Improving the Supply Chains for Medicines and Health Products

Prashant Yadav
William Davidson Institute,
Ross School of Business,
School of Public Health
University of Michigan
Ann Arbor, MI, USA

Impact Evidence and Action to Save Lives in Nigeria
May 7-10, 2013
Uyo, Nigeria
Ineffective or poorly functioning supply chains are the rate limiting step in many health programs, especially in the Africa region.

Facility level stock-outs and poor availability of medicines are amongst the most common reasons for underperformance in health programs.

Careful design can help create better supply chains and improve health outcomes with relatively small investments.

Multi-channel supply chain strategies are the cornerstone of successful supply chains.

Our understanding of this area is weak and needs to reinforced with strong evaluations of what works and when.
Common supply chain bottlenecks

• Typically, multiple factors lead to poor availability of medicines and health products in public health facilities
  – Archaic procurement structures
  – Lack of incentives and information flows in the government run distribution system
  – Poor design of the overall system

• Each country may have a different lead factor.
Commonly observed supply chain bottlenecks

Typical structure. May not hold for all countries and programs

- Suppliers
- Ministry of Health
- State/Provincial Structures
- Distribution
- Clinics

Uncertainties in timing of funds disbursement from MoF or external source

Delays in procurement due to archaic procurement processes, fragmented procurement, and poor quantification and planning

- Complex political economy
- State monopoly on distribution
- Poor information flows
- Poor supply chain design
Improving the Distribution System for Essential Medicines
Results from a Quasi Randomized Pilot in Zambia

Monique Vledder, Jed Friedman, Mirja Sjoblom and Prashant Yadav.

With significant contributions from Tom Brown, Bonface Fundafunda, Chipopa
Current structure of medicines distribution in Zambia

81% of Health Centers experience regular and prolonged stock outs of essential drugs
[2006 Public Expenditure Tracking Survey]
Stock-outs at the district and health facility levels

- ACT adult (malaria treatment): 11% (district) vs. 38% (health facilities)
- ACT pediatric (malaria treatment): 11% (district) vs. 40% (health facilities)
- Amoxicillin (antibiotics): 17% (district) vs. 33% (health facilities)
- CTX (antibiotics): 17% (district) vs. 42% (health facilities)
- DepoProvera (contraceptive): 28% (district) vs. 36% (health facilities)
- SP (malaria prevention): 17% (district) vs. 55% (health facilities)
Relevant attributes of each health facility/clinic

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Working</th>
<th>Not working</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar panel</td>
<td>38</td>
<td>16</td>
</tr>
<tr>
<td>Generator set</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Land phone</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>1- or 2-way radio</td>
<td>44</td>
<td>20</td>
</tr>
<tr>
<td>Ambulance</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>4-wheel drive</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Bi/tricycle</td>
<td>54</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Health Facility Survey by GRZ-MOH and JICA
Option A: Current system with additional role of commodity planner at districts

Each district is provided with an additional resource called commodity planner with some level of training in drug ordering, stocking, inventory management etc.
Option B: District stores as cross-docks with no lay away inventory

Districts collate order requests from health centers and send them directly to MSL.

MSL sends stock for each health center (in clinic level packs) to the district.
A rigorous pilot to compare the options for improvement

Total of 24 districts selected:
- 8 districts for Option A
- 8 districts for Option B
- 8 control districts

A total of 416 primary health centers and 23 hospitals included in the study

Source: Friedman, Vledder, Sjoblom and Yadav 2011
District Selection: Visualization

Source: Friedman, Vledder, Sjoblom and Yadav 2011
Pre-post analysis: Option A

- ACT Pediatric (malaria treatment)
- ACT Adult* (malaria treatment)
- Amoxicillin (Antibiotics)
- CTX* (Antibiotics)
- DepoProvera* (Contraceptive)
- SP (malaria prevention)

Probability of stock-out at HC:

Source: Friedman, Vledder, Sjoblom and Yadav 2011
Pre-post analysis: Option B

Probability of stock-out at HC

Source: Friedman, Vledder, Sjoblom and Yadav 2011
Option B vs Control

Probability of stock-out at HC

Source: Friedman, Vledder, Sjoblom and Yadav 2011
Number of days of stock-out
If Model B were to be scaled up nationwide:

- Reduction of 312,014 uncured cases of malaria and 8,433 severe cases of malaria per year
- 16,600 U5 deaths and 2,200 adult deaths due to malaria could be averted by 2015
- Child and adult mortality due to malaria could be reduced by 21% and 25% respectively
- These gains focus only on increased availability of malaria drugs however widespread gains likely from increased availability of other essential drugs

Model B reduces one day of stock-out of one tracer drug at a cost of US$4.2

Model B over 5 year period: 770,615 years of life lost averted

Cost of $22 per YLL averted for a national scale-up of Version B over a 5 year period
Key take-aways

• Stock-outs of essential drugs at the health facility level remain a key bottleneck to health service delivery

• **Redesigning the supply chain network**: supply chain design decoupled from administrative structures (e.g. fewer tiers in the supply chain) can help improve the effectiveness of the supply chain

• **Systematic collection of stock availability and consumption data** from the health facilities can be a critical first step in supply chain improvement

• **Performance management framework** and incentives for health system staff at each level to improve availability of essential medicines

• Leveraging the private sector for supply chain services e.g., transport and warehousing. Multi-channel strategies
Improving Access to ACTs and RDTs in the private sector: Results from a Quasi Randomized Experiment in Zambia

Jed Friedman
Bonface Fundafunda
John Makumba
Mirja Sjoblom
Elizabeth Streat
Monique Vledder
Prashant Yadav*

*Presenting on behalf of the authors
Access to ACTs and RDTs before the start of the pilot

- Increasing coverage of prevention activities, but low rates of diagnosis and ACT treatment (based on MIS)
- Many fever cases seek treatment in private and informal outlets (LCMS)
- Low availability of ACTs in private sector (and virtually none in private drug stores) (ACT Watch)
  - ACTs are classified as prescription-only medications in Zambia thus only legally accessible in registered pharmacies
  - Pharmaceuticals Act does not allow for second-tier pharmacies, which means that registered pharmacy services are inexistent in rural areas
- Diagnostics increasingly available in public sector but widely unavailable in private, particularly drug stores (ACT Watch)
Private Sector Access Improvement Pilot

ACT and RDT subsidy
- ACTs and RDTs procured from the manufacturer at the public sector price
- Then sold at a subsidized price to existing pharmaceutical wholesalers
- Products delivered through normal distribution channels to accredited drug outlets in pilot districts

Accreditation program based on Tanzania ADDO model
- Training curriculum (dispensing practices, ethical issues, inventory control, supply chain management and an entrepreneurship module)
- Minimum enforceable infrastructure, personnel, records, and product standards
- Increased oversight from the Pharmaceutical Regulatory Authority (PRA)

Community Sensitization and Training
- Measures to increase community awareness, including: public awareness campaigns (radio), drama shows, signs on the shops (“health shop” logo), health messages on packages of ACTs, banners, posters etc.