



USAID GLOBAL HEALTH SUPPLY CHAIN PROGRAM
Procurement and Supply Management

Assessment of the Availability of Quality Newborn and Child Health Commodities in Liberia

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

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

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Acronyms

CHA	community health assistant
CMS	Central Medical Store
DT	dispersible tablet
EML	Essential Medicines List
FHD	Family Health Division (of the Ministry of Health)
GHSC-PSM	USAID Global Health Supply Chain Program-Procurement and Supply Management project
IMNCI	Integrated Management of Newborn and Childhood Illness
LDHS	Liberia Demographic and Health Survey
LMIS	logistics management information system
MOH	Ministry of Health
NBCH	newborn and child health
ORS	oral rehydration salts
SCMU	Supply Chain Management Unit
STG	Standard Therapeutic Guidelines
UNICEF	United Nations Children's Fund
UNCoLSC	UN Commission on Life-Saving Commodities for Women and Children
UNFPA	United Nations Population Fund
USAID	U.S. Agency for International Development
WHO	World Health Organization

Background

Infectious diseases such as diarrhea and pneumonia, and other early-life complications such as birth asphyxia, contribute significantly to child morbidity and mortality despite the existence of effective medicines and equipment for prevention and treatment. While overall child mortality has decreased in recent decades, child mortality and morbidity, especially in the first year of life, remain high. The United Nations Children's Fund (UNICEF) estimates¹ that **4 million infants died worldwide in 2018**.

Although Liberia has made significant improvements in newborn and child health (NBCH), its child mortality remains high. Neonatal, infant, and under-five mortality rates are 25, 54, and 94 deaths per 1,000 live births, respectively.¹ Lagging progress is partially attributable to the limited availability of essential newborn and child health (NBCH) commodities in the national health supply chain. To address high mortality rates, the USAID Global Health Supply Chain Program-Procurement and Supply Management (GHSC-PSM) project assists the Government of Liberia in its efforts to ensure continuous availability of quality-assured NBCH health commodities.

To improve NBCH outcomes and meet the 2030 Sustainable Development Goal for child mortality it is essential to ensure that skilled health care providers receive the medicines and equipment they need. In 2010, a global call to action for national governments established the [UN Commission on Life-Saving Commodities for Women and Children](#) (UNCoLSC). To support its goals of reducing child mortality and improving maternal health, the commission identified 13 commodities that could save the lives of more than 6 million women and children if more widely accessed and properly used. Among them were amoxicillin, used to treat pneumonia and possible serious bacterial infection (PSBI) in children under five; oral rehydration salts (ORS) and zinc, used to care for children with diarrhea; and newborn resuscitation equipment to respond to birth asphyxia.

The World Health Organization (WHO) has called on health ministries and their partners to increase access to essential NBCH commodities by increasing their availability via the national supply chain, ensuring their proper use, and backing easy-to-administer formulations. The formulations recommended as most likely to increase uptake in low-resource settings are amoxicillin dispersible tablets, co-packaged ORS and zinc, and appropriate newborn resuscitation equipment.

Unique benefits of essential NBCH commodities

Amoxicillin dispersible tablets (amoxicillin DT) are more stable, less costly, and easier to manage in the supply chain than the historically used oral suspension or syrup formulations. The dispersible tablet is lower in volume and weight than the other formulations and does not require refrigeration.

Saving children's lives depends on global access to the essential commodities identified by UNCoLSC in 2012.

Each year an estimated 1.36 million children die due to pneumonia, the leading cause of death among infants and children.

Diarrhea kills approximately 760,000 children annually and is the second-leading cause of death for this group despite its being highly treatable.

Birth asphyxia kills 814,000 newborns every year.

Source: UN Commission on Life-Saving Commodities for Women and Children. 2012. Commissioner's Report. New York: United Nations.

¹ World Health Organization. 2019. *Global Health Observation Data*. Geneva: WHO. https://www.who.int/gho/child_health/mortality/neonatal_infant/en/.

Dosing of dispersible tablets is also simpler for those administering it and tends to be more accurate, according to UNICEF.²

Countries that increase the availability of **co-packaged ORS and zinc** (ORS+zinc) can improve NBCH outcomes. Treating diarrhea with this commodity combination can reduce severity and recurrence of episodes. It is estimated that more than 75 percent of deaths caused by diarrhea can be averted by the use of ORS and zinc together³. This co-packaged formulation has not reached the point of care in many countries. In 2017,⁴ 42 percent of patients with diarrhea globally received ORS versus 7 percent who received ORS+zinc. One study found that with co-packaging and supplemental instructional messages, adherence to an ORS+zinc diarrhea treatment regimen increased—by as much as 15 percent in Ethiopia.⁵

Newborn resuscitation equipment (defined as the self-inflating resuscitation bag and appropriate face-mask size for term and preterm infants), when paired with training on use and reprocessing, helps establish adequate breathing and circulation for newborns when complications arise at birth or during the neonatal period. However, the equipment may not be available, or facility staff may not have the capacity to use it in resource-limited settings. Low-cost, easy-to-use resuscitation equipment is available from many suppliers globally. WHO recommends⁶ using a resuscitation equipment package that includes the following:

- Self-inflating resuscitation bag
- Neonatal face masks (size 0 and size 1)
- Electric or foot-operated suction pump and bottle
- Single-use suction catheter
- Single-use or multiuse suction bulb that can be opened, cleaned, and sterilized
- Infant stethoscope

Rapid study on availability of essential NBCH commodities in Liberia

USAID and others continue to invest in programs to reduce child mortality. Still, health systems in many countries experience limited access to essential NBCH commodities. In 2019, GHSC-PSM conducted a rapid study in Liberia to identify supply chain barriers to essential NBCH commodity availability. The study also identified potential solutions to increase availability of these commodities in Liberia's national public health system. This report shares findings and considerations from the study.

² UNICEF Supply Division. 2018. *Amoxicillin Dispersible Tablets: Market and Supply Update*. Copenhagen: UNICEF. www.unicef.org/supply/media/511/file/amoxicillin-dispersible-tablets-market-and-supply-update.pdf.

³ Jones G, Steketee RW, Black RE, et al. How many child deaths can we prevent this year? *Lancet*. 2003;362(9377):65–71. [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(03\)13811-1/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(03)13811-1/fulltext)

⁴ United Nations Children's Fund and World Health Organization. 2017. *Tracking Progress towards Universal Coverage for Reproductive, Newborn, and Child Health: The 2017 Report*. New York: UNICEF/WHO. <https://www.countdown2030.org/reports-and-publications/countdown-2017-report>

⁵ <https://www.ncbi.nlm.nih.gov/pubmed/27246705>

⁶ <https://apps.who.int/medicinedocs/documents/s22389en/s22389en.pdf>

Methodology

The GHSC-PSM rapid study in Liberia first analyzed national health supply chain operations, across health areas and specifically for the essential NBCH commodities amoxicillin DT, ORS+zinc, and newborn resuscitation equipment. During the initial desk review, the study mapped data collection and commodity supply processes. To understand country treatment preferences for diarrhea, pneumonia, and birth asphyxia, the study team reviewed clinical documents and the National Standard Therapeutic Guidelines (STG). The team also analyzed commodity availability and consumption data and identified NBCH and supply chain partners.

Next, a field study phase comprised interviews with designated supply chain and NBCH partners. These stakeholders described (1) upstream and downstream factors that impact commodity availability and (2) opportunities to improve access to essential NBCH commodities. The interview guide addressed four realms that typically affect supply chain efficiency and drive stock availability:

- **Enabling environment:** national policies, health programs, and financing
- **Forecasting, supply planning, and procurement:** quantification approaches, data collection, and sourcing processes
- **Inventory management:** warehousing and distribution
- **Logistics and use:** ordering, reporting, data management, and facility management

The team conducted 10 qualitative interviews with individuals from Liberian Ministry of Health (MOH) agencies, the Central Medical Store (CMS), and select donors and implementing partners working to improve maternal, newborn, and child health in the country.

After the information gathering phases, GHSC-PSM staff co-hosted a validation workshop with the Family Health Division (FHD) at the MOH, attended by 43 people from 28 organizations. The study team disseminated initial findings and gathered feedback on its preliminary proposals for improving availability of the essential NBCH commodities. Based on this discussion, the team developed proposed actions to increase availability of these essential products, which we present as considerations in this report.

Context: Health commodity supply in Liberia

Liberia is comprised of 15 counties, each consisting of districts, and has 686 public health facilities countrywide. The FHD provides oversight and governance of maternal, newborn, and child health services. The Pharmacy Division sets pharmaceutical policy and provides governance and oversight of medical supplies. As part of this work, the Pharmacy Division develops STGs, pharmacy and therapeutic committees, and guidelines for donations, and establishes processes for management of medical supplies at lower levels of the health system. A third body, the Supply Chain Management Unit (SCMU), reports directly to the Deputy Minister of Health/Chief Medical Officer. The SCMU receives requisitions from facilities, reviews orders for quality, and liaises with counties to process orders. The CMS receives the orders from SCMU and is responsible for procurement, storage, and distribution of commodities.

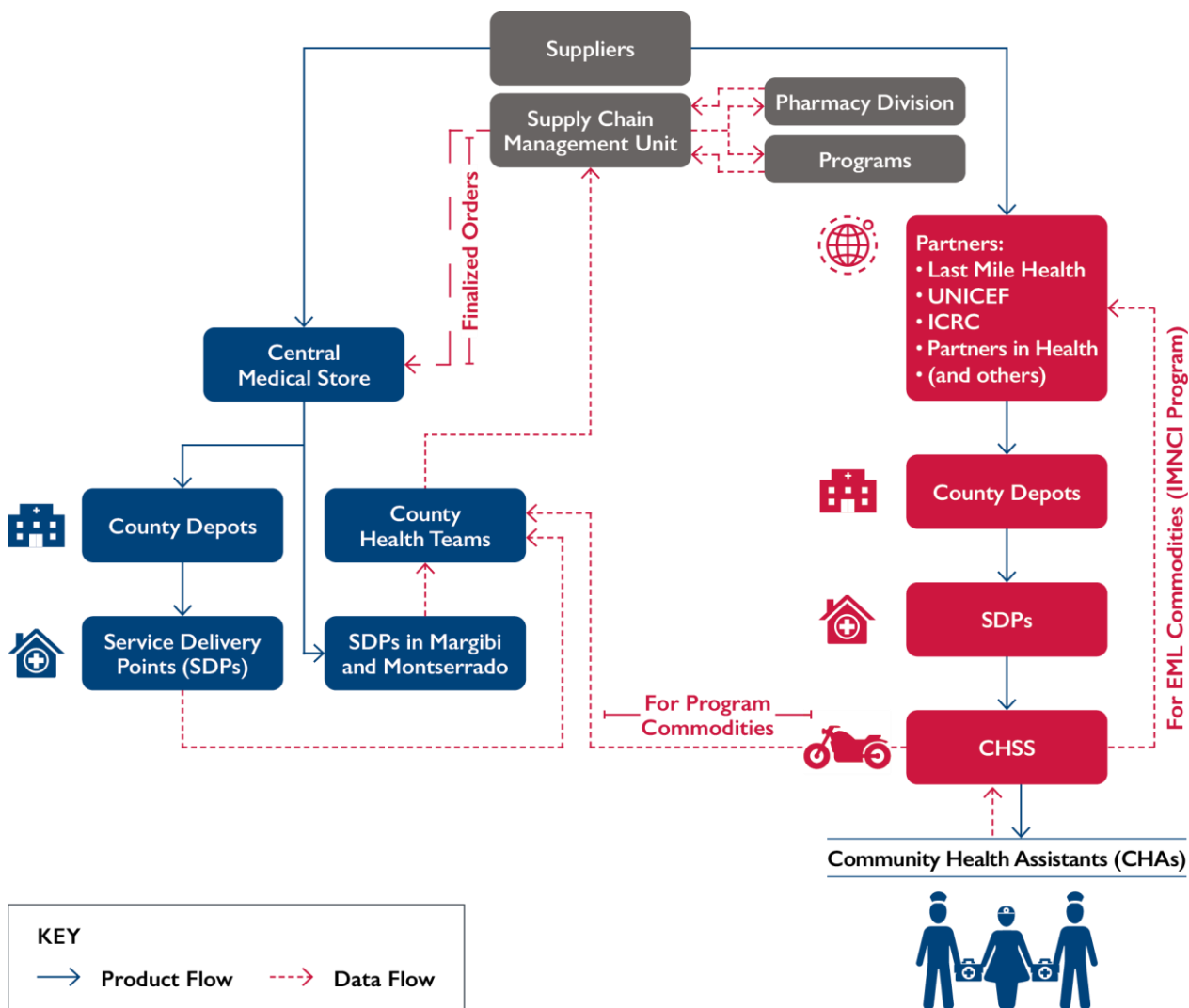
Commodity movement and data management

Two commodity supply chain systems operate in Liberia: one in which orders are managed, processed, and distributed to facilities for use there, and a second that fulfills the commodity needs of community health assistants (CHAs) through Liberia's Integrated Management of Newborn and Childhood Illness (IMNCI) program. This second system is primarily managed by implementing partners.

Liberia currently operates a “pull”-based supply chain system, in which facilities order commodities based on consumption and need. Facilities must submit order forms with a consumption report, generated from logistics management information system (LMIS) data. This information passes through the county health team for review and approval before being forwarded for review by the SCMU at the national level. Managers for each health area program review and approve data and orders for commodities relevant to their programs. The SCMU then passes orders to the CMS for picking, packing, and distribution.

Figure 1 depicts the movement of commodities through the two supply chains in Liberia. At left, commodities move from suppliers to CMS, and then through the supply chain to reach patients seeking health services at public facilities.

Figure I. National Health Commodity Movement in Liberia



CMS carries out distribution through this national supply chain on a quarterly basis. CMS delivers to all hospitals and all health care facilities in two counties (Montserrado and Margibi), and to each county depot in the country. County health teams ensure distribution of commodities from county depots to facilities.

As mentioned above, the other supply stream (shown on right in Figure I) functions for commodities for use by CHAs. Funding and management for this program and most associated commodities are handled by implementing partners, including Last Mile Health, UNICEF, Partners in Health, International Rescue Committee, and others. This system consists of two distinct classes of commodities: program commodities (e.g., for malaria treatment) and other products from the Essential Medicines List (EML) (e.g., amoxicillin DT, ORS+zinc).

Program commodities are reported, ordered, and distributed as explained above (from CMS to counties to facilities), whereas the non-program-related EML products are managed and provided to CHAs through partner-managed supply systems that bypass the national health supply chain. For each county, these products are delivered to the county depot by the designated partner for the county.

Next, county health teams deliver the products to the facilities, where community health services supervisors (CHSS) carry them to CHAs, who provide services and distribute commodities within communities.

Because commodities provided to CHAs bypass the national supply chain, they are not consistently included in facilities' LMIS reports. Rather, supply chain movement of these commodities is captured in two different ways: commodities needed for government health programs (e.g., for malaria or reproductive health) are recorded and reported in routine facility reports, whereas commodities from the general list of essential medicines are captured in the CHA reporting system, which varies from county to county, according to the partner managing the local CHAs. Discussion is currently underway on integrating CHA program data into the national system.

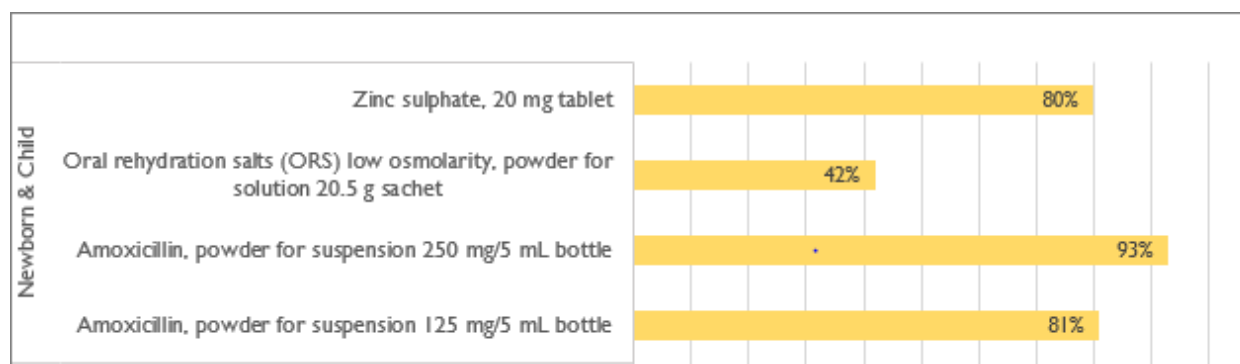
Historically, implementing partners have managed newborn resuscitation equipment as part of their programs and their direct work with facilities or counties. These items are not recorded or reported in any form in the national supply chain, and data on newborn resuscitation equipment are not captured in the LMIS. Interviewees, including MOH personnel, agreed that including newborn resuscitation equipment in the Reproductive Health Program would increase resources allocated to these supplies for procurement and distribution, result in their addition to reporting forms, and increase their visibility as available commodities.

Availability of NBCH commodities

Amoxicillin DT and co-packaged ORS+zinc formulations are not included in the STGs nor are they consistently managed in the national health commodity supply system. Because of this, Liberia's End-Use Verification (EUV) survey does not collect data on amoxicillin DT and ORS+zinc as formulations monitored during site visits. It does, however, monitor related commodities as a proxy to give some indication of potential supply chain barriers to availability should amoxicillin DT and co-packaged ORS+zinc formulations be introduced.

December 2019 EUV data revealed high stock-out rates of the proxy NBCH commodities, as shown in Figure 2. these data were collected during visits to 99 sites across 15 counties, including 5 county hospitals, 73 clinics, 7 health centers, and 14 county storage depots.

Figure 2. Percentage stocked out of selected NBCH medicines, on the day of visit, Liberia EUV survey



Facilities across the country have newborn resuscitation equipment; procurement and equipment-use training have been carried out by donors and health service delivery strengthening partners such as the United Nations Population Fund (UNFPA) and Maternal and Childhealth Advocacy International. The availability of this equipment remains unclear, however, due to the ad hoc implementation of

these programs. UNFPA plans to conduct an audit in 2020 to assess facility needs for equipment and training.

Subsequent sections of this report discuss how this equipment is moved and the challenges to moving it through the supply chain, as well as propose ways to ensure availability of these commodities to low-resource communities.

Findings: Supply chain challenges and opportunities for commodity availability

The GHSC-PSM rapid study assessed Liberia's supply chain in four realms that typically affect supply chain effectiveness and efficiency. The findings below illustrate how amoxicillin DT, ORS+zinc, and newborn resuscitation equipment are managed in Liberia's public health system and identify challenges that exist in each of these realms.

Enabling environment

Policies. Liberia's National Standard Therapeutic Guidelines and Essential Medicines List specify treatment and medicines for newborn and child illness; however, currently listed treatments do not align with the most recent WHO Model List of Essential Medicines. National treatment guidelines do designate the DT formulation of amoxicillin for pneumonia treatment but this product is not included on the EML and oral suspension formulation is most commonly procured. Interviewees stated that a main reason for not procuring the dispersible tablet formulation was its absence from the EML. In addition, many lacked awareness of potential cost and supply chain management benefits.

The STG lack the specificity for ORS and zinc needed to guide appropriate commodity selection. Notably, for treatment of diarrhea in children under the age of five, the national STGs and EML call for homemade ORS combined with zinc sulfate. The guidelines could be improved by including the dosage and packaging information as described in the WHO Model List of Essential Medicines: ORS powder for dilution and zinc sulfate, solid oral dosage form 20 mg. The guidelines could also discuss the option of co-packaging and outline how providing these together would bring clinical benefits, including improved adherence to treatment, and the supply chain benefit, such as combined management of the products for assured availability.

The MOH guidance for birth asphyxia meets UNCoLSC recommendations, endorsing the use of newborn resuscitation equipment.

Funding and programs. In Liberia, national policy and practices may not sufficiently prioritize the availability of essential NBCH commodities. One obstacle is the high number of commodities on the EML—currently more than 200 products—which include the study commodities. GHSC-PSM is advocating for reduction of this list to a more manageable number, reducing it to around 50 products. ORS, zinc, and amoxicillin (both pediatric and adult formulations) are considered general essential medicines and are excluded from government programs that receive elevated attention and resources. Persons interviewed frequently cited a lack of specified funding as a major barrier to ensuring the availability of the essential NBCH commodities studied. Historically, the procurement of essential medicines, mostly supported by the Government of Liberia, has been underbudgeted. Moreover, funds budgeted for essential medicines are rarely fully disbursed. Interviewees noted that newborn resuscitation equipment is not budgeted for or procured by the government.

Designated program medicines receive special earmarked funding from the Government of Liberia, which helps ensure their availability. Discussions with the MOH and partners indicated that the

addition of the essential NBCH commodities to an existing health program could impact funding for and data collection on the commodities. Of existing programs, Liberia's Reproductive Health Program appears to be most relevant; the program already includes some maternal health commodities. Integrating the NBCH commodities would add them to reporting forms and initiate collection of consumption and stock availability data at health facilities.

Liberian Government Investments in Essential Medicines, 2018-2020

2018: \$0

2019: \$600,000

2020: \$10 M requested; \$4 M budgeted*

*amount disbursed not yet confirmed

As mentioned above, a large proportion of NBCH services is provided by community health assistants through Liberia's IMNCI program. This program and most associated commodities are funded and managed by partners: including Last Mile Health, UNICEF, Partners in Health, the International Rescue Committee, and others. Some program commodities (e.g., for malaria treatment) move through the national system, but amoxicillin DT, ORS, and zinc are provided to CHAs by partner-managed parallel supply systems, thereby bypassing the national health supply chain.

Forecasting, supply planning and procurement

Quantifications for the NBCH commodities studied are limited. Quantification has not been carried out for amoxicillin DT for treatment of pneumonia in facilities served by the national supply chain. Demographic data from the latest survey (and not LMIS information) have been used to quantify other amoxicillin formulations since Liberia's LMIS data are reportedly limited and of inconsistent quality. ORS and zinc were separately quantified using demographic data. No quantification has been conducted for co-packaged ORS+zinc. Newborn resuscitation equipment has not been quantified formally by the Government of Liberia in recent years, if ever. Partners providing this equipment procure based on their program targets and available funding. (It is important to note that the Liberia Demographic and Health Survey [LDHS], used to conduct the quantification, was last conducted in 2013, and statistics from this document have reportedly changed in Liberia since then.)

Quantification for the CHA system is conducted nationally based on LDHS data. Partners responsible for implementing the CHA program in the various counties use the funding they have raised from donors to develop supply plans and procure NBCH commodities.

In March 2020, per the recommendations of this study, the National Quantification Committee quantified amoxicillin DT for treatment of children 0 to 5 years exhibiting signs of acute respiratory infection (ARI), at only 7 percent of the total cases reported in LHDS data. This same data set enabled quantification for ORS+zinc at 22 percent of the same target population (children up to 5 years old) to treat diarrhea cases. Following the quantification, the National Quantification Committee developed supply plans for each of the items. GHSC-PSM has initiated a procurement for the amoxicillin DT and the government is looking for support to procure the co-packaged ORS+zinc. In coming months the forecast will be reviewed closely to evaluate accuracy and adjust supply plans as needed.

Quantification for the CHA commodities has not been conducted since 2018 and also used the 2013 demographics data to set assumptions.

Inventory management

No specific warehouse and distribution challenges could be identified for the essential NBCH commodities studied as they are not currently distributed to facilities through the national supply chain. The assessment did identify several general warehousing and distribution challenges:

- **Bullet on commodity availability in central level.** Essential commodities are commonly stocked out at the Central Medical Store. In 2020, there has been no stock of Zinc sulphate in the central warehouse as of the end of March and ORS has been in short supply (less than one month of stock) between January and March. Data reveal that amoxicillin 250mg/5ml, 100ml powder for suspension had reliable stock levels for January-March. For many MNCH commodities, rationing is significant during order processing and quantities distributed can be substantially reduced with products only lasting one week for a quarterly distribution period.
- **Limitations to warehouse space.** Significant space in the CMS warehouse is occupied by expired or overstocked products, including metronidazole powder and personal protective equipment left over from the Ebola outbreak which was no longer needed. The CMS expects guidance from the SCMU on how to dispose of these items.
- **Challenges maintaining warehouse management data.** The CMS has not historically maintained reliable data records on what is in stock and issued to the facilities. CMS has recently started to transition from Excel spreadsheets to a software system to improve data reliability. While the transition poses its own challenges, data quality and availability improvements are anticipated in the long term.
- **Lack of clarity around order processing responsibilities.** Discussions with various supply chain partners revealed a lack of clarity around roles, specifically, who was responsible for rationalizing facility orders. The CMS reported that the SCMU should be rationalizing orders from facilities, including review of what is in stock to be distributed. The SCMU reported lacking sufficient data on stock available to carry out the rationalizing process and stated that this responsibility should lie with CMS. The rationalizing process is challenging and politically charged at times, but must be clearly designated to one unit to ensure clarity in data review and equity in allocation before final orders are confirmed with facilities.
- **Increased service-level stockouts possibly due to quarterly distribution.** The low frequency of distribution may also be a source of prolonged stockouts at facilities. If new stock arrives at the CMS soon after distribution has taken place, facilities will not receive new stock for another three months. A more regular distribution schedule would enable planning and quicker resolution when product availability falls too low to sufficiently fill orders.
- **Insufficient vehicle fleet for distribution, especially from the counties to facilities.** Road networks and conditions are poor in Liberia. The Global Fund contributes resources to assist with in-county distribution, but several reported that funding is limited and unpredictable. Large sections of the country are cut off from major routes for six months of the year due to weather. A limited vehicle fleet and limited central-level stock combined with insufficient planning and facility storage limitations make stocking facilities for this period a challenge.
- **CHA system challenges.** Partners procure and manage their own commodities and distribute to the county level, but they mentioned having a long-term vision of integrating management of these products into the national supply chain. Partners differed the timeline and feasibility of this transition. (Last Mile Health reported that this integration was unlikely to happen soon given the gaps in CMS capacity, whereas UNICEF reported that transition in responsibility for their five counties was imminent, and that the current distribution was delayed as the memorandum of understanding was being finalized.) Partners also reported that storage and distribution from the county level down was particularly challenging because of road conditions and facility storage limitations. Secure storage space becomes more limited as you approach the last mile. Additionally, when facilities experience a drop in the supply of essential

medicines, stocks from the CHA system are often used, thereby reducing the supply available to CHAs when administering care in the community.

Logistics and use

Liberia currently operates a pull-based supply chain system, where facilities order commodities based on consumption and need. Facilities submit their order forms with a consumption report generated from LMIS data. Interviewees at the MOH estimate current LMIS reporting rates between 40 and 60 percent. Low reporting rates lead to insufficient health commodity order requests. Increasing reporting rates will improve transparency and management of commodities but study products could also be added to the data system that currently includes program commodities. This gap will be partially addressed if study commodities are successfully added to the Reproductive Health Program; otherwise, products should be included on reporting forms to enhance the understanding of consumption and availability.

As mentioned above, commodities provided to CHAs through partner-funded programs are not consistently included in LMIS reports prepared by facilities. These commodities are captured differently than are those used in government health programs (e.g., for malaria or reproductive health) and reporting differs based on which partner manages the local CHAs. This inconsistency in how product data is managed makes the quality and completeness of LMIS data unreliable and complicates how the MOH and partners track where supply is available.

Data on newborn resuscitation equipment are not captured in the LMIS; therefore these data are not reported on or ordered through the national supply chain. Interviewees, including from the MOH, suggested that including newborn resuscitation equipment in the Reproductive Health Program would add them to address this.

Considerations to improve availability of essential NBCH commodities

Limited funding, insufficient and imprecise data, and inadequate prioritization are factors that negatively affect NBCH commodity availability. These challenges seem exacerbated in Liberia, which has extremely low procurement resources as well as unreliable reporting rates and data quality. Since 2016, the Government of Liberia has been strengthening and, in many instances, rebuilding the national supply chain after the Ebola crisis. Current national supply chain capacity is limited and cannot always ensure a reliable supply of NBCH commodities. The MOH uses LMIS data to determine demand and must coordinate across many funding bodies, including donors and the country's Ministry of Finance, to secure funding for procurement of these commodities. Different NBCH commodities attract varying levels of attention, priority, and funding, with the result that some of these products may not be in supply when and where they are needed.

GHSC-PSM met with Liberian Government stakeholders and partners following the rapid study to discuss potential solutions. The team developed these potential solutions to guide decision makers as they consider actions for improving NBCH commodity availability in the country.

Advocate for the integration of NBCH essential commodities into the Reproductive Health Program

Without dependable resources and data, the country cannot determine health commodity needs or ensure supply of commodities, and ultimately leaving the population's needs unmet. One potential solution—supported by many interviewees—is to integrate amoxicillin DT, newborn resuscitation equipment, and co-packaged ORS+zinc into the Reproductive Health Program to ensure that these products receive adequate attention, funding, and support. The MOH Family Health Division responded positively to this suggestion, stating that the additional funding thereby channeled toward these products would have the greatest impact on their availability in the country.

Prioritize essential commodities list

The government's oversized Essential Medicines list (more than 200 products) complicates the allocation of scarce resources and often creates an unwieldy management burden for all levels of the supply chain, but particularly, when allocating scarce resources for priority products. USAID, through GHSC-PSM, has continued to advocate for streamlining the EML and should continue these efforts to achieve a stabler, more effective supply chain. Amoxicillin DT, co-packaged ORS+zinc, and newborn resuscitation equipment should be included on the streamlined essential list.

Actively manage the introduction of the amoxicillin DT formulation into the national supply chain

USAID, through GHSC-PSM, currently procures amoxicillin DT, along with select other essential commodities. As the product arrives in country, a well-coordinated effort must be made to ensure that doctors prescribe it for their patients and counties order it from CMS for distribution. When chlorohexidine first arrived in country, some quantities went to waste in the absence of an education and advocacy campaign to clarify its availability and benefits. FHD and service delivery partners should issue guidance on proper prescribing practices for amoxicillin DT to treat pneumonia and advise on how the product can be ordered. FHD and SCMU should monitor central stock to ensure that the product is used. SCMU can monitor availability of amoxicillin DT at each level of the supply chain and

ensure the transition to the DT formulation for treatment of pneumonia is occurring as planned.

Continue to forecast for commodities and use quantification results to advocate for funding to procure these essential medicines

The GHSC-PSM field office in Liberia successfully advocated for including amoxicillin DT and co-packaged ORS+zinc in forecasting activity following this assessment. The resulting elevated profile of these commodities, their need, and proper management will yield focus on the health threats of pneumonia and diarrhea in Liberia and the importance of incorporating these products into procurement plans and budgets. GHSC-PSM should consider collaborating with UNFPA on its planned (Emergency Obstetrics and Neonatal Care) (EmONC) audit of newborn resuscitation equipment in country—findings will clarify the national picture for newborn resuscitation equipment and yield valuable data that can be used to advocate for elevated attention and funding to increase availability. As another approach to improving availability of newborn resuscitation equipment, the equipment and associated processing commodities could be added to the CMS system for management, which would encompass providing order forms, tracking availability, and encouraging commodity managers to order according to facility needs.

Discussion is underway on **integrating the CHA program into the national supply chain in the coming years**. Advancement of this discussion is uneven among the various partners, with no designated centralized body to coordinate the process. Ideally, the process would be more holistically planned and coordinated, leveraging organizational expertise and resources to achieve a comprehensive approach to this transition.

Use an alternative short-term emergency supply method to increase availability while strengthening the overall supply system

Given persistent stockouts and the immediate need to increase availability of NBCH commodities, the MOH may consider other temporary options. As a stopgap measure, it may be appropriate to “kit” a set of essential NBCH commodities and send kits to facilities, provided that a plan is in place to phase out the kit system as stockouts diminish. Though not aligned with supply chain best practices, kitting could ensure a baseline level of commodity availability and could help stimulate reporting and demand. A more thorough analysis, assessing which commodities to include and how kits may differ according to service level, would be required to feasibly and responsibly implement a temporary kit system. It should be emphasized that a kit system does not provide necessary accountability and transparency on commodity availability countrywide and may lead to some wastage as not all components of the kit are utilized at the same rate over time, and therefore is not appropriate as a permanent solution.

Increase investments to improve data availability and quality

LMIS data availability and quality are central to operating a pull-based supply chain system. Interviewees discussed continued and additional investments in data systems that could improve availability. Improvements to Liberia’s data collection systems and processes will likely be medium-to-long-term efforts.

- FHD suggested that an effective intervention for data quality and collection might be to train data officers at the county level. Currently, county data officers do support data collection, but ensuring they have the skills to analyze quality and work with facilities (even remotely) on appropriate follow-up in the case of observed potential errors or anomalies would facilitate order processing at the central level.

- Partners suggested that government and partners could identify creative ways to incentivize data collection and increased reporting rates. More follow-up from supervisors, recognition of well-performing sites through financial rewards or increased data/talk time for those facilities/counties may be worthwhile investments to this end.
- Many government staff indicated that the electronic LMIS has been helpful in increasing available data and the timeliness of reporting; it also facilitates analysis of data for quantification and other activities. Efforts to expand access to the electronic LMIS will be useful for continuing to advance data availability and quality and should continue.

Conclusions and next steps

The GHSC-PSM rapid assessment identified opportunities to expand access to NBCH commodities—specifically, amoxicillin DT, ORS+zinc, and newborn resuscitation equipment—in Liberia’s national health supply chain by increasing advocacy to elevate the profile of essential commodities as a part of an existing health program, establishing quantification processes for the study commodities, enhancing the electronic LMIS by including these essential commodities, and considering kits of essential products for facilities and CHAs during implementation of system strengthening activities.

Following this rapid study, the GHSC-PSM MNCH advisor and team in Liberia will continue coordinating with partners to discuss the findings and integrate partner and government resources to effect increased availability of amoxicillin DT, co-packaged ORS+zinc, and newborn resuscitation equipment to support improved newborn and child health outcomes in Liberia. Future rapid studies that home in on the supply of specific commodities can inform policy and practice at the country level, with significant lifesaving impact.