Supply Chain

Are Commodities Reaching Community Health Workers?
A Review of the Evidence

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CHWs can effectively deliver primary care interventions directly to communities. This includes dispensing medicines to treat these major diseases, and other health conditions.

If properly trained, equipped and scaled, CHWs have the potential to reduce deaths from pneumonia by 70% and malaria by 60%, through community case management. ORS estimated to prevent 70 to 90 per cent of deaths due to acute diarrhea.

Of the nearly **6 million children who die** before the age of 5, nearly 30% die from malaria, pneumonia, and diarrhea.

Even the best, well-intentioned community health worker needs to be able to **dispense medicines** in order to treat diseases, such as:

- ORS for diarrhea
- Amoxicillin for pneumonia
- Artemether-lumefantrine for malaria

**CHW need continuous access to medicines. Without these supplies, their impact on child mortality disappears.**
What do we actually know about stock-outs?

Objectives

A systematic literature review to determine the extent of community-level stock-out of essential and program commodities among Community Health Workers (CHWs) for Maternal and Child Health (MNCH) in Low- and Middle-Income Countries (LMICs), and to identify the underlying bottlenecks for such stock-outs.

Method...

4 electronic databases were searched for published and grey literature. 48 studies that contained information on the number or percentage of CHWs or Health Facilities (HFs) stocked-out, or reasons for stock-outs at these levels were included...

... More method

... in addition, interviews were conducted with domain experts to identify reasons for stock-outs.

+ 3 country deep-dives to assess impact of stockouts on treatment.

Limitations

- Few studies... data on the stock-out quantity and the underlying causes were poorly documented, and data were inadequate in many cases.
- Inconsistent reporting metrics
Definition about stockouts

“The complete absence of a required drug at a storage point or delivery point for at least one day”.
<table>
<thead>
<tr>
<th>Studies</th>
<th>Country</th>
<th>Geographical representation</th>
<th>Reported stock-out period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lufesi M. et al, 2007</td>
<td>Malawi</td>
<td>Lilongwe District</td>
<td>Days/year</td>
</tr>
<tr>
<td>Doherty T. et al., 2014</td>
<td>Ethiopia</td>
<td>239 woredas in 26 zones in 5 regions</td>
<td>Months/year</td>
</tr>
<tr>
<td>Gils T. et al., 2018</td>
<td>DRC</td>
<td>Kinshasa</td>
<td>Day of visit, days of SO</td>
</tr>
<tr>
<td>Smith S. et al., 2013</td>
<td>Madagascar</td>
<td>30 districts out of 114</td>
<td>Occurrences/year</td>
</tr>
<tr>
<td>Doherty T. et al., 2014</td>
<td>Ghana</td>
<td>3 Northern Regions and the Central Region</td>
<td>More than 1 week in past 3 months</td>
</tr>
<tr>
<td>Munos M. et al., 2016</td>
<td>Burkina Faso</td>
<td>North and Central North Rapid Scale Up districts</td>
<td>7 days or more</td>
</tr>
<tr>
<td>WHO, 2018</td>
<td>Niger</td>
<td>4 districts in 2 regions (Dosso and Tahuoa)</td>
<td>At least 7 days in the past month</td>
</tr>
<tr>
<td>Miller N.P. et al., 2014</td>
<td>Ethiopia</td>
<td>Jimma and West Hararghe Zones of Oromia Region.</td>
<td>Day of Visit</td>
</tr>
</tbody>
</table>
CHWs often turn away mothers and their ill children because of frequent and prolonged stockouts supplies

Findings from countries in sub-Saharan Africa: **48% of CHWs were stocked out across different health commodities**

This lack of supplies impacts the lives of children and undermines the trust of the community in the health system and in the CHWs.
### Backup – key statistical results

<table>
<thead>
<tr>
<th>Statistics</th>
<th>CHWs</th>
<th>HFs</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVERAGE (in Percentage)</td>
<td>48.09</td>
<td>54.76</td>
</tr>
<tr>
<td>Range (in Percentage)</td>
<td>4.00 - 91.70</td>
<td>5.00 - 100.00</td>
</tr>
<tr>
<td>STDEV</td>
<td>25.02</td>
<td>27.46</td>
</tr>
<tr>
<td>Median (in Percentage)</td>
<td>41</td>
<td>48</td>
</tr>
<tr>
<td>Variance</td>
<td>626.05</td>
<td>753.83</td>
</tr>
<tr>
<td>Sample size*</td>
<td>31 studies</td>
<td>23 studies</td>
</tr>
<tr>
<td>95% Confidence Interval</td>
<td>[39.28 - 56.90]</td>
<td>[43.54 - 65.98]</td>
</tr>
</tbody>
</table>

* Out of the total included, 26 studies had data on CHWs stock-out, 4 studies had both on CHWs and HFs stock-outs and 19 studies has data on HF stock-out rates. Some studies had multi-country information; therefore the number of data points and studies do not match.
Country case studies

Uganda

Malawi

Mozambique
Methodology

COUNTRIES WERE SELECTED FOR INCLUSION BASED ON:

**Opportunistic Sampling:** Countries where the task team and steering committee of this project had information that existing data systems collected data on CHW stock availability.

**Community Health Roadmap Participation:** Countries that highlight in the Roadmap that their national priority is to strengthen national health information systems for community level.

**POTENTIAL BIAS & LIMITATIONS**

Because countries with well-developed information systems were targeted, the sample is biased and might over-represent contexts with more-developed and better-managed SC systems.

**KEY QUESTIONS FOR CASE STUDIES**

- How is data on CHW stock management recorded & reported?
- What indicators are available to monitor product availability at the community level?
- What SC levels have visibility into CHW stock data?
- What gaps exist in data needed for appropriate supply chain management?
- Does the CHW data link with existing government reporting systems (i.e., HMIS, LMIS)?
VHTs record treatment in VHT/ICCM Register (Form 097)

VHT aggregates sums from Register into Quarterly VHT/ICCM Report (097b)

Health facility in-charge compiles aggregated Form 97b and enters into DHIS2

CHW DATA COLLECTION FORM: HMIS 097 (Relevant Sections)

**Stock Data**

<table>
<thead>
<tr>
<th>Name of Village</th>
<th>Drug Stock Out Status (Tick if out of stock for the specified period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village A</td>
<td>First Line Anti Malarial</td>
</tr>
</tbody>
</table>

**Treatment Data**

<table>
<thead>
<tr>
<th>Patient Name</th>
<th>Diarrhoea</th>
<th>Fast Breathing</th>
<th>Fever</th>
<th>Fever+Danger Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient A</td>
<td>ORS</td>
<td>ZINC</td>
<td>AMOXICILLIN</td>
<td>ACT</td>
</tr>
</tbody>
</table>

**FORM CAPTURES**

- Tick indicates whether/not a stockout occurred during QTR in village
- Tick records whether treatment given to each patient
- Number of children treated can be tallied

**FORM DOES NOT CAPTURE**

- Stock on hand
- Number of stock out days
- Quantities of product dispensed
- Treatment not given due to SO
- SO disaggregated by VHT (Data is reported by village)

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3 Source: Health Management Information System, Health Unit and Community Procedure Manual (October, 2014)

**Stockout Definition & Indicators**

### Definition of a Stockout

- **Product stocked out for >7 days in a month (21 days a quarter)**

### Products Stockout Data reported on

- 1st line malarial
- ORS
- Amoxicillin

*Form revised in 2019 to capture RDTs, Misoprostol, Depo-Provera & Oral pills*

### Potential Data Issues

- **VHTs lack supply chain recording tools** to use on ongoing basis
- **Recall Bias:** Without tracking tools, VHTs could have difficulty remembering number of days stocked out in previous quarter -- in order to report whether or not a stockout (lasting >7 days/mo.) occurred

### Stock Indicators Available in Reports

**Numerator:** Number of VHTs in defined area who had no stock-out of recommended medicine in a given period.

**Denominator:** Total number of VHTs in defined area in the same period or Total number of VHTs that submitted a report.
HSAs send stock on hand and quantity received via SMS to cStock
cStock calculates quantities & notifies HC staff, who communicate if stock is available for resupply
Reports on web-based dashboard for managers for availability, resupply, system challenges and monitoring overall district performance

CHW DATA COLLECTION FORM: SMS

“ORS 20/2”

CAPTURES
- Total SOH (day of report) (e.g. “20”)
- Quantity Received (during month) (e.g. “2”)

DOES NOT CAPTURE
- Consumption, which is automatically calculated (to minimize data collection).
- Number of days stock out lasted prior to report
- Whether treatment could not be given due to stock out

**Stockout Definition & Indicators**

**Definition of a stockout**
Percentage of the HSAs associated with product that have a stock-out of that product for the current month.

**Reporting Rates**
- % reporting: on-time, late, non-reporting
- HSA individual reporting profile

**Stock Status**
- % of HSAs stocked out by product
- HSA stock status (adequate, stock out, overstock) by product
- Number of stockout days

**Consumption Data**
- Average monthly consumption (for last 60 days)
- MOS (current period)
- Total actual consumption; total consumption adjusted for stock outs

**Resupply**
- Aggregated quantity required to ensure HC can resupply CHWs, by product

**Lead Times**
- Time between: 1) HSA sending SOH report & 2) Supervisor sending order-ready msg.
- Time between: HSA 1) receiving order-ready msg. & 2) sending product receipt msg.
- Average lead time by district/facility/HSA

**Order Fill Rates**

**Alert Summary**
- % of HSAs with EOs (emergency orders) that HCs cannot resupply
- % of HSAs resupplied but remain below EOP
- % HSAs registered but have not added products they manage
- % HSAs not reporting receipts

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**Stockout data reported on 19 products, including:**
- LA 1x6 & LA 2x6
- Paracetamol
- ORS and Zinc
- Cotrimoxazole

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*Source: Malawi MOH, User Manual for cStock, Ver 1.0, (Oct. 2012)*
APE Data Collection

APEs use upSCALE app to record 1) patient-level treatment data & 2) stock data.

upSCALE app sends data to CommCare platform that forwards to DHIS2 (SIS-MA).

Health facility supervisors monitor APE stock data on tablet app.

Gov’t health officials view APE dashboard in DHIS2 (SIS-MA).

**CHW DATA COLLECTION FORMS: Relevant upSCALE Modules**

**Stock Data**
- Enter beginning balance in ‘stock inventory’ form
- Enter quantities received from kit in ‘stock entry’ form
- Enter stock adjustments in ‘stock exit’ form

**Treatment Data**
- Record quantities of medicines given to each patient
  - App automatically deducts from stock balance

**CAPTURES**
- Beginning balance & ending balance
- Quantities received
- Stock adjustments (e.g. CHWs lending stock)
- Whether treatment could not be given due to stock out

**DOES NOT CAPTURE**
- Resupply calculations (CHWs receive standardized kits, packaged by Central Medical Stores) in a push system

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13 Source: [https://www.malariaconsortium.org/media-downloads/850/upSCALE:%20mHealth%20system%20strengthening%20for%20case%20management%20and%20disease%20surveillance](https://www.malariaconsortium.org/media-downloads/850/upSCALE:%20mHealth%20system%20strengthening%20for%20case%20management%20and%20disease%20surveillance)
Definition of a Stockout (SO) in DHIS2

Percentage of the APEs that have a stock balance of 0 in monthly inventory

**Stock Indicators Available in Reports**

In Supervisor’s Application

- % of APEs stocked out by product
- % of cases unable to be treated due to SO
- APE stock status (adequate, running low, stock out) by product (See Figure 1)

In DHIS2

- # of APEs stocked out by product
- # of patient seen who could not be appropriately treated due to stock-outs

**Stockout data reported on 27 products**, including:

- AL Tablets
- Paracetamol
- ORS and Zinc
- Amoxicillin
- RDTs
- Microlut

*Includes all products in paper-based system; three of these products not reported in DHIS2*

*Source: Communication from Malaria Consortium, December 2018*

Figure 1. Stock levels for an APE, as seen in supervisor app’s stock module
Country deep-dives support that stockouts occur on a regular basis and impact treatment

**Uganda:** many villages experience stockouts on a regular basis

**Malawi:** stockouts affect all levels of the supply chain across all product groups

**Mozambique:** stockouts were the root cause for non-treatment in Cabo Delgado in 2017
What are the bottlenecks driving CHW stockouts?

1. COMMUNITY LEVEL
   - TRANSPORTATION: Lack of transportation for resupply
   - HUMAN RESOURCES: Inadequate staff capacity or lack of standardized SCM training
   - SUPERVISION: Poor or irregular supervision
   - STORAGE: Lack of storage or poor stock management
   - PRODUCT LIST: No standard supply list or policies on products CHW can dispense

2. RESUPPLY POINT
   - RESUPPLY ISSUES: Lack of resupply procedures or stockout at resupply point
   - HUMAN RESOURCES: Inadequate staff capacity or lack of standardized training
   - SUPERVISION: Lack of guidelines for providing supervision

3. HIGHER LEVELS
   - FINANCING: Lack of financing for supplies or lack of financing for CHW program activities
   - QUANTIFICATION: National quantification does not include CHW data & needs (or poor forecasting occurs)
   - DISTRIBUTION: Weak distribution system in national supply chain

4. CROSS-CUTTING ISSUES
   - LACK OF INTEGRATION: CHWs & their supplies are not integrated into the national supply chain system
   - DATA SYSTEM: Lack of reporting procedures & recording tools. Information system doesn’t capture CHW logistics data. No data visibility into product availability at the community level.
   - PRIORITY OF CHW: Low priority of CHW program or stock. MOH policies don’t officially recognize CHWs.
   - COORDINATION ISSUES: Poor coordination/communication across SC levels or among donors/programs
Backup – cited reasons for stock-outs

Frequency of Reasons for Stock-outs

- Financial Issue
- Transportation
- Data Related Issues
- Human Resource Issues
- Stock Management & Storage
- Poor Forecasting
- Issues at Resupply Point
- Supervision
- Priority/Recognition of CHWs
- Coordination
- High Consumption
- Distribution
CONCLUSIONS

- Although limited data is available there is evidence that stock-outs occur across a wide spectrum of commodities on a regular basis and impact treatment.

- There are many underlying reasons for stockouts and interventions to address these need to be tailored to the local context and its challenges.

- There is a strong case to strengthen supply chain management and to improve end-to-end visibility of stocks to proactively use stock information for management.

- There is a true know-do gap. I.e. there is plenty of guidance on this topic (from forecasting, to distribution, to storing,...) but we need to learn more about what causes the implementation issues.
Ensure policies clarify the products CHWs are able to dispense and define CHW roles, tasks and relationship to the SC system.

Ensure that commodities for community level are part of the annual budget forecast.

Support resource mobilization for non-malarial products, such as amoxicillin, ORS, and zinc.

Implement supervisory mechanisms that include District and Health Center participants.

Ensure data systems are in place and used to inform stakeholders about availability and supply of commodities at all levels of the SC.

Provide training on data collection and reporting, resupply procedures and SCM.

Promote the optimization and integration of CHW into national health SCs.

Ensure national guidelines for CHWs include section on SCM, and clarify expectations for delivering, stocking and reporting on commodities.


