The Role of System Design for Improved Immunization Supply Chains (iSC):

INSIGHTS FROM MOZAMBIQUE

VillageReach® Starting at the Last Mile

What is System Design?

System design is a process which creates the plan, or blueprint, for how a supply chain should run and how all of the components of the supply chain system fit together and interact. Rather than narrowly focus on individual aspects of the supply chain independent from one another, (i.e. cold chain equipment), system design represents a more comprehensive approach that considers the complete supply chain system—from distribution and inventory policies to information systems, human resources AND equipment. System design uses tools like supply chain modeling and logistics management information systems (LMIS) to support data-driven decisions and continually improve performance. Coordinated improvement across supply chain components is critical to protect investments and impact. System design is an essential step towards a "next-generation" iSC that is more agile, efficient and effective.

SYSTEM DESIGN...

- ✔ Provides a comprehensive assessment of the supply chain
- ✔ Uses data-driven technologies and tools to identify potential efficiencies that lead to decreased costs and improved performance
- ✔ Provides a system-wide implementation plan based on individual country needs and resources
- ✔ Offers a strategy for continual improvement processes

Everything is Connected

When one component of the supply chain is not working optimally, it impacts the entire system, putting iSC investments at risk. For example, a country may have state-of-the-art cold chain equipment, but if the delivery vehicle isn't operational due to delays in funding, fuel, human resources or other reasons, the refrigerators at the facility will still be empty.

Mozambique: The Dedicated Logistics System (DLS)

Mozambique offers a concrete example of system design and the significant impact it can have on immunization supply chain performance. Working closely with national and provincial ministry of health officials, VillageReach initiated a system redesign process with a supply chain assessment to identify the most critical gaps in the system—lack of information availability, data utilization, human resources and logistics processes. The assessment led to a new system design called the Dedicated Logistics System (DLS). Utilizing modern supply chain best practices, the DLS introduced transport loops, level jumping, direct data collection and utilization, and dedicated logisticians to optimize the supply chain, while allowing for flexibility so provinces could adjust to fit their individual needs. The result is a more agile, effective and efficient supply chain design better able to respond to the constantly changing and expanding demands of the immunization program.

BEYOND MOZAMBIQUE

The outputs of system design may differ from country to country, depending on a country's unique needs and resources. For example, Benin, Senegal and Nigeria have all engaged in system design efforts, each with a slightly different approach, but leading to the same outcomes:

- ↗ **higher vaccine availability**
- ↗ **increased supply chain efficiency**
- ↗ **improved vaccine potency**

The Results of System Design

The DLS: A next-generation supply chain model

The dedicated logistics system (DLS) represents a fundamental change from the original EPI immunization supply chain design toward a next-generation iSC. Next-generation iSCs are not necessarily one specific supply chain design, but they share common characteristics such as streamlined distribution, complete data visibility, specialized human resources, ongoing monitoring and maintenance of the cold chain, and performance evaluation for continual improvement.

In Mozambique, the results of the five year DLS pilot in a single province showed significant increases in fully vaccinated children, reduced stockouts, improved cold chain uptime and other efficiencies, all at a reduction in government operating costs.

"The DLS has made a direct impact where implemented, resulting in an increase in immunization coverage and greater efficiency of the vaccine supply chain."

- Dr. Francisco Mbofana
National Director of Public Health

This initial evidence encouraged the Ministry to support further expansion, and the DLS is now implemented in half of the country. Results from ongoing monitoring and evaluation reveal sustained improvement across all provinces. The Ministry of Health is now engaged in national-level system design, applying many of the lessons learned from the initial provinces.

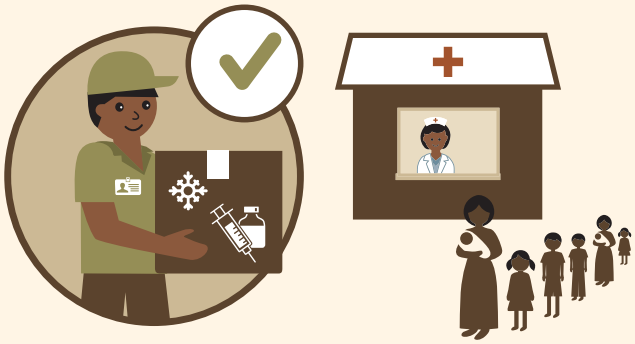
How Does System Design Improve Supply Chains?

EVIDENCE FROM MOZAMBIQUE

BEFORE SYSTEM DESIGN
(Previous iSC)

- **Health workers responsible for logistics—cold chain maintenance, inventory, picking up vaccines & supplies AND…patient care**
- Supply chain operations (funding, fuel, transport) are dispersed across multiple levels = unreliable, ad-hoc delivery to facilities
- Data not available in a timely manner for review and not linked to actionable steps for improving performance

AFTER SYSTEM DESIGN
(Next-Generation iSC)



- ✓ **Free from logistics responsibilities, health workers have more time for patient care. Dedicated teams focus on logistics, including supportive supervision, data collection.**
- ✓ Supply chain operations are consolidated to adequately manage resources = reliable, routine delivery to facilities
- ✓ Automated reporting process via OpenLMIS allows for regular data review and process changes to drive performance improvement

BEFORE SYSTEM DESIGN (Previous iSC)		AFTER SYSTEM DESIGN (Next-Generation iSC)
Logistics Tasks Diffused to **134** workers	**Personnel**[1]	Logistics Tasks Consolidated to **6** workers
348	**Staff Days/Month Spent on Logistics**[1]	**138**
36%	**Stockouts**[2]	**5%**
1 month	**Data Visibility**[3]	**1 week**
$1.50	**Cost per Dose Delivered**[1]	**$1.18** (21% less expensive)
DTP-3 Coverage Rate: **70%**	**Result**[1]	DTP-3 Coverage Rate: **95.4%**

SOURCES:

1. *VillageReach. 2009. Comparison of costs incurred in Dedicated and Diffused Vaccine Logistics Systems: Cost-effectiveness of vaccine logistics in Cabo Delgado and Niassa provinces, Mozambique.*
2. *Mozambique Dedicated Logistics System (DLS). July 2016. Monthly Logistics Data, as reported in Sistema Electrónica de Logística de Vacinas (SELV, the OpenLMIS for Vaccines Platform in Mozambique).*
3. *Mozambique Dedicated Logistics System (DLS). 2014. Monthly Logistics Data, as reported in Sistema Electrónica de Logística de Vacinas (SELV, the OpenLMIS for Vaccines Platform in Mozambique).*

For more information visit **villagereach.org/iSC**

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