Supply Chain Approaches at the Last Mile

Technology, People, Products, Processes

Luciana Maxim


Emerging Trends in Supply Chain Management (USAID)

Washington DC
June 2024
Today’s session:

- What do we mean by the ‘last mile’?
  - And why are we focusing on it?

- Cross-cutting system strengthening
  - Supply chain integration, innovation & optimization
  - Library of online resources + Key themes emerging:
    - Equity, responsiveness, resilience, professionalization, data visibility & use, sustainability

- Beyond the health facility: Strengthening community-level supply chains
  - A new framework: Community Insights to Action (CITA)
  - Supply chains for community health workers (SC4CHWs)
  - Effective coalitions: Community Health Impact Coalition (CHIC) & CAF-Africa

- Leveraging the private sector
  - Outsourced transportation, Pharmaceutical manufacturers & distributors, Digital solutions

- Cross-over lessons: Diagnostics laboratory systems & health supply chains
  - Reverse logistics & innovations for the last mile: 15-country Lab Sample Transport program
What do we mean by last-mile delivery?

And why are we focusing on it?
Health supply chains: Reaching the last mile

- **Central medical store**
  - 500 miles
  - 10 days by road

- **District/regional warehouse**
  - 60 miles
  - 3 hours by road

- **Health facility**
  - 70 miles
  - 3 hours by boat
  - 3 hours by moto

- **Last mile communities**
  - 60 miles
  - 4 hours by moto

- **Middle Mile**
Our Vision
A world where each person has the health care needed to thrive.

Our Mission
To transform health care delivery to reach everyone.

Transformative Solutions to Reach Everyone

- **Service Delivery**: Extending services beyond health facilities through digital technology and outreach services.
- **Health Workforce**: Strengthening the health workforce by supporting a well-trained, paid and professionalized workforce.
- **Health Information Systems**: Designing and integrating data systems to help governments and health workers reach more people.
- **Access to Medicines & Vaccines**: Getting products to people when and where they are needed in ways that are convenient and accessible.

Drive Sustained Impact
Collaborating with governments, private sector, stakeholders and communities to develop frameworks, strategies and innovative finance mechanisms that strengthen health systems.

2030 Goal
To **reduce inequities** in access to quality primary health care among the most under-reached communities.

Responsive Primary Health Care
- **AVAILABLE** when it is needed, even for the hardest-to-reach communities;
- **ADAPTS** to changes in demand and better absorbs shocks and stresses; and
- Routinely factors and **RESPONDS** to the needs and preferences of under-reached communities.

VillageReach: People-Centered and Data-Driven Solutions

Monitoring, Evaluation and Learning – Supply Chain, Pharmaceutical Management & Diagnostics Laboratory Systems

https://www.villagereach.org/what-we-do/resources/
Our Supply Chain Expertise & Experience

**Supply Chain Integrators***

- Supply Chain for CHW*
- Drones for Health*
- NGCA+ Direct Delivery
- Outsourcing w/ Integration*
- Lab Sample Transport
- CCE Preventive Maintenance
- Supply Chain Redesign
- STEP 2.0 Curriculum Design & Deployment
- Pharmacy Assistant Program
- National Logistics Working Group
- NGCA+ Supportive Supervision
- 9-Month Vaccine Dropout Study

**Our supply chain expertise & experience across geographies**

- Test and implement forecasting and supply planning approaches for agile and responsive supply chains
- Design and deploy innovations to optimize supply chain ability to optimally distribute and store commodities
- Strengthen supply chain processes and practices at all levels to enhance human resource and system ability to adapt and respond to evolving needs

**SUPPLY PLANNING**

- Engage with governments and global leaders to advocate for

**DISTRIBUTION + STORAGE**

- Implement systems, tools, and processes which provide end to end visibility and empower actors to act for supply chain management
- Deploy innovations and practices which reduce waste and build climate resilience

**POLICY & GOVERNANCE**

- Implement systems, tools, and processes which provide end to end visibility and empower actors to act for supply chain management
- Deploy innovations and practices which reduce waste and build climate resilience

**DATA, VISIBILITY & USE**

- eLMIS & CHW supply chain tools design and implementation*
- Tools (PCMT) & processes for product data management & standards

**WASTE MANAGEMENT**

- Waste Management Best Practices
- Build Climate Resilience

**SUPPLY PLANNING**

- We take a holistic approach to building responsive, integrated supply chains

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- Immunization Collaborative Supply Planning Strengthening (ICSPS)
- Zero Dose Mapping*
- Private Distributors*
- Gavi 6.0 strategy*
- Supply Chain Investment Coordination & Advocacy (SCICA)*
- Immunization Supply Chain Steering Committee (ISC2)
- eLMIS & CHW supply chain tools design and implementation*
- Tools (PCMT) & processes for product data management & standards
- Data Review Capacity Building
- Data Triangulation & Zero Dose Mapping

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**Bill & Melinda Gates Foundation**
System Strengthening Resources (1)

Governance & Strategic Planning

- **Tool | 2023**
  - Strengthening Public Health Supply Chains: An Integration Framework
  - English
  - French
  - Portuguese

- **Presentation | 2023**
  - SCICA Overview
  - View Resource

- **Report | 2022**
  - The Republic of Liberia Supply Chain Master Plan 2023 – 2028
  - English
  - Portuguese

- **Fact Sheet | 2020**
  - The Path to an Integrated Public Health Supply Chain in Mozambique
  - English
  - Portuguese

Workforce Development & Institutional Capacity Building

- **Presentation | 2023**
  - Getting Started with Supply Chain Professionalization Video Presentation
  - View Resource

- **Tool | 2024**
  - Health Supply Chain Professional Career Pathways
  - View Resource

- **Report | 2023**
  - Human resources & community health systems Application of the P4H supply chain management theory of change in Liberia
  - View Resource

Financing

- **Research | 2021**
  - Optimized Supply Chain Model Reduces Health System Costs in DRC
  - View Resource

- **Fact Sheet | 2020**
  - Rapid Modeling for improved Reproductive Health Supply Chains

Enabling Environment

- **Research | 2021**
  - Getting Products to People: Recommendations for Funders and Governments
  - View Resource

- **Fact Sheet | 2020**
  - Promoting Equitable Health Product Access through Supply Chain Design
  - View Resource

- **Research | 2018**
  - Leading from all levels: supply chain leadership capacity in Equateur, DRC
  - View Resource

https://www.villageraach.org/what-we-do/resources/

https://www.villageraach.org/our-impact/newsroom/
System Strengthening Resources (2)

Information Systems

Big Picture Vision for eLMIS

*eLMIS* in place in countries as part of an integrated, interoperable HIS ecosystem providing the data visibility required to enable effective, responsive supply chain performance management and ensure reliable availability of commodities when and where needed.

Risk Management

Health Supply Chain Resilience Framework

Cyclone Freddy response

Case Study: Demand Generation at COVID-19 Vaccination Sites in CI and DRC

Climate change to worsen malaria, cholera situation in Africa: Experts

Ebola Outbreak Response in the Democratic Republic of Congo

https://www.villagereach.org/what-we-do/resources/

https://www.villagereach.org/four-impact/newsroom/

Supply Chain Management Resources

**Forecasting & Supply Planning**
- **FACT SHEET | 2024** Immunization Collaborative Supply Planning Strengthening Project
  - View Resource
- **REPORT | 2023** Improving forecasting and vaccine access with private health providers for urban poor communities
  - View Resource
- **TOOL | 2019** PPE Quantification and Forecasting Tool Process
  - View Resource

**Inventory Management**
- **RESEARCH | 2013** Vaccine wastage in Ghana, Mozambique, and Pakistan: An assessment of wastage rates for four vaccines
  - View Resource

**Data Analytics & Performance Management**
- **Data Visibility & Use**
  - Where the address the technical, behavioral and organizational aspects of data visibility and use to drive data-informed supply chain decision-making
  - View Resource
  - Data Systems
    - Addressing challenges to enhance data visibility and implementation of an MIS
    - Improving processes for vaccine quantification and forecasting
    - Product tracking management tool
    - Data collection and quality assurance
- **Data Review**
  - Impact data and modeling on use data to support evidence-based decision-making
  - Implementing data management and quality assurance tools and methodologies
  - Implementing data-driven decision-making to secure informed, data-driven solutions for supply chain management

**In-Country Logistics Operational Support**
- **FACT SHEET | 2022** Last Mile Supply Chain Overview 2022
  - English
  - Portuguese
- **REPORT | 2020** ONSE Health Activity Malawi – 2020 Report
  - View Resource

**Integrating Drones into Immunization Supply Chains: DRC Case Study**
- **PRESENTATION | 2019**
  - Delivering health supplies on the road less traveled in Liberia: Part One
  - View Resource

Additional Resources:
- [https://www.villagereach.org/project/last-mile-supply-chain/](https://www.villagereach.org/project/last-mile-supply-chain/)
- [https://www.villagereach.org/project/organized-network-of-services-for-everyones-health-malawi/](https://www.villagereach.org/project/organized-network-of-services-for-everyones-health-malawi/)
- [https://www.villagereach.org/project/next-generation-supply-chain/](https://www.villagereach.org/project/next-generation-supply-chain/)
- [https://www.villagereach.org/what-we-do/products-for-people/](https://www.villagereach.org/what-we-do/products-for-people/)
- [https://www.villagereach.org/our-impact/newsroom/](https://www.villagereach.org/our-impact/newsroom/)
Beyond the Health Facility: Strengthening Community Level Supply Chains
The Community Insights to Action framework

Used to design systems that routinely monitor and improve the quality of care and guide governments toward making changes.

Health Outcomes
Reduced inequity in access, quality, and coverage of essential PHC services.
Community Health Impact Coalition (CHIC)

The Dual Human Rights Issue

Millions of Community Health Workers are not salaried, skilled, supervised, and supplied.

70% of CHWs are women. Half in low- and middle-income countries are unsalaried. The ultimate injustice: One billion people will never see a health worker.

CHWs are out of stock 1/3 of the time

Members

[List of members]

Funders & partners

[List of funders and partners]
Supply Chain for Community Health Workers (CHWs)

Goal: Community Health Workers have quality essential health products (medicines, supplies) when needed for appropriate treatment of common community childhood and maternal illnesses

Multi-level Intervention

- **National engagement**
  Advocacy for process, strategy, policy change, prioritization of CHW supplies, financing, TWG

- **District/County**
  Support for transportation of supplies, govt engagement

- **Community level**
  Staff capacity building, support with digital tool use/deployment

Supply Chain Financing
Advocate for increased funding of health products/supplies

Transport
Refine last-mile delivery operations & modalities

Advocacy
Integrate CHWs into national public health systems including supply chains

Health workforce
Increase community health workforce supply chain competencies at the last mile

Data
Deploy digital solutions to simplify community-level data collection, analysis and use

Where:
- Liberia
- Kenya

Results:
- Increased SC capacity & SOP adherence
- Kits reduced delivery costs by 70%
- Designed/deployed eCBIS
- Updated national supply chain strategy and forecasting

Partners Involved:
Key Highlights from Liberia

Integration of Community Health Assistant (CHA) commodity needs and forecasts included in the national commodity quantification and supply plan reviews.

Improved the LMIS reporting rates to 100% contributing to systematic allocation of commodities to the NCHP by counties.

Digitization and pilot deployment of the community-based information system (eCBIS).

Developed and deployed a CHA kit delivery system (kit includes products for Malaria, Diarrhea, Pneumonia and Family Planning services).

https://www.villageReach.org/project/nchha-liberia/
Objectives:

- Increase quality and efficiency of service delivery
- Improve effective supervision, training, and job aides
- Reduce inefficiencies
- Improve data quality, visibility, timeliness
- Improve supply chain

Application Supports:

- Individual log ins & task lists
- Household/individual registration
- Service delivery workflows with built in calculations and decision support
- In-app dashboard and reports
- Peer-to-peer offline data transfer
- Web-based dashboards and admin

eCBIS: Digitizing the Community Based Information System in Liberia

A collaborative effort between the MOH, Last Mile Health (LMH), VillageReach and Ona

https://www.villagerach.org/project/ebchis-liberia/
Supply Chain for PHC Project:

Strengthening Community Health Supply Chain in Migori County, Kenya & beyond

Project Goal:
CHW product availability

Funding required
For expansion in 2024
### Key Findings from Migori Baseline Assessment

<table>
<thead>
<tr>
<th>1. Stockouts of essential medicines and equipment are common for CHWs</th>
<th>• 45% stockout rate of essential medicines</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Inconsistent training on stock management</td>
<td>• 50% of CHWs have not received commodity management trainings in the last 12 months</td>
</tr>
<tr>
<td>3. Poor stock management &amp; storage practices</td>
<td>• Lack of stock data tools at the last mile, poor temperature monitoring practices</td>
</tr>
<tr>
<td>4. Lack of supportive policies &amp; financing at county and national levels</td>
<td>• No forecasting or procurement policy, less than 50% of supply chain needs funded by government</td>
</tr>
</tbody>
</table>
Key Highlights from Kenya

VillageReach & partner Lwala Community Alliance are active members of the CHU4UHC (Community Health Units for Universal Health Coverage) platform

- Supply chain (SC) curriculum for Community Health Promoters (CHPs) developed & integrated by MoH into existing training
  - All CHPs in Kenya will now be trained in SC as they are onboarded
- Currently there is no system/standard operating procedures (SOPs) in place to track the CHP commodity kits
  - We are working with the MoH and other community health partners to design commodity data collection tools to inform kit re-supply
- Delivery of CHP kits is currently to the county level; last mile transportation is ad hoc
  - Requires further planning by county
Community Health Resources

The Road to Responsive Primary Health Care Starts Here ➔

Squaring the Circle of Malawian Health Care Through Community Insights to Action ➔

Operationalizing Community Insights to Action for Data-Driven Solutions in the DRC ➔

The CHA Kit: Ensuring Liberia’s Community Health Workers Have the Commodities They Need ➔

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

Integrating Community Insights to Build Responsive Primary Health Care Systems ➔

Community Health Workers as Vaccinators: A Rapid Review of the Global Landscape, 2000–2021 ➔

Protecting the Community Health Workforce During COVID-19 ➔

Using community-based, participatory qualitative research to identify determinants of routine vaccination drop-out in Malawi ➔

https://www.villagesreach.org/our-impact/newsroom/

https://www.villagesreach.org/what-we-do/products-to-people/
COVID-19 ACTION FUND FOR AFRICA
CAF-Africa

An action-oriented collaborative of 30+ organizations dedicated to protecting Community Health Workers (CHWs) on the frontlines of Africa’s COVID-19 response.

THE IMPACT

As an emergency response effort, the COVID-19 Action Fund for Africa was able to mobilize quickly to supply Personal Protective Equipment (PPE) on a larger scale than any one partner could have done alone. **Between June 2020 and March 2022**, we mobilized more than $21.5 million in financial and in-kind contributions to procure and distribute 121.3 million units of PPE (including surgical and non-surgical masks, KN95 masks, pairs of gloves, eye protection and gowns) to nearly 480,000 CHWs in 18 sub-Saharan African countries.
Leveraging the Private Sector
Private Sector Engagement Resources

**PRESENTATION | 2024**
Building Health Supply Chains for the Future: Opportunities for Private Sector

**MOZAMBIQUE TRANSPORT CASE STUDY**
SDG3 Working Group: Addressing the constraints to scaling innovation in African primary healthcare systems: Mozambique Transport Case Findings and Insights

**FACT SHEET | 2022**
Leveraging Private Sector Capacity for Stronger and more Sustainable Public Health Systems

**PRESENTATION | 2022**
USAID: Best practices for successful outsourcing in the public health supply chain

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**Pharmaceutical Manufacturers & Distributors**

JUN 5, 2023 | BLOG POST
Leveraging Local Pharmaceutical Manufacturers and Distributors in DRC →

**Digital Solutions**

AUG 21, 2023 | NEWS
Enhancing Healthcare: VillageReach and Tec4med for Better Access and Quality in Underserved Communities →

https://www.villagereach.org/what-we-do/resource
Distribution & Transportation Resources

Outsourcing: Benefits, Costs and Lessons

- Presentation | 2023
  Outsourced Transport Resource Center – General Presentation (Oct 2023)
  View Resource

- Fact Sheet | 2024
  Outsourcing Perceptions Survey 2024 Flyer
  English
  French
  Portuguese

- Research | 2023
  Health Product Integration – A Critical Enabler for Outsourcing Transport
  English
  French
  Portuguese

- Report | 2023
  A Cost Management Approach: Sustainable Outsourced Transport Solutions
  English
  French
  Portuguese

Ground, Water & Air Transportation

- Presentation | 2022
  Outsourcing Transport of Health Commodities: Presentation (Video)
  View Resource

The Future is Here: Drones for Health

- Report | 2023
  Lessons learned in the transportation of healthcare products by drones
  English
  French

https://www.villagereach.org/what-we-do/resources/

https://www.villagereach.org/our-impact/newsroom/
OTRC

Provides four service packages to governments, implementing partners and the private sector to integrate land and drone-based outsourced transport

EXPLORATION & SET-UP
- Develop strategy & cost model
- Develop & release request for proposal
- Align on roles and required skills
- Assess government capacity & develop skills development plan
- Develop implementation plan
- Conduct advocacy & fundraising

IMPLEMENTATION
- Prepare start-up implementation plan & toolkit
- Develop stakeholder management plan
- Develop roles, procedures & SOPs
- Coordinate regulatory applications for drone transport authorization
- Implement the infrastructure acquisition plan
- Develop & validate the service level agreement
- Implement monthly review of performance
- Implement quarterly expense review
- Develop the transition strategy & plan

MANAGEMENT
- Develop the transition strategy & plan*
- Develop stakeholder management plan*
- Develop staffing model
- Assess government capacity & develop skills development plan*
- Provide coaching & training based on skills development plan
- Develop annual budget with government
- Conduct advocacy & fundraising*

VERIFICATION
- Design verification approach, plan & budget
- Assess government capacity & develop skills development plan*
- Provide coaching & training based on skills development plan*
- Assess data quality & perform data analysis
- Develop verification report
- Conduct advocacy & fundraising*

*This service is listed in more than one package and may not be required if already completed in another package of services.

Visit otrcsupport.org to learn more and contact us at otrc@villagereach.org
**USAID Last Mile Supply Chain Program, Mozambique**

### Outourced Transport Solution Description

<table>
<thead>
<tr>
<th>1.0 Enabling</th>
<th>1.1 4PL/3PL Service Definition</th>
<th>1.2 4PL/3PL Supply Analysis &amp; Strategy</th>
<th>1.3 4PL/3PL Tendering, Selection &amp; Contracting</th>
<th>1.4 Transport Route Optimisation</th>
<th>1.5 Performance Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 Managerial</td>
<td>2.1 4PL/3PL Management</td>
<td>2.2 Logistics Cost Management</td>
<td>2.3 Supervision</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0 Operational</td>
<td>3.1 Distribution Cycle Coordination</td>
<td>3.2 Health Commodity Distribution</td>
<td>3.3 Inventory &amp; Cold Chain Data Collection</td>
<td>3.4 Distribution Evaluation &amp; Transporter Payment</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Each Solution element has associated Standard Operating Procedures, tools, templates, and roles & responsibilities requirements.

**Current LMSC Scope:** Verification Process

- **On-Time Delivery**
  - Deliveries according to the distribution plan (Distribution Plan vs actual delivery date (Waybill)).

- **In-Full Delivery**
  - Delivery according to agreed quantities (without discrepancies);
  - Verification of Discrepancies (including damages, losses) reported by DDM/IF and discrepancies reported by 4PL (verified in incident reports).

LMSC scope and activities from 2018 to 2022

VillageReach current scope from 2023 to date

https://www.villagereach.org/project/last-mile-supply-chain/
Medical drones are one of the **moonshot technologies** shaping healthcare access by offering the opportunity to bypass patchy infrastructure and get medical support to remote areas. Medical drones can form part of the **last-mile delivery system** aimed at addressing logistical challenges in the health sector’s supply chains often defined by large distances characterised by **rough and rugged terrains** and punctuated by bad, impassable roads.

These drones enhance logistical capacity to access emergency medical supplies at lower carbon footprints than traditional transport. Drones also aid in fast-tracking laboratory tests such as viral load and sputum samples and deliver anti-snake serums and blood products.

The medical drones in Malawi and Ghana are using AI to identify safe landing zones, optimise delivery routes, and navigate extreme weather conditions.
... and Costs are Starting to Become Competitive

<table>
<thead>
<tr>
<th>Specification</th>
<th>Current Fleet Options</th>
<th>Future Fleet Options (Q3 2024)</th>
<th>Traditional air-base Fleet Options</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Swoop Aero, Rigitech#</td>
<td>Orcas from Phoenix-Wings#</td>
<td>Cessna Caravan#</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pelican from Pyka#</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dronamics#</td>
<td>Mi-8 Helicopter#</td>
</tr>
<tr>
<td>Landing/Take off</td>
<td>VTOL</td>
<td>VTOL</td>
<td>Up to 1,900km</td>
</tr>
<tr>
<td>Range</td>
<td>Up to 125km</td>
<td>Up to 130km</td>
<td>Up to 600 km</td>
</tr>
<tr>
<td>Payload Load</td>
<td>Up to 4kg/15L</td>
<td>Up to 15kg/96L</td>
<td>Up to 1593kg</td>
</tr>
<tr>
<td>One Trip Cost</td>
<td>150</td>
<td>75</td>
<td>2,000-4,500</td>
</tr>
<tr>
<td>Cost Per Kg ($)</td>
<td>32</td>
<td>5</td>
<td>4,500-6,000</td>
</tr>
</tbody>
</table>

# Estimated baseline price varying upon minimum service commitment.
& The following data has been based on available charter costs; it does not consider re-positioning costs this could significantly increase per delivery cost.

Business Models are Changing:
- transition from Drone Technology Providers
- to Transport Service Providers
Evidence shows drones can be integrated into health systems

**UNICEF, Matternet, VillageReach Malawi**
- First medical drone flights in Africa

**Flying Labs DR, VillageReach** with multiple providers

**VillageReach Malawi**
- Testing with Vayu

**DHL & GIZ Tanzania** with Wingcopter
- UNICEF Vanuatu with Wingcopter & Swoop Aero

**Zipline Rwandá***
- First national drone delivery network launched

**UPDWG established**
**VillageReach & Hermes**
- First drone cost modeling analysis published

**Malawi Dept of Civil Aviation, UNICEF Malawi**
- First humanitarian drone corridor established

**PSI Madagascar***
- with Aerial Metric (USAID funding)

**USAID GHSC Malawi** with Wingcopter & Swoop Aero

**VillageReach DRC**
- Testing with Swoop Aero

**UNICEF, FCDG Malawi with Swoop Aero**
**GIZ Malawi, UNICEF with Wingcopter**

**VillageReach DRC***
- with Swoop Aero (Gavi, BMGF vaccines + USAID/UNICEF Ebola funding)

**VillageReach Malawi***
- Testing with NextWing

**VillageReach Mozambique**
- Testing with Swoop Aero

**VillageReach Malawi***
- continued & expanded UNICEF/FCDG project with Swoop Aero (FP, UPS, USAID DIV funding)

**VillageReach Mozambique**
- with Swoop Aero

Zipline Rwanda, Kenya, CDI launched
Zipline Ghana 1st impact eval published
Zipline Rwanda Delivery study published
**VillageReach DRC, KSPH, UCLA**
Endline process eval. + cost-effectiveness results
**VillageReach Malawi, INSEAD**
Endline process evaluation

*ongoing* (in 2024, five countries have drone transport services at scale)

Source: Medical Drone Delivery Database (MD3) at www.UPDWG.org
DRC Evaluation Results (2021-22): Higher availability of immunization products in remote facilities + faster transport after drone introduction

<table>
<thead>
<tr>
<th>KEY INDICATORS</th>
<th>Baseline</th>
<th>Target</th>
<th>Endline Jan – Jun 2022</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard-to-reach health facilities (drone landing sites)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Vaccine availability (9 vaccines) (last 3 months)</td>
<td>65%</td>
<td>80%</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>% facilities with stockouts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pentavalent</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>• Measles</td>
<td>12%</td>
<td>0%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>• Yellow fever (last 3 months)</td>
<td>18%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>% facilities taking 2+ days to get vaccines</td>
<td>65%</td>
<td>0%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>% facilities stocked according to plan</td>
<td>32%</td>
<td>80%</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>% AFP samples received at provincial EPI within 2 days (Drones and ground transport)</td>
<td>35%</td>
<td>80%</td>
<td>69%</td>
<td></td>
</tr>
</tbody>
</table>

Endline evaluation results are consistent with prior trends seen in the 1st and 2nd midterm evaluations (data collected over 18 months)

Evaluators: VillageReach & Kinshasa School of Public Health (https://www.villagereach.org/project/drones-for-health-in-the-drc/)
Malawi Evaluation Results (2022-23): Drones are valued for their speed, especially facilitating timely and life-saving deliveries in critical situations

“It’s a good development as it’s able to bring medicines in good time. Also, being a hard-to-reach area, it is very hard to rely on vehicles as the roads are bad, and drones are fast and reliable in times of emergency.”
(Woman, Community Focus Group)

All health workers interviewed in remote health facilities said that drones improved their job (70% said the improvement was significant). But drones also have challenges: they carry small quantities, can be weather dependent, and mechanical or operational faults may occur.
Building the Health Supply Chain of the Future

Integrating Outsourced Transport:
Building high-performing supply chains that are fit for purpose
For effectiveness and sustainability, governments and their partners must consider integrating outsourced transport into the public health supply chain.

Consulting services to accelerate the introduction of drone transport:

- Project management
- Technical Assistance
- People-centered solutions
- Data & performance management
- Sustainability & transition

https://www.villagereach.org/project/ottr/
Cross-over Lessons:
Diagnostics
Laboratory Systems & Health Supply Chains
Polio Lab Sample Transport

Following national assessments in 2022, VillageReach and partners have been implementing customized programs in 15 countries at risk for polio outbreaks, aiming to improve the speed & quality of human and environmental surveillance sample transportation from communities/health facilities to national/int’l laboratories.

Objectives

**ACHIEVE COORDINATED & EFFECTIVE SAMPLE TRANSPORT SYSTEMS**

- Timeliness & reliability of transport
- Sample quality (good condition)
- Governance & coordination
- Efficient response to outbreaks
- Sustainable transport systems

**IMPROVE SAMPLE TRACKING, DATA VISIBILITY & QUALITY**

- Enhanced, real-time sample tracking
- Improved data visibility & proactive monitoring for Ministries of Health

https://www.villagereach.org/project/polio-laboratory-sample-transport/
Timeliness of Polio Sample Transport: Ambitious Target

Countries without Polio lab in country have difficulty reaching the transport timeliness target, but many challenges still at the last mile.

AFP Sample Transport Timeliness Improved

Countries not meeting the 3-day target at baseline (2022) – all send to int’l lab or use air transport

<table>
<thead>
<tr>
<th>Country</th>
<th>Avg # days from collection to international Lab</th>
<th>Avg # days from collection to national level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRC</td>
<td>17.3</td>
<td>6.9</td>
</tr>
<tr>
<td>CHAD</td>
<td>20.4</td>
<td>7.6</td>
</tr>
<tr>
<td>GUINEA</td>
<td>21.7</td>
<td>6.9</td>
</tr>
<tr>
<td>MOZAMBIQUE</td>
<td>36.3</td>
<td>7.6</td>
</tr>
<tr>
<td>NIGER</td>
<td>16.8</td>
<td>7.3</td>
</tr>
<tr>
<td>TANZANIA</td>
<td>21.1</td>
<td>6.9</td>
</tr>
<tr>
<td>MALAWI</td>
<td>20.9</td>
<td>7.6</td>
</tr>
<tr>
<td>ANGOLA</td>
<td></td>
<td>14.5</td>
</tr>
</tbody>
</table>

Across 7 countries, our intervention contributed to:
- Avg 8.7 day decrease
- 40% reduction from baseline to last quarter

Transition to Government
Transportation of lab samples using local transporters, (C)HWs

- Technician loading drone with HIV & TB lab samples in Mozambique. Photo: Swoop Aero
- Photo courtesy of R4H Malawi
- Photo: VillageReach DRC
- National Lab Transport Hub System in Uganda. Photo: Denis Onyodi
- Photo: Access for Humanity, S. Sudan
- Laboratory transport at the last mile in Chad. Photo: ASRADD
- Photo: VillageReach
- Photo: G4S vehicle bringing samples to KEMRI Lab, Kenya. Photo: VillageReach
- Samples loaded onto airplane in DRC. Photo: VillageReach
- Technician loading drone with HIV & TB lab samples in Mozambique. Photo: Swoop Aero

Photos credit: VillageReach DRC
Transportation of lab samples using local transporters, (C)HWs
Real-time location tracking & remote temperature monitoring

- Digital trackers allow for product & quality management while commodities are in transit
- Data is transmitted to and stored in the cloud for traceability
- Data: Location, route, temperature, humidity, light, shock
- Real time alert via SMS, Email and App via Tec4Cloud
- Dashboards & maps

PRACTICAL USES:
- Real-time location tracking helped to address bottlenecks & improve transport duration (useful in remote areas)
- Real-time temperature monitoring helped with changing ice packs during transport
- Maps tracked movements & validated transport route used
- Dashboards helped to assess transporter performance and push for improvements
- Could feasibly be used for distribution of any time-sensitive or cold chain products

- DRC, Malawi, Mozambique, Chad, Cameroon, Kenya (Tec4med): VillageReach or partner coordinates with MoH/provinces/districts + transporters to monitor data and act on it to solve delays, while samples are still in transit. Stakeholders have visibility & can verify data before reporting it further.
- Guinea (Accent Systems); Zambia (Parsyl); Nigeria, Ethiopia, South Sudan (U-TRIX)
Adapted USSD system in Malawi to polio samples to centralize HW alerts

Assignment of unique identifiers to samples

Informing transporters and MoH managers when samples are collected or ready for pick-up

Real-time transport data provided through accessible dashboards

Responsible Partner

- Riders for Health
- SPEED
- WHO

FIRST SAMPLE

SECOND SAMPLE
**Mozambique: On-demand Sample Transport Requests**

1. **Health Facility** reports to **Health Facility Officer**.
2. The Health Facility Officer triggers the **Sample Notification Service**.
3. The **Sample Notification Service** notifies all **Key Stakeholders**.
4. **Transporter** initiates logistics setup.
5. **Surveillance Officer** monitors shipments and results.
6. **Hotline Operator** handles **Dial AlôVida** national hotline.
7. **Enter data to online form** for **Hotline**.
8. **Enter data to online form** for **Surveillance**.
9. **Enter data to online form** for **Health Facility Officer**.
10. **Enter data to online form** for **Surveillance Officer**.

**Responsible Partner**
- AGL / VillageReach
- WHO

**Data Reviews and Continuous Improvements**
Eclipse - Last Mile Vaccine Carrier

- **Performance Validated:** WHO PQS pre-qualified (E004/070 – Freeze Free Vaccine Carrier and E005/028 – 0.6 L Water Pack)

- **Lightest Product On Market:** Over 30% lighter than any other freeze-free PQS-approved product on the market.

- **Single Ice Pack:** Eclipse requires only one ice pack; other products require 3 - 4 icepacks.

- **Bigger Payload Volume, Smaller Footprint:** Combing a payload volume of 1.8 L and an external volume of 13.8 L

- **Rapid Cool Down:** Our proprietary technology enables faster cooldown times than any other.

- **Refined User Experience:** Comfortable carrying ergonomics and easier icepack handling

<table>
<thead>
<tr>
<th>Product</th>
<th>Gobi Eclipse</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payload Volume</td>
<td>1.8 L</td>
<td>Smaller</td>
</tr>
<tr>
<td>Payload Dimensions</td>
<td>86 cm² x 20 cm tall</td>
<td>Smaller</td>
</tr>
<tr>
<td>External Volume</td>
<td>14.7 L</td>
<td>2x-3x Larger</td>
</tr>
<tr>
<td>External Dimensions</td>
<td>22 cm (dia.) x 39 cm</td>
<td>Larger</td>
</tr>
<tr>
<td>Ratio Total : Useable Volume</td>
<td>8.1 : 1</td>
<td>2x-5x Larger</td>
</tr>
<tr>
<td>Number of Ice Packs</td>
<td>1 (0.6 L)</td>
<td>3x-4x More</td>
</tr>
<tr>
<td>Ice Pack Mass</td>
<td>0.6 L</td>
<td>3x-4x More</td>
</tr>
<tr>
<td>PQS Cold Life at +43 °C</td>
<td>36 hours</td>
<td>Shorter</td>
</tr>
<tr>
<td>Weight (Fully Loaded)</td>
<td>5.5 kg</td>
<td>Up to 50% Heavier</td>
</tr>
<tr>
<td>Weight (Empty)</td>
<td>3.4 kg</td>
<td>Up to 40% Heavier</td>
</tr>
<tr>
<td>Insulation Effectiveness</td>
<td>Triple layer vacuum</td>
<td>3x-4x Less</td>
</tr>
</tbody>
</table>

Eclipse Sets Itself Apart From The Competition
Altai Self-Cooling Parcel

Altai is perfect for cold chain material distribution and sample collection

• Start cooling on-demand
• No infrastructure requirements (no ice/ PCM/ gelpacks, no electricity, no lithium batteries)
• Safe and secure
• No need for PCM storage or conditioning at the clinic
• 96 hours 2 – 8 °C and 15 - 25 °C ISTA 7D summer and winter validated

www.gobi.world
info@gobi.world
Why is last-mile delivery so important?
- Access to populations which can be hard-to-reach: Improve access, equity, coverage, and health outcomes – by reaching the under-reached
- Currently, supply chains aren’t designed to get health products into communities or homes
  - Cannot always expect people to come for services, sometimes it’s more effective to bring services closer to them
- Strengthening the ‘last mile’ requires adjustments at the ‘middle mile’ as well
  - Need to ensure that the right data, infrastructure, management & procedures are in place to support last mile delivery

Cross-cutting system strengthening
- Integration of resources for different SC functions and across health programs could achieve better efficiencies and sustainability
  - But integration must be done thoughtfully to ensure the needs and outcomes of each health program are met
- Other key themes: Responsiveness, resilience, professionalization, and data visibility for informed decision-making

Beyond the health facility: Strengthening community-level supply chains
- Community Insights to Action: Building new models that bring the voices of under-reached communities into service delivery & design
- Supply chains for community health workers: Recognizing CHWs (most of them women) as an important cadre and ensuring they are paid, trained and equipped with a consistent supply of health products (those needed to provide appropriate care at the community level)

Leveraging the private sector
- Outsourcing for improved outcomes: Transport, Pharmaceutical manufacturers & distributors, Digital solutions/technology, etc.
- Most medicines are provided through private channels (pharmacies, clinics, etc.) and supplied by private (mostly for-profit) distributors
  - Risks to quality of medicines dispensed to patients – It is urgent to address the private distributor channel (both growth and compliance)
- Outsourced Transport Resource Center: Helping Govts & partners integrate outsourced transport into the public health supply chain
  - Drones as an additional means of transport can be helpful in hard-to-reach areas, but need diversified utilization for sustainability

Cross-over lessons: Diagnostics laboratory systems & health supply chains
- Reverse logistics: With incentives & training, it is possible to create large networks of local transporters & achieve fast transport in remote areas
- Innovations for the last mile: Real-time geolocation and temperature trackers; free SMS (USSD) notification systems for health workers; hotlines or automated systems for on-demand transport requests; next-generation freeze-free carriers for cold chain products
Interested to connect and learn more? Get in touch!

Your facilitator today:
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• Alassane Kamagate – Cote d’Ivoire: alassane.kamagate@villagereach.org
Thank you!
Group Work: Last Mile Distribution Scenarios

1. What approach(es) did you select, and why?

2. Is this an approach that could work in your context where you live/work? What would it take?

3. What challenges would you foresee in implementing this approach?

4. Do you have a guess as to what country context was being described?
In the country of Castillo, 30% of the population lives in **rural areas** at least 5 km from the closest health facility. A large proportion of the population depend on **Community Health Workers (CHWs)** for treatment of under 5 illnesses, family planning, and basic MNCH services.

In theory, CHWs retrieve the products that they need from their nearest health facility every 2 months. However quite often, a CHW will arrive to collect products, and find the **facility out of stock**. Or the In-charge will ration only a small portion of the requested products to the CHW, because the remaining stock is needed by the facility clinical staff. Castillo has limited funds for commodity procurement at the national level, so **rationing of products** is common. National **product forecasts** are conducted annually.

CHW supervisors try to track how many products their CHWs use each month in their notebooks, and share that data with the health facility at the end of each month. This data is combined with that of the health facility to incorporate into the monthly R&R (**Report and Requisition** for commodities). The **quality of CHW data** has never been validated. CHWs and their supervisors have received no **training in commodity management**. The country has an eLMIS but it only captures data down to the district level.

**What are some approaches that you might recommend to help improve commodity availability for CHWs in Castillo?** *(Hint: You can mix and match some of the approaches you learned about today).*