

Improving Availability of Medicines and Supplies at the Point of Care in Liberia

Transforming the medicines supply chain to community health workers with kit distribution system

By Lusubiro Mwamsamali

Photo: Andrew Snorton

KEY MESSAGES

- A supply chain that functions for community health workers must be people centered
- The design of the system is crucial to the success of a kit delivery system
- A kit delivery system can only function if it has an adequate commodity supply and trained human resources to manage it

Introduction

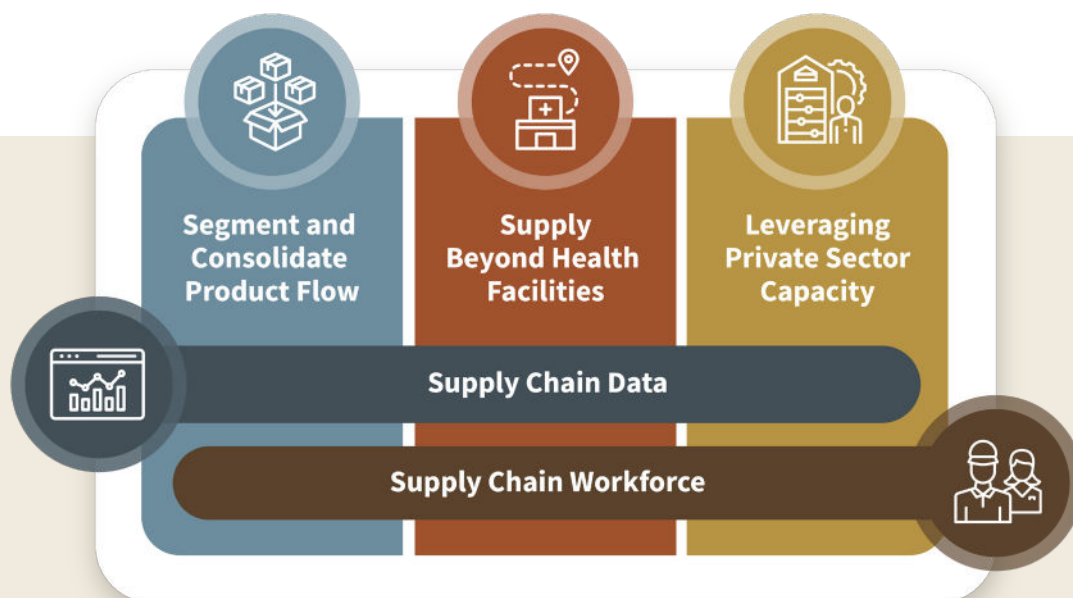
The Supply Chain for Community Health Workers program was launched by VillageReach in November 2021 in partnership with the Liberian Ministry of Health (MoH) with support from The Global Fund. The project implemented activities in two regions—Margibi and Bomi counties—to connect CHAs to the supply chain and ensure CHAs receive the supplies they request and need through timely delivery and resupply of commodity kits. This brief examines how the project interventions are augmenting information sharing at all levels in the supply chain, improving consistency in the availability of medicines and supplies needed at the point of care, and the lessons learned in implementing a kit delivery system for community health workers.

Liberia's community health workers are essential to the delivery of health care to the majority of its citizens, who live more than 5 kilometers away from a health facility. Liberia's Community Health Assistants (CHAs) serve as the



Photo: Paul Joseph Brown

primary point of care for most rural villagers. CHAs, however, face difficulties due to poor logistics management and information systems (LMIS), which do not adequately relay demand data about medicines and equipment. Moreover, the supply chain is inefficient, resulting in inconsistent deliveries and lifesaving drug shortages. Due to these types of systemic logistics challenges, we know that community health workers are stocked out of medicines $\frac{1}{3}$ of the time¹. We must change this pattern in order to ensure medicines get to the last mile and everyone has access to healthcare. By utilizing a people-centered, equity-based approach, VillageReach is enabling the development of responsive solutions in Liberia.



Step 1: People-centered design leads to meaningful innovation

Using innovation driven by end-user needs, VillageReach sought to create lasting change. In order to achieve that, we facilitated a workshop that engaged stakeholders at all levels of the medical distribution supply chain. Through the people-centered design process workshop in February 2022, we were able to gather information for the development of a commodity kit delivery system that will solve critical challenges in healthcare delivery. By employing a human-centered design approach, various stakeholders in the supply chain were given voice through a range of presentations describing how the supply chain functions and improvements they would like to see. In the design workshops, we aimed to:

- Design a commodity kit
- Develop a standard operating procedure for picking, packing, and delivery of kits

Designing a commodity kit made it possible to pinpoint systemic challenges, such as an understaffed and undersupplied Central Medical Store, as well as data issues that created bottlenecks in the supply chain. The participants were able to steer the Logistics Management and Information System (LIMS) toward an e-LIMS that would improve the approval and tracking of CHA requests.

By shifting the packing of the commodity kits for all CHAs to the CMS, the standard operating procedure ensured that kits would be responsive to requests, packed securely, and tracked efficiently.

¹ <https://human-resources-health.biomedcentral.com/counter/pdf/10.1186/s12960-022-00755-8.pdf>

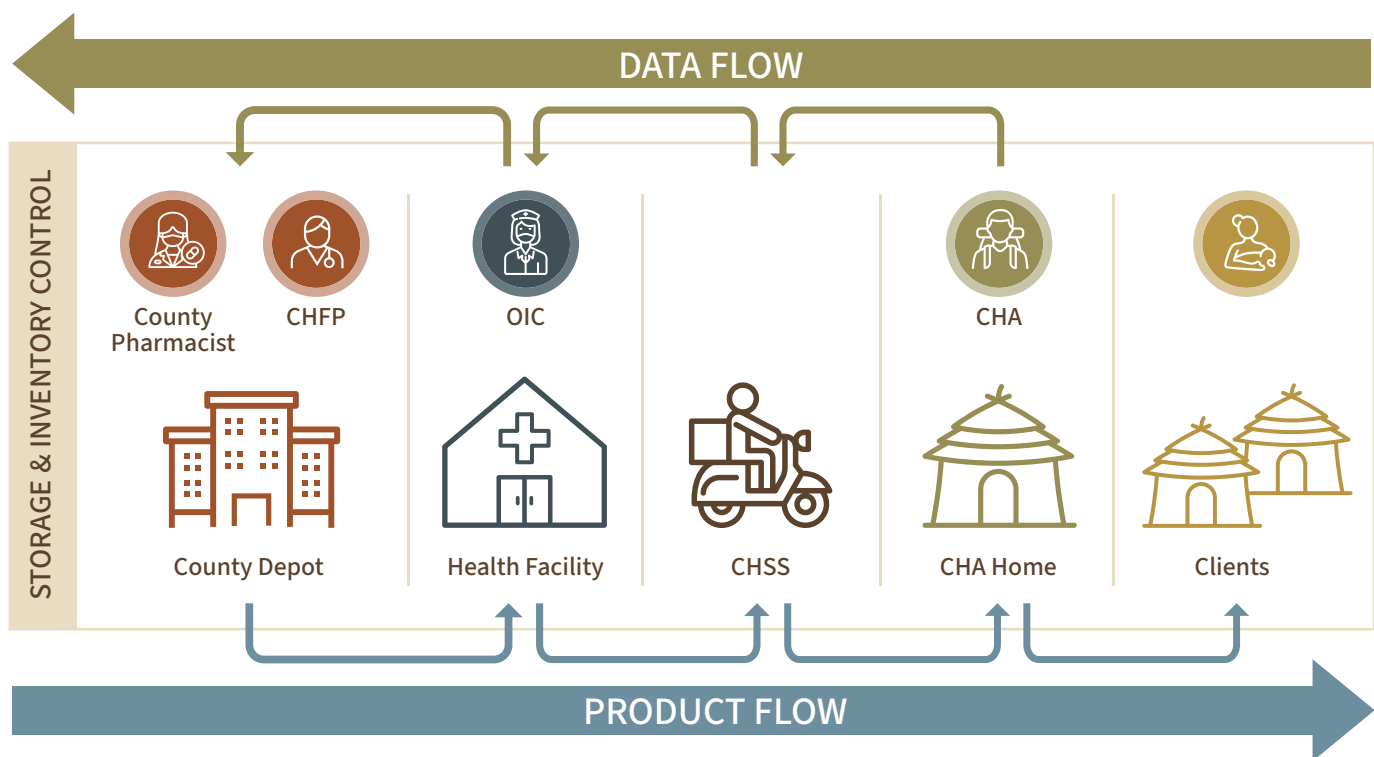
Step 2: The CHA commodity delivery system

The previous system took supplies that were delivered to the county level from the central medical store and then distributed the supplies to medical facilities, where the Community Health Services Supervisors (CHSS) together with the Officer in Charge determined how much should be allocated to the Community Health Assistant Program (CHAP). The CHSS in turn would resupply CHAs based on a top-up approach. With this system the CHAs were last to receive the supplies. Because of the top-up approach it was impossible to review the performance of key supply chain metrics such as lead time as distribution of supplies was tied to the supervisor's visit.

“The design of the kit system and continuous review of the processes is critical to its success.”

Lusubiro Mwamsamali,
VillageReach Country Lead

THE OLD SYSTEM:



Inadequate support and training on LMIS and inventory management led to myriad problems. Medicines were often not accounted for or not tracked properly making it difficult to ascertain whether the commodities made it to the CHAs.

Consumption data was also sent back to facilities where it was aggregated, which skewed the true medicine and supply needs for each CHA.

To address these challenges a kit delivery system was proposed to ensure the commodities allocated to the CHAs reach them.

WHAT IS A KIT?

A kit is a standardized and centrally prepackaged plus sealed list of approved items which is designed to supply/serve a specific number of people and is only opened at the final destination.

By its nature, a kit can only hold a small number of supplies. That makes the design of the system critical to success since each missing product or mispacked kit has an outsized negative effect on the CHAs ability to provide the primary health care services in their community.

Recognizing where commodities started getting misplaced informed a redesign of the system that eliminated pilfering. The new design used e-LIMS to inform the central medical store what to pack in each kit and where each kit was destined to go.

THE NEW SYSTEM:

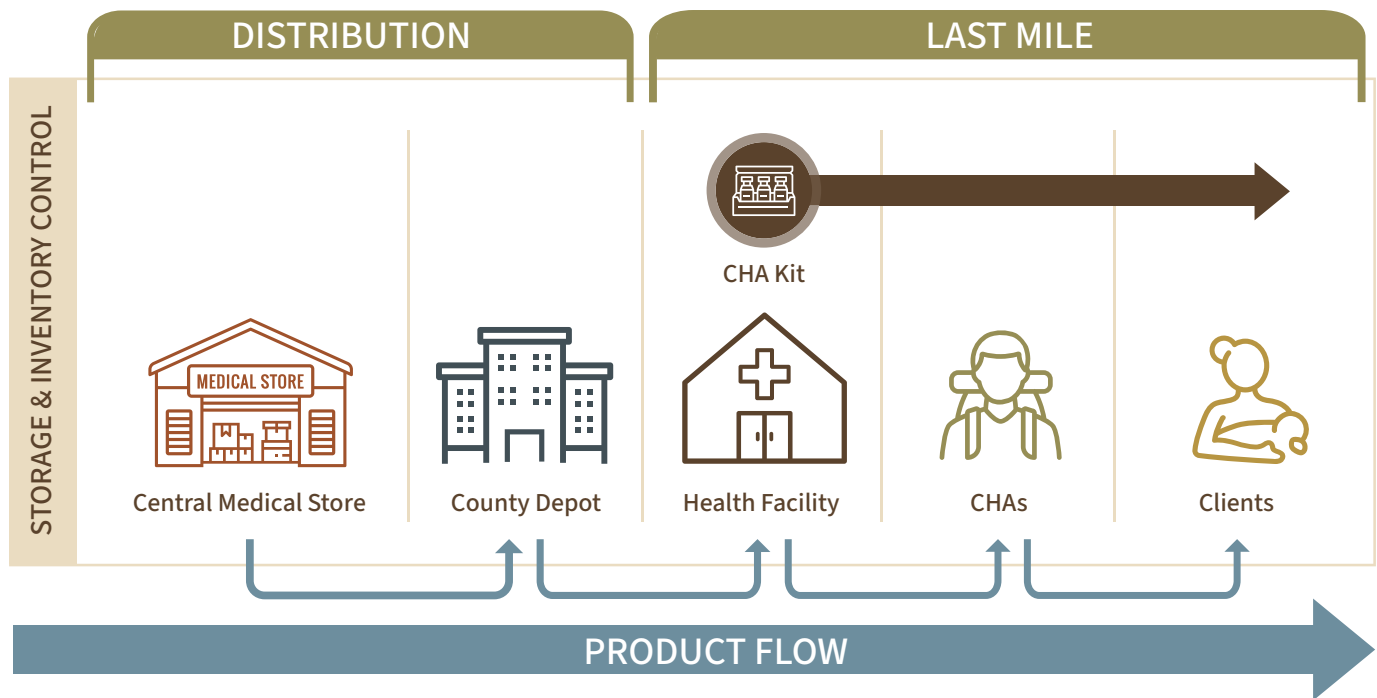


Photo 1: Packaging materials branded with MOH logos and NCH

Following the kit design workshop, the users prioritized branded packaging materials (see photo 1) to reduce pilferage and diversion when the kits are transported through the supply chain. The package included the following key unique features.

- Branded with the Ministry of Health(MOH) logos
- National Community Health Program(NCHP) imprint on the different
- MOH and NCHP Branded sealing tape

THE KIT PICKING, PACKING AND DISPATCH PROCESS.

This process followed the Liberia Central Medical Stores warehouse management and distribution standard operating procedures up to the county level and the kit job aid to aid CHSS distribution to CHAs from facilities to communities.

Two approaches to this process were piloted to determine the most cost-effective and responsive approach to the community health supply chain.

FIRST APPROACH: PICKING, PACKING AND DISPATCH AT CENTRAL MEDICAL STORES

In the maiden distribution exercise, all 400+ kits were packaged at the Central Medical Stores and were dispatched to county depots for onward distribution to CHSS and CHSS. This process took an average on 34 days.

SECOND APPROACH: PICKING, PACKING AND DISPATCH AT COUNTY DEPOT

In the subsequent distribution the CMS dispatched the CHA drugs per facility to the county depot. The county depot was responsible for packing and distribution to facilities. It took an average of 7 days to complete packing, verification and countywide distribution to CHAs.

The first approach was inefficient, requiring lengthy time to pick and pack kits at the CMS coupled with human resource and equipment constraints. The second approach reduced the lead time by over 80%, from over 34 days to just 7 days.

MINIMIZING DIVERSION

Each kit has unique CHA ID and waybill for easy follow up and reconciliation of consumption data and most importantly traceability of products in cases of product recalls.

The CHAs and County Health Team (CHT) found the kit packaging pleasing as they felt they are known at the national level and their commodity needs are honored further inspiring them to report on logistics data to inform future resupply.

Aaronic Kollie, a CHA in Yahlon town in Margibi said “Thanks to the kit, Its easy for me to now plan for my outreach activities as I have commodities in stock for a longer period, and it will help to reduce referrals since some villages are far from the clinic, most people refuse to go with their children when they are referred because there is no medicine at the clinic”.

The kit delivery system not only aimed to reduce pilferage and diversion but also increase stock availability by increasing by 1) reducing the lead time and number of distributions – from six times in a quarter to once 2) giving CHAs buffer stock just like any supply chain tier.

These new and critical systemic changes have paved the way for an efficient, transparent, and accountable CHA commodity delivery system and through these we have seen the following positive results.

- **Reduced number of distributions and easy estimation of distribution costs:** The kit delivery system has significantly slashed the lead time and the number of distributions from a staggering six to one distribution in a distribution cycle reducing the distribution costs by 70%. This not only translates into substantial time and cost savings but also equips CHAs with buffer stock since the quarterly allocation includes a one month of buffer stock. This system allows for a simplified and true estimation of both county and individual CHA commodity distribution costs since all CHAs in a county receive a kit and distribution visits are known unlike in the old system where only few CHAs received commodities from their supervisors on an adhoc basis.
- **Ability to measure key supply chain performance indicators for the last mile:** With the kit delivery system the downstream lead-time is two weeks, in the old system the lead time was unknown and varied per each individual county, CHSS and their CHAs. The set lead time and order fulfillment rate which are key supply chain performance indicator have prompted counties and CHSS to distribute within this expedited timeframe and institute inquiries upstream for missed facilities during dispatch at CMS. This shift in behavior has not only aided in meeting performance targets but also significantly strengthened the accessibility and availability of commodities to CHAs at the last mile.
- **Increased visibility into CHA supply chain:** Since the national and county teams have visibility into the stock supplied to each individual CHAs, it has helped to improve resupply efforts for emergencies as these are targeted exclusively at CHAs who were undersupplied or did not receive their supplies helping to mitigate stock outs. This system has introduced a newfound capability for monitoring expiry dates of supplies at the last mile and enables adaptive redistribution based on changing consumption data trends. This approach minimizes wastage, illustratively negligible amounts of anti-Malarial drugs expired in March 2023 due to the county visibility and prompt action to redistribute to CHAs with a higher catchment population or send to their facilities. This visibility into the distribution process and transparency will simply forecasting of CHAs future commodity needs.
- **Reduction in stock out rates and increased availability of life-saving commodities for a longer period:** In this system CHAs receive a five-month supply and the maiden delivery reduced stock out rates for commodities distributed in the kit by 90% and this helped to increase consistent access to diarrhea and Malaria treatments for all under five children in Bomi and Margibi counties for a six month period. CHAs in both counties applauded the system as it helped them to effectively plan for household visits and community sensitization meetings.

This new system was easy to tailor to the disparate needs of each county. It also helped reduce theft, and it provides an equitable distribution of medicines to each CHAs as the kits are packed based on their consumption data.

Step 3: Continuous improvement and learning from end users

Since its introduction, the kit delivery system has seen resounding success and an acceptable intervention for the CHA commodity deliveries. The county Pharmacist and CHT in Bomi said “ this is a great system and

“The extended duration empowers CHAs to plan household visits and community sensitization meetings with greater assurance.”

James Duwoe, CHA for Beejah community in Bomi

has increased stock availability and has helped to reinforce to both the county and CHA that government cares about this program” and in Margibi, Mr Joel Tweh, County Pharmacist said “ there involvement in the design, implementation and monitoring of the kit system made the supply chain team at the county feel responsible for all commodities in the county chain including the community health program, making it easy for them to fully support its success.” However just like any pilot its critical to measure, monitor and reassess whether the intervention is addressing the problems its meant to address.

“This innovative system has helped extend the availability of life saving commodities significantly. Most CHAs now enjoy a supply coverage lasting at least five months, this is a notable improvement from the previous reliance on bi-weekly resupplies.”

Yassah Jallah, CHSS for Firestone in Margibi County

New systems fail because they only focus on the end goal, as much as kits were distributed there was need to identify and strengthen the enabling factors to the success of the system.

Through routine monitoring and assessment, the following issues were identified that need to be routinely reviewed and monitored for a kitting system used in normal settings as a delivery system.

- **Shelf-life:** At the design stage the minimum shelf-life for all commodities packaged into the kit was 6 months however with a two months buffer stock included in each cycle, the recommendation was to increase the minimum shelf-life to 9 months to reduce expiries
- **Policy adjustments:** Some policies should be adjusted to reduce stock outs ie allow CHAs to dispense other formulations such as suspensions and solutions, as CHAs can only dispense oral tablets. presumptive treatment of Malaria in the absence of a test kit and testing clients for Malaria in the absence of antimalarials

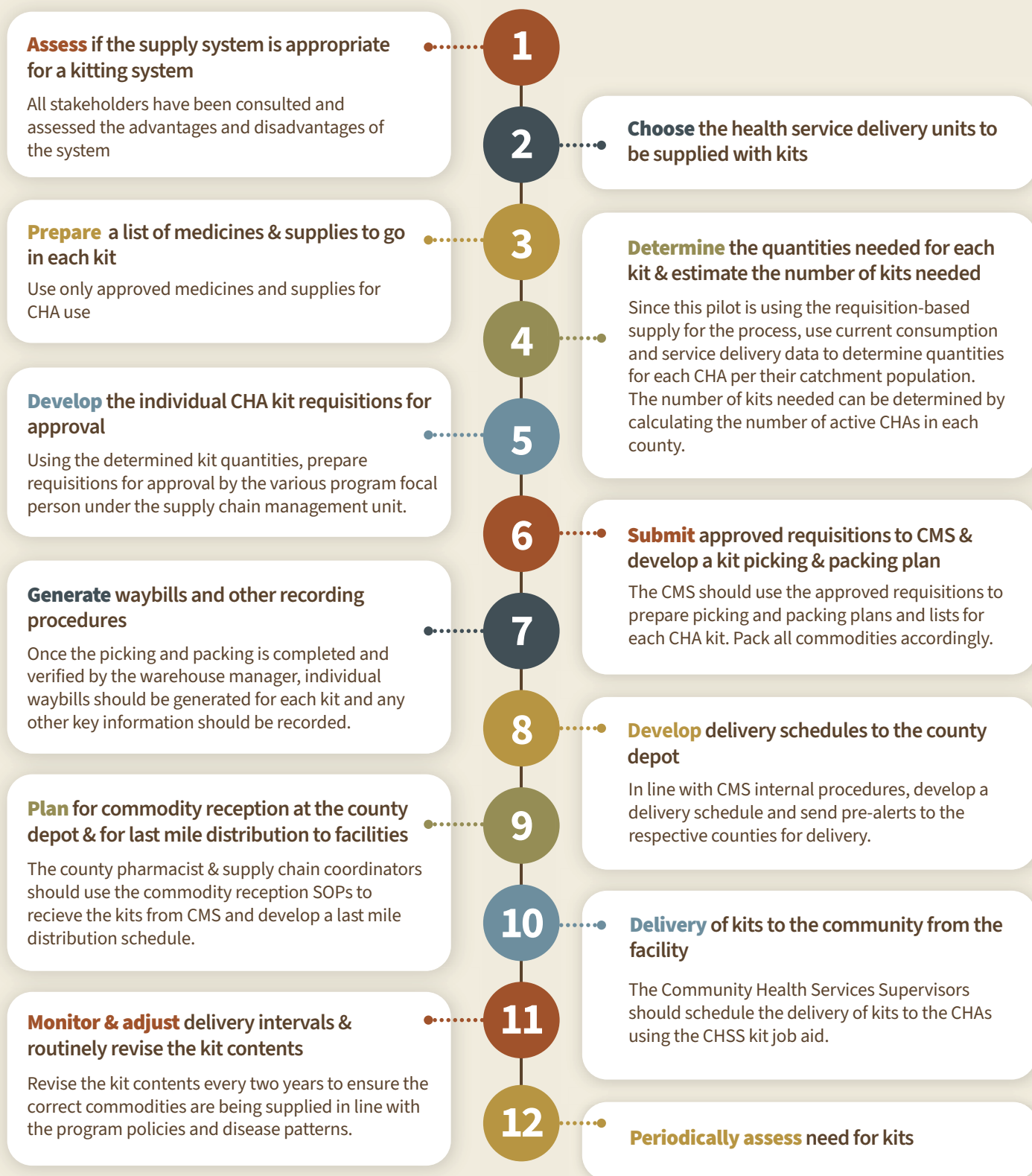
Though the shelf-life has been adjusted however the policy changes might take time.

Equipping the CHAs with sufficient supplies and clearer estimation of their consumption time helps them to confidently strategize for key and routine activities ensuring more effective and impactful community engagements.

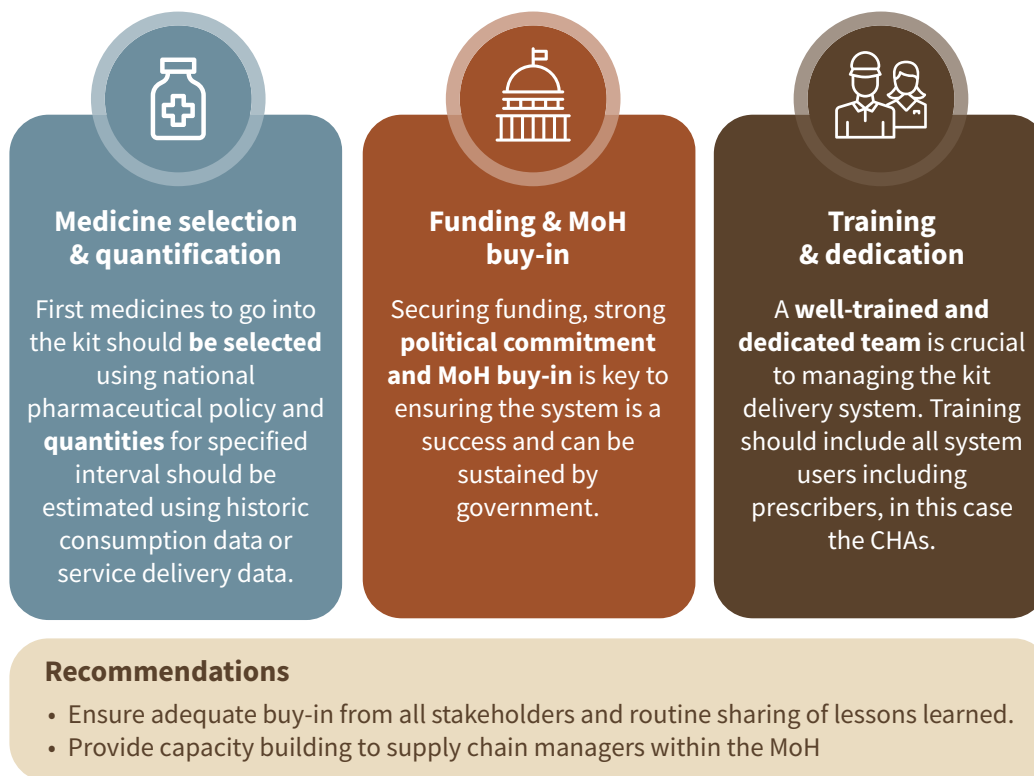
Implementing a CHW commodity kit delivery system

VillageReach developed a supportive model that governments can use to implement a kit delivery system. Successful implementation does require a tremendous investment in upfront work to engage with relevant stakeholders, to make sure commodities are available at the central medical store to meet demand, and to pivot strategy based on frequent monitoring and reassessment.

STEPS IN IMPLEMENTING A KIT DELIVERY SYSTEM IN LIBERIA



CONDITIONS TO BE MET BEFORE OPERATIONALIZING A KIT DELIVERY SYSTEM



Major lessons and recommendations deploying a kit system in Liberia.

CAPACITY REQUIREMENTS SHOULD BE IDENTIFIED AND KNOWN.

A functional kit delivery requires critical redesign of the following supply chain elements:

- **Storage and transport capacity:** Enhancements must first include setting up an efficient kitting process at the warehouse, which is highly dependent on availability of a dedicated and appropriately sized space. The space is important for planning, reviewing orders, processing, assembling and packaging materials, and consolidating orders. Currently, these activities take place in the staging area at the CMS, it's important to have a distinct area for the National Community Health Program(NCHP) as it significantly aids the warehouse staff in concentrating on CHA orders. This intervention mitigates the risk of packing the wrong commodities, and it streamlines the verification and dispatch process. Prompt dispatch is vital once order orders have been verified, however availability of transport is a challenge within the distribution process. This challenge contributes to elevated holding costs, since packaged kits need to be stored for extended periods in the warehouse, reducing the available space for other essential warehouse operations. To optimize efficiency, it is recommended to allocate a warehouse space of approximately 25 to 30 cubic meters specifically designated for the storage of commodities and the kitting process. This allocation would adequately accommodate the requirements of these operations while promoting overall supply chain efficiency.
- **Human resource capacity:** The intricacies of the picking, packing and dispatch process is resource intensive. It's essential that a cohesive team spanning from daily hires to warehouse supervisors is readily available to perform their unique responsibilities. Given that this process is conducted quarterly,

the existing labor resources do currently suffice for timely completion. However, a notable enhance would involve wrapping up this process a month ahead of the quarterly county picking and packing cycle. Presently, the utilization of labor remains at a low 0.3 FTE for most warehouse roles, highlights an opportunity for improvement. Strategically reallocating the workload over the course of the year would maximize the efficiency of the CMS and MoH workforce, and positively impact drug availability at the last mile.

PREDICTABLE COMMODITY PROCUREMENT AND RESUPPLY INTERVALS

A notable challenge exists in the unpredictable procurement of essential medicine, which hampers the strategic planning required for effective distribution. The recurrent commodity stock outs exacerbate the issue, casting a shadow on the efficacy of the kits themselves. The design of the kit packing materials and dimensions were tailored to accommodate a full array of the 16 approved CHA commodities, including personal protective equipment. The current trends see an average of only four to five commodities included in the kit. This huge discrepancy compromises the robustness of the kit and renders them vulnerable to getting damage, especially during the critical last leg (facility to CHA) of transportation. Predictable and reliable distribution cycles at the national level particularly at the CMS are the cornerstone of commodity availability at the community level since it forms the bedrock for supply chain safety and buffer stock, resupply intervals and LMIS reporting timelines. Adherence to this strategic framework will ensure that CHAs are adequately supplied ahead of the next resupply bolstering their capacity to effectively serve their communities.

REGULAR CONTINUOUS IMPROVEMENT REVIEWS AND PLANNING ON THE KIT DELIVERY SYSTEM WITH STAKEHOLDERS INCLUDING CHAS

To enhance the kit delivery system to the distinct requirements of the last mile (community) supply chain, it is imperative to engage in process evaluation and refinement in collaboration with key supply chain stakeholders throughout the chain. This approach is essential to building a resilient and optimal system that meets the continuously evolving supply chain landscape. A significant scope for innovation exists within the kitting process. It encompasses a broad array of innovative improvements to bolster the effectiveness and efficiency of the system, from weather-resilient packaging materials to end-to-end traceability of the kits.

LEVERAGE COMMUNITY HEALTH SUPPLY CHAIN SUPERVISORS EXPERTISE

Community Health Supply Chain Supervisors are entrusted with the pivotal responsibilities of delivering and resupplying CHAs. They possess the potential to significantly expedite the kit packing and verification process at the critical stages on the county level, which would lead to faster deliveries. Preliminary analysis indicates that this strategic shift could lead to a remarkable 75% reduction in order processing time, while concurrently augmenting the order fulfilment rate. This approach would also alleviate pressure from the already resource constrained CMS. However, the success of this transformative approach would require significant enhancements of the county storage depots with adequate equipment, space, and security.

When stakeholders and governments invest the time and resources necessary for people centered solutions engagement, they can improve the supply chain for community health workers to improve equitable access for all. This case study presented evidence from a successful kit delivery system in rural Liberia and demonstrated the value of using data to improve commodity distribution.