managing overall commodity and supply chain costs through the following initiatives:

Preventing country- and site-level shortages

The project mitigates potential shipping delays and shortage risks by prioritizing commodities based on the stockout risk and the depth of the programmatic impact in the event of shortages. GHSC-PSM's methodology to prevent shortages includes:

- Placing replenishment orders earlier than usual.
- Revising monthly forecasts while taking into account production capacity.
- Requesting GADs of existing orders sooner.
- Coordinating supply with other global partners to prioritize critical countries.
- Releasing orders from the RDCs for commodities with longer lead times.
- Working with countries to move stock closer to the facility level to liberate space higher in the supply chain.
- Reprioritizing order allocations.

More health commodities through market dynamics, strategic sourcing, and supplier management

GHSC-PSM works across project teams and external stakeholders to understand markets for the medicines and other health commodities it procures. The project develops sourcing strategies, builds strategic relationships with suppliers that shape markets, enhances project performance and achieves greater value for USAID within each product category. GHSC-PSM conducts market analysis, leads strategy development, employs sourcing best practices, contributes to process improvements and negotiates and proactively manages contracts with suppliers. The project executes sourcing activities for products under each health area in line with the strategic sourcing calendar and undertakes additional sourcing for products to support USAID's COVID-19 response. See sections B1, B2, B3, B4 and Annex A for details.

Supplier relationship management

In Q1, GHSC-PSM conducted business reviews with more than 23 key suppliers while proactively managing operations affected by the market, supply chain, and logistics factors, including the continuing impacts of COVID-19. Supplier meetings update the project on the impact of regional shutdowns, logistical challenges and other issues on production and delivery schedules, while commodity and supplier risk profiles inform performance assessments and order allocation strategies.

RDC operations

In Q1, GHSC-PSM leveraged the three RDCs to deliver more than $201M worth of commodities to 41 destination countries with a 86 percent OTD (75 percent COVID-impacted). As the COVID-19 pandemic continued to disrupt the global supply chain, the project's strategy to use RDCs and pre-position key commodities across task orders ensured continued access to commodities with minimal/no disruption. The project used RDCs in Q1 to deliver more than 79 percent of TLD while enabling HIV MMD rollout.

Decentralized procurement (DCP)

In Q1, GHSC-PSM managed a large volume of orders through DCP. The project achieved 86 percent OTD (75 percent COVID-impacted) for the quarter despite the COVID-19 challenges, which caused shortages and logistics constraints that ultimately affected DCP commodities throughout the global supply chain. Examples of issues and solutions include:

- **VL/EID supply:** GHSC-PSM continues to monitor COVID-caused constraints on global supply of VL/EID reagents and consumables. This includes COVID-related logistics constraints, particularly affecting South African Development Community countries due to significant reductions in commercial air freight lanes particularly for cold and frozen orders. In Q1, Hologic informed GHSC-PSM of reagent supply shortages that are expected to last through Q2. Mitigation measures are being put in place for affected countries to distribute VL/EID demand across all available platforms until this constraint is relieved. Further, many PEPFAR-supported countries, including Haiti, Mozambique, Nigeria and others, are undergoing transitions away from legacy platforms. These transitions are highly coordinated with the interagency and at the country level to ensure a smooth transition.

Global Standards

GHSC-PSM operationalizes its procurement requirements for pharmaceutical, medical device, sterile kit, laboratory reagent and LLIN suppliers to adopt standardized product identification and labeling and exchange product master data leveraging GS1 standards. These supplier requirements include:

- Assigning Global Trade Item Numbers (GTINs) that identify trade items and Global Location Numbers that identify business entities and locations.
- Labeling specified packaging levels with barcodes encoded with the GTIN, batch/lot and expiration date.
- Exchanging master data through the GDSN.

In Q1, the project saw progress in supplier implementation of these requirements, thus laying the groundwork to use this data in global and national supply chain processes and systems. Advancing

compliance requires regular engagement with suppliers for existing and new items. In Q1, through this ongoing engagement, the project:

- Collected, validated, and added GTINs for 73 items to the GHSC-PSM catalog.
- Collected master data for 38 new items through the GDSN, and maintained data on existing items. In Q1 alone, the project sent and received more than 2,000 messages in the GDSN.

Quality assurance

GHSC-PSM streamlines and optimizes QA and QC business processes and procedures to rapidly address any incidents and product failures as they occur, ensuring quality products reach the end consumer. Highlights in Q1 include:

- Managed 39 quality incidents across TO1/TO3/TO4. The number of incidents does not necessarily reflect product rejection, as quality assessments are conducted based on the situation and recommendations are then made to USAID for concurrence to release or reject impacted products for distribution.

- Managed six open recalls and two recalls reported in Q1 across TO1/TO3/TO4 and facilitated collaboration across internal and external teams to expedite activities, including product quarantines for patient safety and product replacement to avoid stockouts.

- Implemented the development of additional QA task fields in AssurX (GHSC-PSM's incident management system) to increase visibility and optimize tracking of quality incidents.

- Identified areas for improvement in procurement processes and quality incidents reporting to other respective functional units including suppliers/3PLs.

- Collaborated with GHSC-QA to conduct five quality awareness trainings for project global supply chain staff to better understand FHI 360's role and activities during procurement.

- Conducted trainings on product quality incident procedures across different GHSC-PSM field office/non-field office staff (Angola, Zimbabwe and the Project Management Unit) to promote incident reporting and ensure processes are followed accordingly.

- Worked with GHSC-QA to provide input and support toward COVID-19–related commodity procurement.

QA for malaria commodities

In Q1, GHSC-PSM continued to innovate and implement more robust quality assurance and QMS within the various product types procured by the project through investigations and collaborations with other external partners and global donors.

The project onboarded a new laboratory for LLIN testing, following an RFP, and a new laboratory for pharmaceutical product testing and actively initiated the use of the additional laboratories for product testing.

GHSC-PSM's QC process efficiency strategy creates flexibility in testing capabilities by performing method transfer and method validations at additional pharmaceutical testing laboratories to broaden the number of laboratories capable of testing key high-volume products.

In Q1, on behalf of the LQAG, the project presented on the topic of Quality in LLINs for Procurers at the Raising the Floor Nets: ITN Quality Convening webinar hosted by the BMGF, CHAI and i2i. The webinar convened industry stakeholders; procurers, suppliers, regulators and end-users to discuss LLIN quality.

For more detail, see section B2. Malaria.

Impacts of COVID-19 on freight and logistics

Origin challenges

Just as it appeared that the effect of the COVID-19 crisis on the supply chain was stabilizing, the emergence and rapid spread of the Omicron variant created a new wave of supply chain problems. Shipping from South Africa and the surrounding region was shut down in response to the spread of Omicron for a relatively short time in Q1. A curfew remained in effect in South Africa through the end of Q1, but by the end of the quarter, ports and terminals were beginning to operate normally and almost all air traffic returned to normal. However, the rapid spread and sharp rise in COVID-19 cases is hindering the supply chain industry's recovery from ongoing COVID-19–related logistics challenges.

Rising infections and lockdowns in key, high-volume origin points, such as the Chennai region of India and Ningbo region of China, are directly affecting shipping capacity and restricting the flow of shipments to these ports.

China's zero-COVID policy and practice of locking down an entire district at the first sign of new infections is causing the biggest disruptions. Ningbo-Zhoushan Port has repeatedly been subjected to China's tough COVID-19 restrictions over the past six months, with the latest lockdown taking place in Ningbo's Beilun district, which borders three of the port's container terminals. Container loading and discharge are operating normally, but the impact on trucking and access to the port is severe. Trucks cannot move from Ningbo to most nearby cities, and drivers entering the city face a 14-day quarantine. Therefore, many international bookings are being rerouted through other ports, which is putting additional pressure on those hubs. This is also causing land side delays, as containers are slow to be delivered to/from the ports.

Airfreight

Airlines gradually added flights throughout Q1, but the emergence of the Omicron variant in late November temporarily affected flights from South Africa and the surrounding region with carriers suspending flights through December. These restrictions lasted a little over a month and flights have resumed to all the affected areas.

Another COVID-19–related factor hindering air freight schedules is lengthy quarantines for air crews. As an example, Hong Kong's quarantine requirements are so strict that their flagship airline Cathay Pacific has temporarily suspended flights. Other countries also have their own quarantine rules for international air crews that have created scheduling challenges in the global air freight market.

These schedule challenges have led to overall reduced air freight capacity and created unpredictable rate fluctuations. Airlines are responding by focusing their routes on popular destinations. While overall airline scheduling continues to rebound, one area of concern is reduced capacity to already underserved locations. This has led to an imbalance as more popular regions return to normal air freight operations, while service to underserved destinations remains slow.

Impacts of fuel challenges in Haiti

While not COVID related, a fuel shortage in Haiti briefly put a stop to cold chain imports because carriers could not keep refrigerated containers running. For now, the fuel shortage is over, but the continued security instability means that Haiti is likely to experience similar disruptions to cold chain shipments. There are no other region-specific cold chain constraints; however, overall capacity reduction creates an elevated risk as prices rise to secure guaranteed space.

Ocean freight

Space on ocean vessels and equipment remain tight due to frequent canceled sailings and some ports being omitted from the schedule at the last minute. Carriers are overcommitted and are limiting booking acceptance and rolling shipments. Vessel delays are creating unreliability in scheduling, which will have a significant impact into Q2. Rates remain stable, but at record high levels, with most carriers extending their rates into 2022.

As mentioned earlier, lockdowns at origins, especially in China, are leading to increased congestion and causing carriers to reroute vessels. These port challenges are compounding scheduling unreliability and increasing transit times.

Destination challenges

COVID-19–related destination challenges were mostly realized in labor shortages at ports, customs houses, and trucking, impacting import processing and deliveries. Several destinations also have long quarantine rules and have closed land borders to fight the spread of COVID-19.

C1b. Project Performance

In this section, we summarize findings on key indicators of global supply chain performance. More detail on these and other indicators is provided in Annex A.

Delivery Timeliness

GHSC-PSM measures OTD in two ways:

- OTD, the number of on-time deliveries as a percentage of expected deliveries in the period
- OTIF, the number of on-time deliveries as a percentage of all actual deliveries in the period

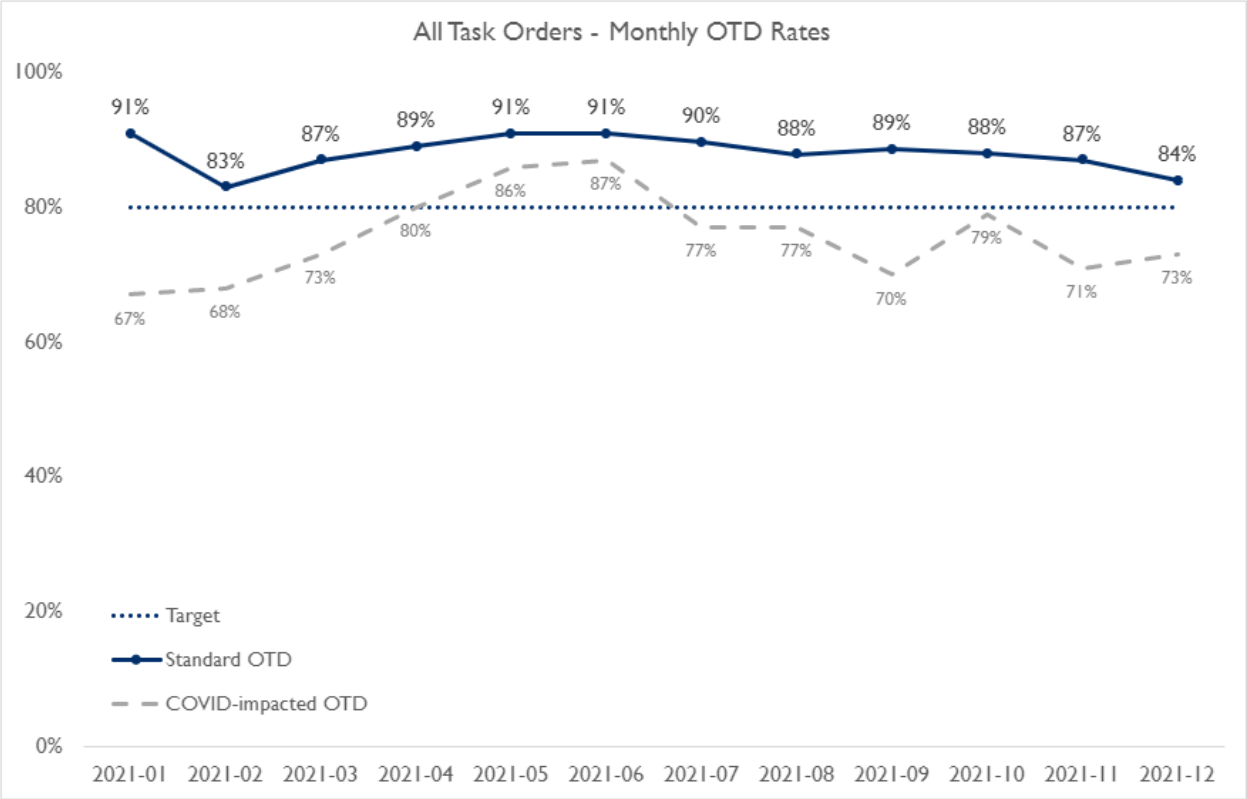
OTD is a more accurate reflection of recent performance, while OTIF is a lagging indicator as late orders due in prior periods get delivered.

In Q1, GHSC-PSM OTD was 86 percent (75 percent COVID-impacted) and OTIF 84 percent (72 percent COVID-impacted) for the quarter, the eleventh successive quarter that OTD has been above 85 percent (see Exhibits 16 and 17).

During the COVID-19 pandemic, GHSC-PSM presents two versions of OTD indicators:

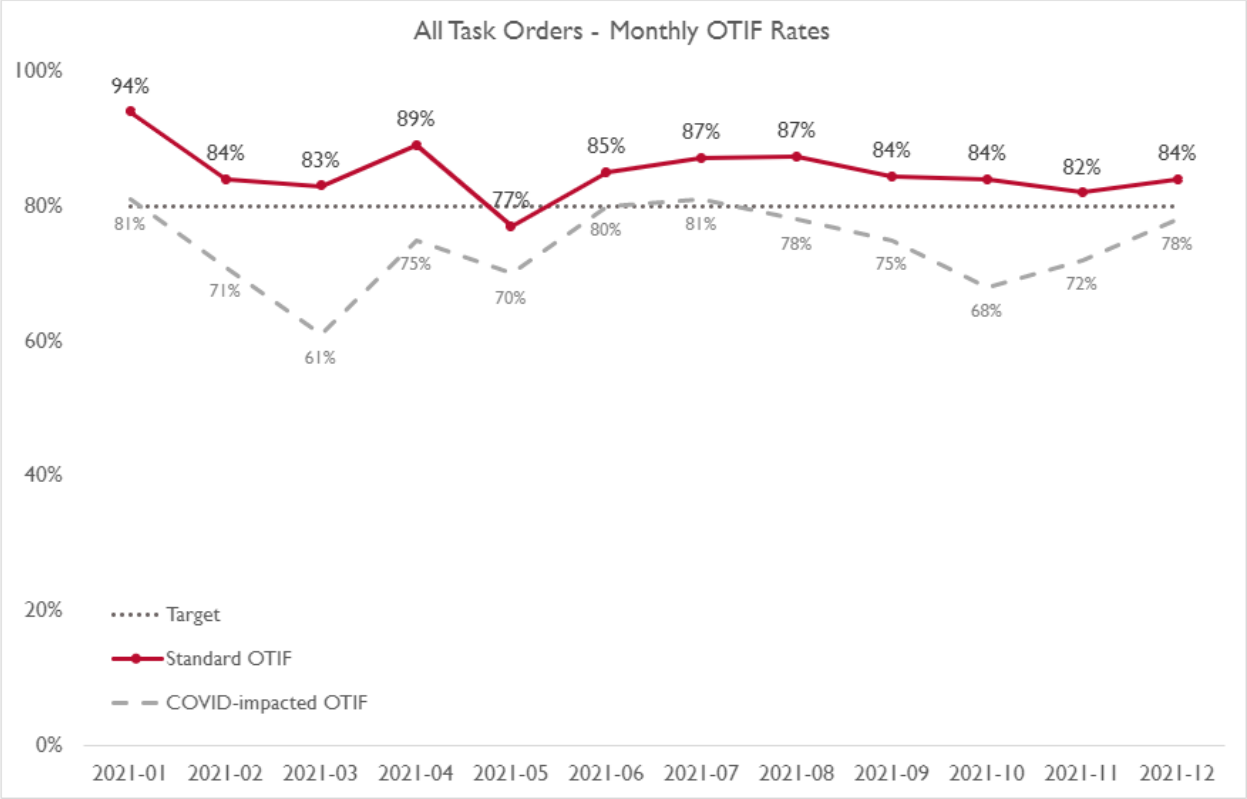
1. According to the indicator definition, the "standard" version is calculated as laid out in the project's monitoring and evaluation plan and following all associated policies.
2. The "COVID-19-impacted" version follows the same rules and definitions as the standard indicator but removed the "control" for pandemic impacts to demonstrate the adverse effect of COVID-19 on OTD from Q3 FY 2020 to date on GHSC-PSM shipments.

Exhibit 16. January 2021 through December 2021 monthly OTD



At the end of Q2 FY 2020, the number of COVID-impacted orders increased significantly and continues to adversely affect OTD. The high degree of uncertainty and the extreme volatility in global supply chains caused by the pandemic has continued to affect a vast number of orders in Q1 FY 2022. This impact is expected to continue through this FY.

Exhibit 17. January 2021 through December 2021 monthly OTIF



C2. Systems Strengthening Technical Assistance

Assisted 50 countries with health supply chain systems strengthening over the life of the project.

Provided **technical feedback on 161 supply plans this quarter** to strengthen national supply planning capabilities.

As part of a new technical series, **published a landmark technical document on contracting transportation to the private sector.**

GHSC-PSM's strategic goal is for every country to have a locally led health supply chain that is integrated, optimized, accountable, agile, lean, and able to sustainably supply quality products to all citizens. To support this goal, headquarters-based technical specialists work with in-country teams to define systems strengthening strategies that are appropriate to the local context and that can be realistically achieved. Emphasis is placed on automated data capture and real-time end-to-end data visibility (most notably through advanced analytics, global standards and traceability, forecasting and supply planning and management information systems), private-sector engagement, pharmaceutical-grade infrastructure and efficient distribution across countries (through laboratory networks, warehousing and distribution systems strengthening). Through workforce development, leadership and governance activities, the project works with country stakeholders to ensure their supply chains are managed by supply chain professionals dedicated to quality improvement, and, where possible, collaborates on strategies to outsource functions to accountable private sector providers.

Advanced analytics

Advanced analytics aims to enable countries to expand use of data to facilitate decision making, from day-to-day operations to high-level strategy. GHSC-PSM does this by using existing data resources and leveraging previous investments in management information systems. Moreover, advanced analytics aims to automate processes to be repeatable, creating a positive feedback loop for rapid data use.

GHSC-PSM is implementing a data science strategy across multiple countries to meet individual country needs and then make these tools available to other countries that may benefit from them. The project develops advanced analytics tools that leverage open-source platforms (such as Python) or readily

available software like MS Excel, allowing local institutions to easily adopt, use and maintain such tools with limited ongoing technical support.

In Q1, GHSC-PSM supported the government of Namibia by leveraging analytics tools—stock redistribution, anomaly detection and inventory turnover—developed in Ghana, Nepal and Zambia. The Namibia country office is taking advantage of the results of the process known as "refactoring" the code (removing all of the original country-specific aspects and redesigning the data from another country) to support the same analysis. As such, adapting a tool to a new country becomes a matter of rapid configuration instead of time-intensive customization.

GHSC-PSM provided remote support to Angola, Burundi, Eswatini, Ethiopia, Haiti, Liberia, Malawi, Namibia, Uganda, Zambia and Zimbabwe in Q1. Below are two examples of how the project leveraged existing analytic resources and strengthened the use of data for decision making and action:

- In **Liberia**, monthly data collection of key HIV commodities at the 21 PEPFAR-supported health facilities is done by receiving information directly from health facilities through WhatsApp chats and emails. The GHSC-PSM country office currently enters these data into Excel for capture and analysis. To improve the current Excel tool, GHSC-PSM facilitated the development of an automated data quality check and analysis solution to leverage historical data to identify potential issues, resolve them at the data entry stage and automatically generate analytics to help ensure a reliable supply of HIV commodities.

- In **Namibia**, GHSC-PSM is working to incorporate stock redistribution tools developed in Zambia into the existing web-based dashboard application for accessing key logistics data at the facility level. With this integration within existing infrastructure, users require access to only one platform to assess data and use it in supporting intuitive pharmaceutical supply chain decision making.

Global standards and traceability

GHSC-PSM's support for implementing GS1 standards aims to enable trading partners—including manufacturers and suppliers, logistics providers, regulatory agencies, medical stores and health facilities—to operate from the same high-quality master data.

GHSC-PSM provided technical support to seven countries–Botswana, Ghana, Namibia, Nigeria, Rwanda, Zambia and Zimbabwe–to support their adoption of GS1 standards for product identification, location identification and data exchange. More information on standards implementation within the project can be found in Section C1. Global Supply Chain, along with the Management Information Systems section below.

In Q1, GHSC-PSM continued to develop its Traceability Planning Framework Toolkit as a resource for country programs. The project circulated to GS1 Global, USAID and country offices the "Key Considerations for Traceability Models Quick Guide," a resource that provides key considerations for countries contemplating the implementation of centralized approaches for pharmaceutical verification, tracking, and tracing. The resource is expected to be finalized in Q2.

Adopting global standards can enable countries to reduce costs, enhance efficiency, and improve the availability of health commodities in their public health supply chains.

- In **Botswana,** continued the work of FY 2021 in supporting development of the Botswana National Pharmaceutical 2021/2022–2026/2027 Traceability Vision and Strategy and providing ongoing guidance to the Botswana Medicines Regulatory Authority (BoMRA) on instituting a governance body to oversee traceability implementation. In Q1, supported BoMRA in conducting the first meeting of the traceability steering committee that will oversee strategy implementation.

- In **Ghana**, continued the work of FY 2021 with the MOH/Ghana Health Service to review and finalize the Ghana National Pharmaceutical Traceability Strategy. In Q1, supported the MOH in establishing a governance body to oversee traceability implementation by developing terms of reference for the National Traceability Steering Committee.

- In **Namibia,** supported the central medical store (CMS) in implementing a series of activities aimed at improving data quality and more granular inventory data visibility through automation. As a prerequisite to enabling automation that leverages GS1 standards in supply chain processes, users must have access to standardized product master data that support the concept of GTINs. In Q1, reviewed the current state of CMS's product master data and provided recommendations for data models and governance requirements for leveraging GS1 standards to standardize data. The recommendations will enable CMS to leverage GTINs for increasing process efficiencies through automation.

- In **Zambia**, worked with the MOH to bolster national traceability objectives through implementing a National Product Catalog (NPC) and identified a service provider to lead the configuration and deployment of the NPC technical solution that will be hosted on the MOH information and communications technology platform. The project supported configuration of the technical solution for NPC through the selected vendor and in parallel, developed a simple tool that allows for automatic capture of GTINs from in-stock items. The tool will help the Zambia Medicines and Medical Supplies Agency (ZAMMSA) in its efforts to collect GTIN data from the central warehouse. GHSC-PSM supported the Zambia Medicines Regulatory Agency in reviewing industry feedback on draft identification and labeling guidelines earmarked to be finalized in Q2, thus making progress on policy and regulations to support traceability efforts.

- In **Zimbabwe**, continued the work of FY 2021 in establishing a master data task team within NatPharm (the central medical store) to support a standardized master data program leveraging GS1. In Q1, began standardizing product master data at NatPharm to align with global standards. GHSC-PSM reviewed NatPharm product master data and recommended data models, governance and systems requirements to generate process efficiencies through introducing a consistent and standards-based approach to managing product data at NatPharm and, by extension, other downstream supply chain systems, such as eLMIS, which use these data.

Forecasting and supply planning

GHSC-PSM supported forecasting and supply planning (FASP) assistance to help institutionalize processes so countries can move from relying on external technical support to developing their own fully integrated FASP capabilities. This included remote quantification assistance, training and supply plan monitoring support. In Q1, GHSC-PSM reviewed 161 USAID high-priority supply plans from 36 countries to ensure that plans complied with data quality, supply planning and procurement scheduling standards, thereby enhancing program managers' ability to maintain adequate inventory to meet disease prevention and treatment targets.

GHSC-PSM continued rolling out the Quantification Analytics Tool (QAT). QAT's supply planning module is a modernized solution for country-led quantification that leverages new technologies and has enhanced features over the existing supply planning tool, PipeLine, and will eventually replace it. With an enhanced user interface and usability, greater analytical capabilities and automated data exchange, this tool enables program managers to optimize commodity procurement and delivery schedules, monitor product stock status and share data with external platforms and key stakeholders.

The project continued to support the automated transfer of FP/RH supply plans from QAT to the VAN and integration with GHSC-PSM's enterprise resource planning (ERP) platform. ERP integration allows program managers to link USAID-funded shipments in their supply plans to shipments in the ERP for automated shipment updates. By the end of Q1, almost 1,800 shipment lines had linked to 70 different supply plans from 20 countries. A total 17 FP/condom QAT supply plans went directly to the VAN through the automated integration. To improve overall data quality, the project changed the ERP logic used to generate the estimated delivery date for a shipment that is sent to QAT, revising the delivery date from arrival at the port to arrival at destination.

Throughout FY 2021 and into Q1 FY 2022, the project conducted QAT supply plan module training for supply planners across project-supported countries. These training workshops were remote due to the ongoing COVID-19 pandemic. With global COVID-19 vaccination rates rising, GHSC-PSM had planned to conduct an in-person training in Mozambique in December 2021, but ultimately pivoted to a remote format.

As GHSC-PSM QAT users became more skilled, they began rollout to local stakeholders. In Q1, project country offices provided QAT training to government stakeholders in Cameroon, Nigeria, and Rwanda. GHSC-PSM also provided targeted, program-specific technical support to help countries transition country PipeLine supply plans to QAT. By the end of Q1, 21 countries submitted 93 supply plans through QAT, with 13 additional supply plans in process and more countries and supply plans to be added later in FY 2022. See more about supply planning submissions in C2a. Project Performance.

A key component of ensuring the sustainability of QAT is wide user adoption of the tool. To this end, GHSC-PSM aims to engage multiple health supply chain partners and stakeholders to build a broader user base for QAT. In Q1, GHSC-PSM supported an abbreviated supply plan user training for UNICEF, which is interested in using QAT for supply planning of nutrition products. At the end of Q1, QAT users numbered 409 worldwide.

In **Cameroon**, after completing the onboarding of all mandatory supply plans to QAT during the previous quarter, GHSC-PSM organized two training sessions for 19 MOH staff and seven from key supply chain partners, including the U.S. Centers for Disease Control and Prevention, UNICEF and USAID. MOH staff from the *Direction de la Pharmacie, du Médicament et des Laboratoires* and National Malaria Control Program updated the supply plans following the recent quantification.

Also, GHSC-PSM:

- Prioritized and planned change requests that will be implemented later in FY 2022. These change requests will enhance the QAT user experience.
- Developed and reviewed wireframes and user interfaces for the upcoming QAT forecasting module (module 2) to be launched by Q3 FY 2022.
- Continued developing online, self-directed training for QAT supply plan viewers to be launched in Q2 FY 2022.

Management information systems (MIS)

GHSC-PSM continues to focus on improving data accuracy and quality as a key priority for management information system implementation, including implementation of GS1-compliant standardized product data to build standardized master datasets for end-to-end data visibility. Establishing methods and plans for managing master datasets (products, facilities, etc.) across information systems helps avoid redundant data entry and ensures data accuracy and quality. GHSC-PSM supports countries in evaluating the data captured in information systems (e.g., eLMISs and warehouse management systems) for standardization.

The project promotes operational uniformity through NPCs, the Supply Chain Information System Maturity Model and other approaches. GHSC-PSM also invites external and country office experts to present new technologies and lessons learned for knowledge sharing.

In Q1, GHSC-PSM conducted webinars, presented to various working groups, made recommendations for system interoperability and introduced standardized approaches to achieving data visualization through innovative tools to improve processes and efficiency.

Project country-specific MIS activities in Q1 included the following:

- In **Colombia,** conducted an assessment of the national information system "PAI Web," focusing on the supply chain operation of LMIS nationwide and providing support to address system challenges. The project launched several activities to mitigate a backlog in registering COVID-19 vaccinations, including improving the software by hiring a team of local technical experts; supporting the MOH in optimizing its database management and hiring and training data entry personnel.

- In **Malawi,** supported expansion of the number of health facilities using OpenLMIS from 160 to 275, as part of an ongoing effort to improve facility-level health commodity tracking and accountability. Leveraging key findings and recommendations from a Q4 assessment, in Q1 GHSC-PSM partnered with the MOH to hold a Digital Supply Chain – Strategy and Architecture workshop to present the concept of digital supply chain and how it is both applicable and beneficial to Malawi. The workshop focused on key digital priorities to be considered and highlighted the need for Malawi's digital supply chain to adopt advanced technologies. The project also provided a roadmap for Malawi's digital supply chain transformation as a recommended framework.

- In **Mali**, partnered with PNLP to establish a call center for collecting stock on hand of antimalarial medicines in community health centers in the regions of Gao, Kayes, Koulikoro, Mopti and Timbuktu. The call center, an online platform originally developed by GHSC-PSM in South Sudan, is integrated with the local telephone network to make calls online for the purpose of tracking inventories and improving the quality of logistics data. As agreed with the PNLP, the call center will be implemented in selected areas where health facilities face security threats and data quality issues. So far, the call center has been set up for the health facilities of Gao, Mopti and Timbuktu, and will be installed in the facilities of Kayes and Koulikoro in Q2.

- In **Namibia,** supported the upgrade of SysPro, the ERP system to strengthen warehouse operations and management. As part of Phase 1, the project demonstrated the system and reviewed the configuration. User acceptance testing is scheduled for Q2.

- In **Thailand**, supported the Division of Vector Borne Diseases of the Ministry of Public Health to establish an application that tracks movement of malaria commodities, analyzes and reports stock status in warehouses and reports consumption data. The system went live at the central warehouse in September 2021, and in November, 13 participants from warehouses in

Chantaburi, Chonburi, Rayond, Sakaw and Trat provinces learned to use the system. Thailand has an effective malaria surveillance system called Malaria Online, but commodity stock reports, especially from SDPs, are still paper-based, and no system is in place to routinely capture, analyze, and monitor logistics data across the supply chain. The new application aims to improve malaria commodity data visibility and mitigate supply risks.

Laboratory networks

GHSC-PSM continues to promote the development of efficient and well-planned laboratory networks and support high-quality service delivery through data-driven optimization and geographic information system–based visualization applications. The use of modern software applications like Opti—developed by GHSC-PSM and FIND[19] in collaboration with USAID—can increase coverage and reduce costs by providing models and potential scenarios that improve visibility into network performance and costs and provide opportunities to optimize laboratory equipment placement.

In FY 2021, GHSC-PSM began to provide diagnostic network optimization (DNO) support to **Eswatini** and **Uganda** using Supply Chain Guru and OptiDx, respectively, for the analysis. DNO is an activity in which multiple stakeholders—including MOH, GHSC-PSM, USAID, other implementing partners and donors—review models and propose scenarios for the laboratory network to determine potential changes that would improve a key objective, such as optimizing cost or the distance between facilities and labs. Stakeholders review the scenarios that may inform an optimal mix (type and number) of laboratory equipment, an appropriate location for each instrument and/or an efficient specimen referral system to connect testing demand with point of care (POC), near-POC or conventional laboratory-based testing sites. At the conclusion of a DNO workshop, partners develop an operational plan, taking into account how implementing the proposed changes to the lab network affects the program's budget, operations, human resources and logistics. GHSC-PSM supports cost-efficient and sustainable procurement and placement of laboratory instruments.

After a workshop in **Eswatini** in early Q1, GHSC-PSM finalized the report, began preparing the operational plan. and started implementing the actions agreed to during the workshop. In preparing for the **Uganda** DNO, the project identified gaps in scope and stakeholder involvement and paused the activity to address them and resume in Q2. **Burundi** prepared for DNO implementation with data collation and data wrangling and clarifying the scope with appropriate stakeholders.

GHSC-PSM revised the Instrument Procurement Questionnaire that includes 12 questions country teams answer to demonstrate sufficient need and preparation for purchasing laboratory equipment. The revised questionnaire provides country teams with greater clarity on expectations for completion and reduces the need for follow-up questions. **Burundi** and **Mozambique** were the first to complete the questionnaires using the updated format.

[19] See https://www.finddx.org/about/

Warehousing and distribution

GHSC-PSM improves warehousing and distribution systems in more than 25 countries. As part of this work, the project aims to move countries from a warehousing to a distribution center model that promotes more frequent stock turnover (inventory turns) and requires changes in infrastructure and processes. Interventions include improving data-driven decision making across the supply chain, optimizing distribution networks and increasing efficiencies in warehousing and distribution operations.

GHSC-PSM is also implementing private sector approaches, including activity-based costing (ABC) and sales and operations planning, two approaches that recognize that warehousing and distribution are part of a larger strategy. Effective supply chain management requires integrating procurement, transport, storage, picking and packing, delivery and other activities; doing so results in velocity, good orchestration, high performance, low risk of expiry and lower cost.

3PL subcontracting

GHSC-PSM develops SOPs and helps modify requests for quotations and 3PL subcontracts for various country programs, aiming to improve distribution and storage practices. Several countries are following Angola's contract mechanism for pharmaceutical and LLIN distribution, where a multi-award indefinite quantity service contract is intended to pre-qualify suppliers who then compete for each distribution action through requests for task order proposals (RFTOPs). By including key performance indicators (KPIs) in each RFTOP, the mechanism is projected to produce higher and more measurable performance improvements. This approach has already generated a cost savings of about 30 percent in Angola.

The project produced a draft generic template based on the Angola model for potential use in any USAID-supported country, with an emphasis on transitioning from transaction-based to performance-based logistics contracting. The draft contract template includes commercial supply chain KPIs to measure and monitor 3PL performance. Countries that included KPIs in their RFPs for upcoming contract modifications or renewals are Ghana, Kenya, Mali, Niger and Uganda. GHSC-PSM revised the contractual language to ensure the project is measuring appropriate activities to reduce or eliminate risk. The draft contract is under review by the project's risk management team for finalization. GHSC-PSM is also developing a KPI tool and dashboard for each country, with the goal of establishing a robust mechanism and record of 3PL performance in each country that will allow comparison of KPI results across countries. The KPI dashboard is currently being piloted by Angola and Kenya country teams.

ABC

ABC has now been implemented and is being practiced daily in Kenya, Lesotho and Uganda. A private sector methodology, ABC identifies activities in an organization and determines the cost associated with a specific commodity for each activity. This is done by identifying the actual related consumption costs, rather than applying a fee based on the value of the commodity. For nine months, the Mission for Essential Drugs and Supplies in Nairobi, Kenya, has been practicing ABC methods, implementing a new profit-and-loss statement and performing monthly self-assessments of their warehouse operation.

Temperature and humidity monitoring

GHSC-PSM collects data from temperature and humidity data loggers installed in Burkina Faso, Cameroon, Ghana, Guinea, Haiti, Mozambique, and Zimbabwe.

Project country-specific warehousing and distribution activities in Q1 included the following:

- In **Burundi,** continued support of the central medical store (CAMEBU), through which CAMEBU moved from an exclusive pull distribution system to a combination of monthly pull and quarterly active distribution systems. The first push distribution launched in September 2020 in 11 pilot health districts. After three rounds of active distributions, CAMEBU scaled up all 48 health districts. This new distribution strategy supported the introduction of MMD of ARVs. In Q1, CAMEBU organized a workshop with relevant partners to assess the active distribution strategy, evaluate findings, discuss weaknesses, and make changes to improve the system. Through the fifth round of active distribution, GHSC-PSM supported CAMEBU in distributing 107,000 ALu 120/20 mg malaria treatments and 83,000 of TLD90 for HIV, with more than 80 percent of ART clients participating in MMD.
- In **Ethiopia,** continued the work of FY 2021 in providing intensive technical support to the Ethiopia Pharmaceuticals Supply Agency (EPSA) head office and the Adama and Hawassa hubs for QMS ISO 9001:2015 certification. A third-party certifying body audited the hubs and central warehouse for certification and, after improvement areas were addressed, provided certification in October 2021. The implementation and certification will help EPSA ensure that the agency's supply chain processes are strategically aligned to improve availability and reduce stockouts of public health commodities.

- In **Malawi**, subcontracted an engineering firm to conduct a maintenance needs assessment of 447 prefabricated pharmacy storage units previously installed[20] in 437 health facilities nationwide. After the assessment is completed, the engineering firm will deliver a report on the maintenance needs of each unit and an estimate of cost to repair identified problems, which will later be implemented with Global Fund funding.

- In **Zambia**, after analysis to understand continuing performance challenges at ZAMMSA—despite recent progress in many areas—revealed that warehouse floor managers needed to improve their management and supervision skills, GHSC-PSM trained warehouse managers on skills to assist them in optimizing central warehouse operations and increasing efficiency. The project collaborated with ZAMMSA management to assign daily tasks to operational teams in the warehouse to cover the number of routes specified in daily distribution plans. This intervention resulted in increased routes-per-day productivity from 0.5 to four and

[20] See https://www.ghsupplychain.org/news/solar-powered-and-secure

30-ton trucks loaded from one to six daily. ZAMMSA completed the distribution of health commodities within the planned two-month cycle, demonstrating complete adherence to the schedule. Staff morale also improved as evidenced in part by many unsolicited positive statements. This level of output had not been seen in more than four years.

Workforce development

GHSC-PSM strengthens public health supply chain workforces through the project's country offices. These interventions build sustainable workforces through professionalization and systematic approaches to workforce development. GHSC-PSM provided remote support in Q4 to Angola, Botswana, Burkina Faso, Ethiopia, Liberia, Rwanda, Sierra Leone, Zambia and Zimbabwe.

GHSC-PSM began developing a virtual learning platform and working with Arizona State University to draft and deliver asynchronous and synchronous learning for USAID staff in the Introduction to Supply Chain Management training scheduled for February 2022. The course is designed to employ self-learning offered in video lectures, discussion boards, interview lectures, six 'live' virtual sessions and post evaluations in a three-week period.

Project country-specific workforce development activities in Q1 included the following:

- In **Sierra Leone**, began developing and updating the integrated health commodity logistics system SOPs. The SOPs will involve operations at all levels, including peripheral health units, secondary and tertiary hospitals, district medical stores and central medical stores. Training will begin after the SOPs are completed and will support training of trainers that will cascade the training to all facilities.

- In **Zambia**, 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 and alleviate the disruptions of in-person training caused by COVID-19 pandemic restrictions. The initiative aims to increase the knowledge and skills of student nurses, pharmacists, biomedical scientists and MOH professionals in supply chain management across all logistics systems and to support integrated community case management. The project has so far recorded 13 e-learning sessions on topics for nurses, pharmacists and laboratory professionals.

Leadership and Governance

GHSC-PSM continues to support strategy, planning, and standards-setting activities:

- In **Ethiopia**, provided technical support on emergency supply chain (ESC) response to conflict-affected health facilities in Afar and Amhara regions, adapting the ESC playbook

(previously developed for disease outbreak management) and developing different tool formats for logistics management, determining quantity of commodities, participating in supportive supervision at 30 sites, facilitating delivery of products to more than 200 health facilities and providing forklift maintenance services. Some health facilities received starter stock of HIV, malaria, FP/RHH, MNCH and TB commodities after being affected by the conflict from four to six months.

- In **Malawi**, supported the MOH's Policy Department in developing supply chain strategies for the Health Sector Strategic Plan (HSSP III) as a follow-on to the HSSP II plan that ends in 2022. Development of the strategy is expected to continue in Q2. Also in Malawi, the project began remote support in developing a new SOPs manual to replace the 2015 edition.

- In **Nigeria**, facilitated a training for 17 master trainers from Sokoto on key concepts, processes and components of the DRF system that helps ensure sustainable financing for public health commodities. The 17 master trainers will cascade the DRF training to other health workers in the state. The training is part of preparations to launch DRF in Sokoto State in Q2.

Environmental compliance

In accordance with USAID's Environmental Procedures (22 CFR 216), the project supports implementation of the GHSC-PSM Initial Environmental Examination and the Environmental Mitigation and Monitoring Plan. Implementation includes multi-faceted services to staff globally, such as review of documents pertaining to USAID's 22 CFR 216 Agency Environmental Procedures, technical guidance and direct technical assistance.

In Q1, GHSC-PSM collected 1 million expired COVID-19 rapid detection test kits from Travis Airforce Base in California and safely disposed of them in accordance with applicable environmental and waste management regulatory standards. Before the COVID-19 pandemic, the project had in place a framework for addressing health care waste management that the project customized to respond to COVID-19. Based on the availability of these resources, USAID issued a Technical Directive Memorandum to the project in FY 2021 to dispose of the kits. The activity is effectively complete, pending receipt of the final deliverables from the vendor and final invoicing.

GHSC-PSM also began preparing the annual Environmental Mitigation and Monitoring Report, which will be finalized and submitted to USAID in Q2.

C2a. Project Performance

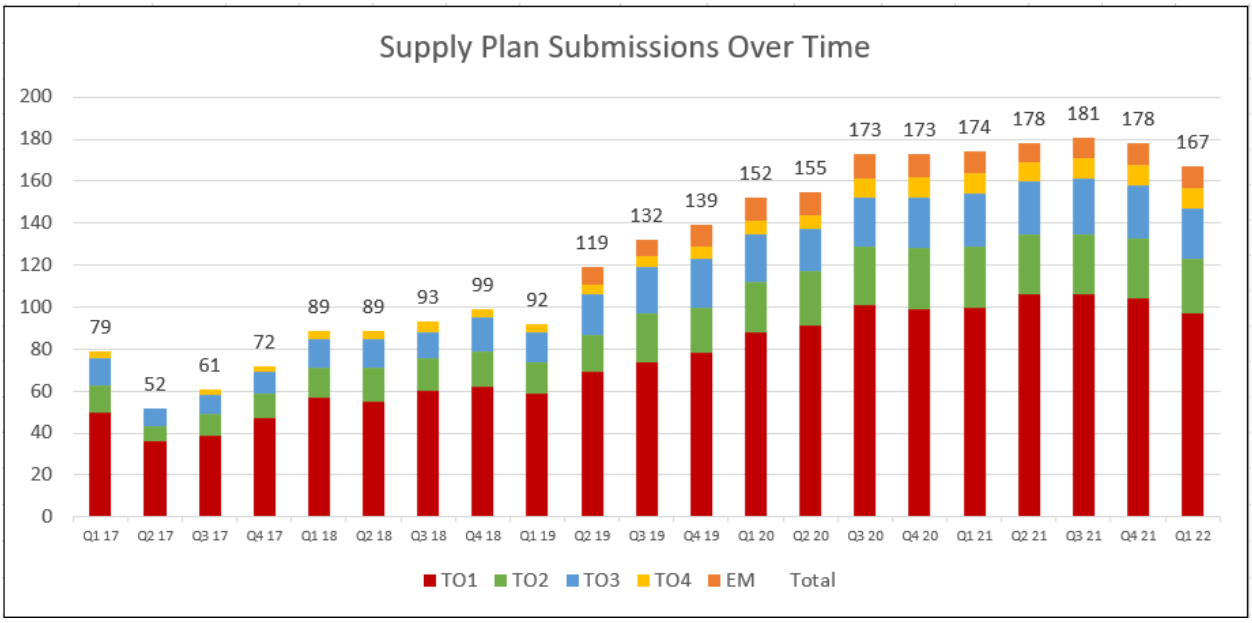
GHSC-PSM collects and analyzes data on a variety of indicators of national supply chain system health to understand the environments in which the project operates and to help calibrate our work. These indicators also help establish priorities for the project's health systems strengthening support and, over

time, will allow the project to assess the outcomes of technical assistance. Dashboards with these country-specific indicators are made available for GHSC-PSM country offices to explore with in-country stakeholders.

Supply plans

GHSC-PSM drives adoption of the quarterly supply planning paradigm. In Q1, the project received 167 supply plans from 36 different countries. Of those, 140 were Priority 1 (required by USAID) supply plans, keeping the submission rate for this category around 94 percent (140 out of 149 submitted or 94 percent). Exhibit 21 shows the number of supply plans received by quarter and task order since Q1 FY 2017. In Q1 FY 2022, 102 of the 167 supply plans were submitted through QAT, which is 61 percent of all supply plans submitted to GHSC-PSM HQ.

Exhibit 21. GHSC-PSM supply plan submissions over time



Under the quantification paradigm supported by GHSC-PSM, supply plans provide a regularly updated, forward-looking view of demand for 18 months. This comprehensive, systematic, and long-term approach to supply planning provides visibility into monthly demand, even if a single quarterly update is not submitted.

GHSC-PSM monitors supply plans quarterly to identify common errors and omissions across countries or commodity categories, to assess results from earlier improvement efforts, and to identify areas for additional guidance and mentoring. The quality of the plans is assessed against 16 criteria, with the reviews generating actionable recommendations for improvement. The supply plan reviews identify issues with future orders, enabling country offices to take pre-emptive actions to minimize impact.

Capacity building

The number of people trained is an indicator that the project focuses its capacity-building resources on and identifies areas to improve related supply chain outcomes. GHSC-PSM trained 4,552 individuals in Q1 (1,685 women and 2,867 men).

Most trainings were cross-cutting and addressed topics relevant to multiple health areas. By funding source, 29 percent were trained with HIV/AIDS funding; 25 percent with malaria funding; 10 percent with FP/RH funding; and 36 percent with MCH funding. Trainings focused on warehousing and inventory management, LMIS, governance and finance, transportation and distribution, and human resources capacity development.

C3. Global Collaboration

In Q1 FY 2022, GHSC-PSM made **15 presentations** and hosted **one satellite session** at **seven conferences**.

In Q4, the **LQAG** was made official. GHSC-PSM chairs the group whose participants include the Global Fund and UNICEF.

The scale, scope, and complexity of managing a global supply chain require collaboration with international and local partners to ensure the availability of medicines and health commodities. By integrating work across health sectors and sharing information, resources, activities and capabilities, the project can achieve what it could never accomplish alone. GHSC-PSM's global collaboration efforts focus on coordinating with global donors and stakeholders to develop innovative means for responding to supply chain interruptions.

Strategic engagement

As described throughout this report, GHSC-PSM engages actively with other global players to promote the availability of medicines and commodities. The project does this by providing supply chain expertise and working with global partners to allocate scarce supply, promoting harmonization of standards and practices and managing commodity stock information as a global good. Highlights of groups the project participates in are recapped below.

- Worked with COVID-19 vaccine donors **UNICEF, World Bank** and the **U.S. State Department** in Q1 to coordinate vaccine shipments and support country-wide distribution of COVID-19 vaccines in Ghana, Mozambique and Nigeria.
- Support automated transfer of FP/RH supply plans from QAT to the VAN. A total 17 FP/condom QAT supply plans went directly to the VAN through the automated integration.
- Host monthly **Proactive Stock Risk Management (ProStock)** meetings with USAID as a forum to build on the project's HIV/AIDS data collection and analysis and discuss gaps in HIV commodity access and implement action plans to address them. (For more details, see section B1.)

- Participate in the **KSM/API sub-working group**[21] of the **Malaria Pharma Task Force**:[22] 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 semi-synthetic artemisinin in the wake of increased pricing and sourcing challenges for vegetal artemisinin. (For more details, see section B2.)

- Serve as a member of the **Global Donor Technical Working Group** and participate in bi-weekly meetings to coordinate actions and resolve problems with malaria commodity suppliers who cannot fulfill demands because of capacity constraints due to COVID-19.

- Hosted a webinar in Q1 on the topic of Quality in LLINs for Procurers at the Raising the Floor Nets: ITN Quality Convening for the **LQAG**. This group, made official in Q4, also includes the Global Fund, PMI, UNICEF and WHO PQ. GHSC-PSM chairs the working group, 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. (For more details, see section B2.)

- Work with the **Global Fund, UNICEF** and the **Malaria Consortium** to share demand information and to coordinate procurement planning for SPAQ for FY 2022 SMC campaigns. (For more details, see section B2.)

- In coordination with **UNFPA,** developed and finalized a joint green packaging scope of work exploring opportunities for greener, more environmentally friendly packaging of priority FP products. (For more details, see section B3.)

- The **RHSC Systems Strengthening Working Group (SSWG)** meets throughout the year. Several GHSC-PSM staff have since volunteered to lead or support work streams identified in the RHSC FY 2022 work plan. (For more details, see section B3.)

- Continued to participate in the **Maternal Health Supplies Caucus** through technical presentations, participation in ongoing meetings and long-term work planning.

- Participate in USAID and BMGF-funded **CHTF** meetings and contribute to ad hoc CHTF activities. In Q1, the project began collaborating with partners from the CHTF on a series of technical meetings to discuss barriers to availing key commodities for **treating childhood**

[21] KSM/API Working Group members include CHAI, BMGF, GHSC-PSM, the Global Fund, Medicines for All Institute (M4ALL), Medicines for Malaria Venture (MMV), Maisha Meds, PATH, Unitaid, PMI and WHO.

[22] 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, MSF, Pan-American Health Organization, PATH, PMI, UNICEF and WHO.

pneumonia and PSBI and identify actions for national governments to take to ensure these commodities are accessible for families. (For more details, see section B4.)

- Participated in a seminar organized by the national chapter of the **International Association of Public Health Logisticians** in Ghana, with the theme: Sustaining Supply Chain Performance Improvement in the Public Sector of Ghana. GHSC-PSM collaborated with GHS to present on Ghana's Supply Chain Monitoring and Evaluation Framework and key supply chain initiatives being implemented within the public health sector.

Knowledge sharing

To ensure that the critical lessons learned, adaptations and best practices can be repurposed by Ministries of Health, supply chain managers, donors and other supply chain stakeholders, GHSC-PSM documented and shared project activities, technical research and success stories. Details can be found in sections throughout the report, but below are some highlights:

- Presented at the *Raising the Floor Nets: ITN Quality Convening* webinar hosted by BMGF, CHAI and i2i.

- Participated in the 10th Annual Meeting of the Ouagadougou Partnership. The partnership includes nine West African countries with the goal of accelerating progress in the use of FP services. GHSC-PSM published and promoted "Keeping our commitments: Agility in the face of COVID-19 disruptions to the global health supply chain," a technical report that describes how GHSC-PSM helped provide key COVID-19 commodities while pivoting to ensure that USG-supported health programs for HIV/AIDS, malaria, FP/RH and MCH continued uninterrupted.

- With increased global focus on cold chain and ultra-cold chain (UCC) due to the COVID-19 vaccine, developed a **podcast series examining cold chain in-depth** and have published four episodes; the most recent, focused on Malawi's vaccine deployment, was released in Q1.

- Partnered with **People that Deliver** (PtD) to hold a webinar to launch the PtD Supply Chain Management Professionalization Framework. GHSC-PSM staff facilitated the webinar, and another from Rwanda presented on progress to date.

- Finalized a **white paper,** *The Active Site Rule for Contraceptive Stockout Rates: Assessing the Use of a Business Rule Approach for Health Facility Stock Status*. The paper, which examines the rule's impact on data quality and the implications for its rollout through two case studies in Nepal and Malawi, is posted alongside the Active Site Rule video series. Both parts of the series are posted to the GHSC-PSM website.

- To share resources from over a decade of global supply chain standards, developed a **Global Standards Toolkit**.

- Participated in the **2021 Co-Creation Workshop: Sharing Product Master Data** with Digital Square, GS1, and Village Reach and presented on the NPC initiative implemented across Malawi and Rwanda.

Supply chain collaboration in global fora

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. Participation helps the project exchange information and stay current with emerging trends, market risks and requirements to respond to global health commodity needs. By sharing project success stories and innovations in these collaborative spaces, the project promotes USAID's global leadership in supply chain commodities. In Q1, GHSC-PSM participated in the following conferences:

- Two presentations on the project's malaria and data visibility work at the **American Society of Tropical Medicine and Hygiene 2021 Annual Meeting**.

- Seven cross-cutting presentations at the **Global Health Supply Chain Summit 2021**. GHSC-PSM's Malawi vaccine team was one of three finalists for the Global Health Supply Chain Summit grand prize.

- Two presentations on last-mile delivery and COVID-19 support at the **Association for Supply Chain Management CONNECT Conference**.

- One presentation on emergency supply chain preparedness at the **Health Informatics in Africa 2021 Conference**.

- A satellite session with USAID at the **African Society for Laboratory Medicine 2021 Conference**: *Beyond DNO: The Changing Landscape of Laboratory Medicines*. Following its success, USAID requested that the session be held as a webinar for all USAID staff in December 2021.

- Three poster presentations, sharing successes and lessons learned, at the **International Conference on AIDS and STIs in Africa**: 1) Strengthening HIV Viral Load Laboratory Supply Chains and Network Performance through a Sustainable, Replicable, Data-driven Approach, 2) Quality Management Improvement Approach in Rwanda and 3) Approaches applied to ensure essential HIV services during COVID-19 in Ethiopia.

Collaboration with Other USAID GHSC Projects

GHSC-PSM is a member of the GHSC program family and interacts regularly with the other GHSC projects.

In particular, GHSC-PSM collaborates with GHSC-QA to share information, identify mutual challenges and solutions, and ensure QA requirements are incorporated into GHSC-PSM systems. Furthermore, GHSC-PSM collaborates with GHSC-QA to streamline and optimize QA and QC business processes and procedures to rapidly address any incidents and product failures as they occur, ensuring quality products reach the end consumer.

In Q1, the project worked with GHSC-QA to conduct five quality awareness trainings for project global supply chain staff to better understand FHI 360's role and activities during procurement. GHSC-PSM also worked with GHSC-QA to provide input and support toward COVID-19–related commodity procurement.

Annex A. COVID-19 Response

Placed orders for COVID-19 commodities for **eight countries** approved for American Rescue Plan Act (ARPA) funding, including more than **7.3 million line items of oxygen equipment, vaccine administration supplies, PPE, and cold chain equipment**.

Delivered **6,800 non-invasive ventilation helmets to Italy** in Q1.

Delivered **one containerized PSA system** to **Mozambique** and **76 line items of oxygen consumables and durables** to **Ghana, Haiti, Honduras, Mozambique and Tajikistan** and shipped **three PSA plants** to **Tajikistan** by the end of Q1.

In Q1, GHSC-PSM continued to work on the following global supply chain workstreams to manage and respond to COVID-19, including:

- COVID-19 country support for procurement from a list of 332 USAID and GHSC-QA–approved products through the ARPA
- Respiratory and cardiac supply procurement for Italy
- Ventilator support
- Oxygen procurement and technical assistance

GHSC-PSM also worked across several country offices to plan for and implement **COVID-19 vaccination-related technical assistance**. Efforts are underway to ensure the supply chain can support large-scale vaccine distribution and the project has specifically ramped up its work assessing cold chain capacity in the countries it supports and identifying opportunities to strengthen the global supply chain for vaccine distribution. More on these activities is provided below.

COVID-19 country support

Ensuring commodity quality

In collaboration with the Global Health Supply Chain-Quality Assurance (GHSC-QA) project, GHSC-PSM provides QA support for COVID-19 activities. More on how GHSC-QA is involved in the

ARPA COVID-19 procurement process is provided below.

Procuring under COVID-19 ARPA

In FY 2021, GHSC-PSM received $11.5M in funding under ARPA to procure cold chain supplies, cold chain equipment, bulk liquid oxygen (LOX), COVID-19 diagnostic tests, general patient care commodities, laboratory consumables, essential medicines and PPE. USAID approved three additional commodities (pre-qualified by WHO) for procurement under ARPA in Q1 specifically for COVID-19 vaccine support, including long-range vaccine carriers, short-range vaccine cold boxes and user-programmable temperature data loggers.

By the end of Q1, GHSC-PSM placed orders for the following countries, after a comprehensive analysis and quantification process conducted by the respective GHSC-PSM country teams, to meet in-country needs within country-specific ARPA funding envelopes:

- **Benin:** 67,500 COVID-19 RDTs
- **Botswana:** 400 coolant water packs, 400 temperature data loggers, 36 long-range vaccine carriers and 3,000 short-range vaccine cold boxes
- **Guatemala:** 5,000,000 disposable syringes
- **Namibia:** 150,000 surgical gloves, 150,000 examination gloves and 100,000 face masks
- **Pakistan:** 1,000 Nuvo10 oxygen concentrators, 180 Max30 oxygen concentrators, 7,000 oxygen masks, 400,000 nasal catheters, 600 oxygen analyzers, 150 cardiac monitors, 600 infrared thermometers, 17,000 oxygen tubes, 1,200 pulse oximeters, 2,000 stainless steel suction tubes, 1,600 intravenous infusion pumps, 1,200 nebulizers and 9,000 endotracheal tubes
- **Panama**: 50,000 pre-filled syringes of enoxaparin and 3,950 dexamethasone vials
- **Rwanda:** 1,350,000 hypodermic syringes
- **Tajikistan:** 250 oxygen cylinders and 250 oxygen regulators

GHSC-PSM also kicked off work in Q1 to support bulk LOX needs in Botswana and Namibia. By the end of Q1, four MOH-identified facilities in Francistown, Botswana, were being assessed by suppliers to determine commercial feasibility of supplying bulk LOX, and eight hospitals in Namibia had been assessed for bulk LOX procurement. GHSC-QA is conducting supplier eligibility and quality assurance analysis and review while the proposal for supplying bulk LOX in both these countries undergoes GHSC-PSM technical and cost evaluation.

Procuring a COVID stockpile

On December 17, 2021, USAID directed GHSC-PSM to establish a Rapid Response Mechanism (RRM) with a funding envelope of $18M to procure a limited range of critical COVID-19 commodities for countries requiring emergency supplies, as part of USG's global COVID-19 response. The RRM commodity plan will initially consist of a virtual and physical stockpile of commodities. This stockpile includes items that are expected to be frequently ordered, such as COVID-19 RDTs for surveillance, diagnostics and case identification and a variety of PPE, and has funding set aside for emergency orders of other types of commodities. USAID also issued a Technical Directive Memo, which authorized a virtual stockpile of approximately $3M in PPE and prioritized commodity procurements and technical assistance specifically for Botswana and Lesotho. By the end of Q1, GHSC-PSM was pending defined commodity mixes and quantities to inform orders for both countries.

Procuring COVID-19 equipment for Italy

In Q1, GHSC-PSM delivered 6,800 non-invasive ventilation helmets to the Pomezia warehouse for further distribution across Italy by the Italian Government. Also, the project continued to work on the remaining, re-specified, order for imaging equipment to be shipped direct to Policlinico Hospital. The project anticipates completion of this final delivery of COVID-19 commodities to support Italy in Q2.

Ventilator support

In Q1, GHSC-PSM continued work on the ventilator program, issuing supplementary purchase orders and coordinating with ventilator manufacturers and local service providers on service agreements. USAID approved three requisition orders in support of recipient countries: Mozambique, Rwanda and Uzbekistan. These requisition orders enabled the purchase of bacterial filters, reusable ventilator circuits, and continuous positive airway pressure masks, totaling approximately $400,000.

Oxygen

Procurement

By the end of Q1, GHSC-PSM placed orders for a total of 291 oxygen commodity line items, including Pressure Swing Adsorption (PSA) and Vacuum Swing Adsorption units, oxygen concentrators and cylinders, oxygen disaster manifolds, durable spare parts and consumables. The project delivered one containerized PSA system to Mozambique, shipped three PSA plants to Tajikistan and delivered 76 line items of consumables and durables (including nasal cannulas, resuscitation masks, air oxygen blenders, high concentration oxygen masks, oxygen regulators and pulse oximeters) to Ghana, Haiti, Honduras, Mozambique and Tajikistan.

Technical assistance

In Q1, GHSC-PSM continued its clinical and non-clinical technical assistance to improve the oxygen ecosystem for the COVID-19 response in Ghana, Guatemala, Haiti, Honduras, Kenya, Mozambique and Tajikistan.

All seven countries received contracting officer representative (COR) approval on full clinical technical assistance work plans, while all but Kenya have received COR approval for full non-clinical technical assistance work plans. Kenya received COR approval on its startup work plan, including assessment activities to be carried out in Q2. The assessments will inform recommendations for the full work plan that will be carried out in coordination with the PSA delivery and installation expected in Q4.

Country-specific TA included the following:

- In **Ghana**, the project's clinical TA implementing partner has trained 255 health care workers (62 physicians, 135 nurses, 18 clinical officers and 40 others) to date across 59 health facilities on key topics, including COVID-19 care pathway and triage, oxygen therapy and delivery, basic intensive care, infection prevention and control and health care worker safety. GHSC-PSM also conducted a non-clinical multi-day training course for employees of the four PSA recipient sites who will be engaging regularly in machine operation. The course reviewed the management, operation and upkeep of the PSA plants. Also, a training on effective management of oxygen ecosystem plants and equipment (PSAs, concentrators, ventilators and medical gas piping) was held for 44 biomedical/clinical engineers and technicians across Ghana.

- In **Guatemala**, the project's clinical partner provided technical assistance to hospitals in Huehuetenango and Quiché, including a ventilator workshop, with USAID representatives attending, in Huehuetenango in October. To date, 464 health care workers completed trainings on topics such as oxygen concentrators for clinical care, oxygen therapy, COVID-19 prevention and COVID-19 triage. GHSC-PSM also coordinated with the MOH to prepare the last distribution of consumables and durables that arrived at the MOH's central warehouse at the end of Q4 FY 2021. The distribution is expected to take place in Q2.

- In **Haiti,** developed consumables and durables kits for facilities based on guidance from USAID to ensure that the volume of products for each facility is proportional to the volume of COVID-19 patients at those facilities. Also, the non-clinical technical assistance team completed the first draft of the oxygen market assessment report, which discusses two examples of public-private partnerships in Haiti. For clinical technical assistance, the project's partner developed a clinical training curriculum and materials and trained 37 clinical staff, including physicians, nurses and three MOH staff. After the trainings, the implementing partner established a community of practice to facilitate peer-to-peer continual learning through WhatsApp groups and webinars.
- In **Honduras**, received USAID/Honduras approval for the first two non-clinical technical assistance deliverables completed for 1) Central-level Oxygen Sector Assessment and 2)

Honduras Training Needs Assessment and Capacity Building Plan with Recommendations. The project also onboarded a senior oxygen consultant to lead development of the remaining deliverables and finalize the Non-Clinical Oxygen Management Program materials. For clinical technical assistance, GHSC-PSM's implementing partner led competency-based clinical skills trainings to improve COVID-19 respiratory care in Q1, including four virtual sessions with didactic content and background reading and two hands-on trainings. In total, 20 health care workers (10 doctors and 10 registered nurses) were trained from five hospitals.

- In **Kenya**, the project's clinical partner continued in-person and virtual trainings on Basic Emergency Care (BEC) for lower-level medical facilities throughout the country. To date, 99 health care workers in 55 facilities have received clinical oxygen training (five physicians, 56 nurses, 32 clinical officers and one pharmacist). Of the facilities that received BEC training, 95 percent reported an improvement in patient care. To assist with non-clinical technical assistance, GHSC-PSM onboarded a senior oxygen consultant to lead the PSA site assessments and conduct site reviews.

- In **Mozambique,** began work on a non-clinical sustainability plan that will address total cost of ownership, identify a transition plan for the responsibility of oxygen equipment, analyze gaps in the current oxygen supply chain, cylinder filling and distribution models to support PSA catchment facilities. To date, the project's clinical partner has trained 66 health care workers (10 physicians, 37 nurses and 19 others) at eight facilities in clinical oxygen topics.

- In **Tajikistan,** carried out clinical TA activities that included planning for mentorship visits to facility sites, which began in December and will be completed in Q2, and editing three clinical training modules to incorporate feedback from technical staff and the MOH. GHSC-PSM also finalized Non-Clinical Oxygen Management Program materials and translated them into Russian and Tajik. A training-of-trainers is scheduled in Q2 in Dushanbe.

Health systems strengthening: COVID-19 and emergency preparedness and response

In addition to global support, country teams engaged with national government stakeholders in Q1 to assist them in responding to the COVID-19 pandemic.

- In **Angola**, conducted a master training on pharmacovigilance for 23 MOH officials. The focus of the training was monitoring vaccine safety and adverse events following COVID-19 vaccination. The attendees will go on to train other provincial and municipal health technicians as the country works to rapidly distribute and administer the COVID-19 vaccine. GHSC-PSM also helped develop and disseminate 1,500 informational sheets explaining the potential for adverse reactions following vaccine administration, making them available at every vaccination point

nationwide. GHSC-PSM then visited select COVID-19 vaccination points to supervise adverse events surveillance and ensure adverse events were being appropriately monitored and recorded.

- In **Colombia,** conducted a rapid warehouse assessment for the COVID-19 vaccine cold chain and the dry storage commodities for COVID-19–related commodities at Bogotá "Zona Franca," and at the departments of La Guajira and Anitoquia municipal warehouses. Overall, the results showed adequate provision of cold rooms and freezers to maintain the vaccine supply chain. However, all warehouses had space constraints. The central warehouse in Bogotá can greatly benefit from implementation of a warehouse management system for end-to-end visibility into information, commodity and funding flow. GHSC-PSM recommended all warehouses implement the 5S-lean workplace methodology, a systematic approach to workplace organization that includes the five steps of Sort, Set in Order, Shine, Standardize and Sustain.

- In **El Salvador**, provided technical support and trained 56 warehouse, quality control and administrative personnel in the logistical handling of COVID-19 vaccines and management of the vaccine cold chain. Starting in Q1, COVID-19 vaccine distribution in the country moved in the direction of becoming decentralized. As a result, all the national vaccination network centers and mobile units expanded their reach to more remote sites. The country's National Biological Center (CENABI) is now distributing to four regional warehouses. Once there, the vaccines are transferred to 320 vaccination sites, including hospitals, health units and vaccination centers. Each region also received cold chain control equipment, including temperature sensors and system control gateways, procured and delivered by the project. The cold chain control equipment is expected to be activated by the end of January 2022, and will have the ability to monitor the cold chain nonstop with real-time alarms to ensure temperatures do not exceed those required for the COVID-19 vaccines. The technical training and new lessons learned at CENABI for the logistical management of vaccines are ensuring efficiency in distributing COVID-19 vaccines.

- In **Guatemala**, conducted technical visits in eight prioritized health regions to evaluate and support resilient cold supply chains. The project and Ministry of Health collaborated to assess the sites' cold chain capacity and identified gaps and challenges, including in staffing, storage areas, industrial security equipment, information systems and supply chain administration, specifically in inventory management. Following the assessment, the project began monitoring the available inventory and dispatches to the 29 health areas, and conducted periodic reviews of temperature monitoring to ensure they were aligned with the internal process of the MOH. GHSC-PSM then supported delivery of equipment to these health areas for inventory support, control and temperature monitoring, including: 29 tablets, 32 system control gateways, 398 temperature sensors and 32 uninterruptible power sources. The project also began implementing a temperature monitoring plan at the National Biological Center (CNB) in Q1. The project delivered 42 temperature sensors and three system control gateways, and trained seven CNB staff members to use the equipment. Also, five logistics monitoring advisors were hired to support the five prioritized health regions. With the equipment delivered and newly trained personnel, GHSC-PSM is helping avoid inventory losses and ensure vaccines are safe by controlling and monitoring the cold chain.

Supporting the global COVID-19 vaccine rollout

In FY21, GHSC-PSM received $18.885 million of COVID-19–related funding for technical assistance and commodity procurement to support vaccine rollout and COVID-19 case management in 19 countries. Countries that have received funding include Angola, Benin, Botswana, Burkina Faso, Colombia, El Salvador, Ethiopia, Ghana, Guatemala, Guinea, Lesotho, Malawi, Mozambique, Namibia, Pakistan, Panama, Rwanda, Tajikistan and Uzbekistan. In Q1, these countries continued to make major progress in their work plan activities. Technical support varies from country to country and includes providing cold chain and UCC storage and distribution, developing waste management plans to manage vaccine-related waste and coordinating vaccine rollout activities through participating in various technical working groups.

GHSC-PSM carried out the following activities in Q1:

- In **Botswana**, conducted two ESC playbook training sessions for 46 district health management team personnel. These trainings provided key staff with an overview of the playbook as a tool for achieving a well-functioning supply chain for effective emergency preparedness and their role in the emergency response.

- In **Ethiopia**, supported the MOH and EPSA in developing a COVID-19 vaccine deployment and distribution plan and in monitoring stock at different levels of the system. GHSC-PSM supported training for 80 logistics staff working at EPSA, regional health bureaus and vaccination centers on cold chain, and safe stock management of COVID-19 vaccines. Also, GHSC-PSM conducted

supportive supervisions at 111 vaccination centers on COVID-19 vaccines cold chain and supply chain management practice.

- In **Ghana,** continued to support the MOH and the Ghana Health Service to implement a nationwide vaccination exercise. In Q1, the project contracted a 3PL to distribute more than 3 million doses of the COVID-19 vaccine donated by USAID, UNICEF and other partners from the central to regional levels. To ensure effective tracking of COVID-19 vaccine distribution, GHSC-PSM also provided technical assistance to Ghana's Expanded Programme on Immunization to manage and process vaccine allocations in the country's logistics management information system, GhiLMIS.

- In **Nigeria,** through a separate funding stream, supported the Government of **Nigeria** (GON) in conducting last-mile distribution of COVID-19 vaccines throughout the Federal Capital Territory (FCT) in Q1. FCT has the third-lowest rate of COVID-19 vaccine uptake among Nigerian states. GHSC-PSM also supported reverse logistics for approximately 250,000 unused (expired) vaccines and empty vials. Leading up to the FCT mass vaccination campaign, the project had been working with GON to ensure distribution of COVID-19 vaccines for months, including distribution of 4,000,080 doses (phase 1) from the central to regional level in FY 2021 and facilitating discussions with UPS to ensure distribution of 3,577,860 additional doses (phase 2) from central-level cold storage to all 36 Nigerian states and FCT. As of November 30, GHSC-PSM supported the movement of 5,232 vaccines (during phase 2) from various hubs to 97 vaccination sites and conducted reverse logistics using a 3PL. GHSC-PSM has also been working closely with USAID and GON to improve the distribution design, timeline and demand creation to ensure more efficient operations moving forward. The strategy used in FCT will be adapted based on lessons learned and cascaded gradually to the other states.

- In **Pakistan**, in collaboration with the Central Health Establishment of Ministry of National Health Services, Regulations & Coordination, hosted training sessions for public-sector staff on Public Health Emergency Response at different points of entry in Pakistan. The training sessions included comprehensive modules on the SOPs on COVID-19 Rapid Antigen Tests and data management while using the Traveler Surveillance Management Information System and were held at Karachi International Airport, Faisalabad International Airport, and Multan Airport.

Presenting COVID-19 successes

In Q1, GHSC-PSM prepared three presentations on important successes related to its COVID-19 technical assistance work in Ethiopia, Ghana and Malawi, and presented them to project staff, USAID Washington, and USAID Mission staff. The successes highlighted included engagement of private-sector 3PL distribution in support of vaccine availability, safety and tracking of vaccine hesitancy, and forecasting and supply planning for PPE and COVID-19–related medicines.

To further share GHSC-PSM's experience with COVID-19 vaccine technical assistance, the project was invited to present at USAID's monthly COVID-19 Technical Assistance Implementing Partners Forum held in November 2021. GHSC-PSM's country director for Malawi presented on the project's work to support COVID-19 vaccine planning and coordination with the Government of Malawi and service delivery implementing partners to ensure equitable distribution and availability to communities throughout the country.

Lastly, GHSC-PSM created two guidance documents for project country teams to use as they develop cold chain and UCC distribution agreements with local distribution partners.