Building a more resilient supply chain through design

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16th TechNet Conference
Shaping a resilient and adaptive immunization program

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VILLAGE REACH®

How does a robust supply chain operate?

Working from the manufacturer to the "last mile", a supply chain provides:

Enhanced **availability** and **use of information** for supply chain planning and monitoring

Leveraged local resources to **plan**, **procure**, and **deliver** supplies

Supportive **legal**, **regulatory**, and **policy environments**

Efficient supply chains **operations** and **trained human resources** managing commodity flow and dispensing

8

Designing the Next Generation of Supply Chain (NGCA) – A VillageReach experience

A. Key steps:

1. Pre-system design workshop:

   - Training of data collectors

   - Assessment of the existing supply chain system

   - Desktop research on the performance of the existing supply chain

2. System design workshop:

   - Development of a new and optimized supply chain system

   - Validation of the new and optimized supply chain system

3. Implementation of the new and optimized supply chain system

B. Next Generation of Supply Chain (NGCA) - element descriptions (1/2)

CATEGORY	NGCA SOLUTION ELEMENT	ELEMENT DESCRIPTION
ENABLING	1.1 Government Engagement	Building the strong relationship or partnership with the MoH by include them in each steps from assessment of supply chain to implementation of solution identified. Define the service package (product delivery, data gathering and other activities) based on needs of provincial facilities and health facilities. Network of champions for system optimization was made among staffs of MoH in all levels.
	1.2. Supply Assessment & System Design	Supply chain assessment which identified logistic challenges and making the system design on partnership with the MoH. Developing and validating the implementation plan
	1.3.Transport Route Optimization	Mapping the health districts priority Identify the best physical routes between store house and points of use (e.g. health facilities or storage site) considering target service levels, transportation costs and lead-times; use actual route performance to improve planned routes
MANAGERIAL	2.1 Coordination Mechanisms	Strengthening the governance and leadership of MoH on supply chain (Analysis, decision making)
	2.2 Training	Building capacity of MoH staffs on leadership and management of supply chain, supportive supervision and logistic of health commodities.
	2.3 Performance Analysis	Conduct post-distribution evaluation meeting with all stakeholders; evaluate performance of sites or health district, identify and launch corrective actions. Sharing those data to M&E team

NGCA - element descriptions (2/2)

CATEGORY	NGCA SOLUTION ELEMENT	ELEMENT DESCRIPTION
OPERATIONAL	3.1 Health Commodity Distribution	Elaborate the Distribution plan of health commodity, Packing the products per health facility, conduct pre-distribution meeting to review and valid the distribution plan and training the distribution teams. Direct delivery each two months according the consumption data Conduct post-distribution evaluation meeting with all stakeholders; evaluate performance using agreed and sharing valid data to M&E team which put to dashboard for analysis
	3.2 Data Collection (HF and Zone)	Data collection per Health facility(Vaccine consumption, available stock, stock out, loose) and helps for determine the needs of each health establishment, decision making. Also allows to evaluate performance of management on supply chain in each level.
	3.3 Supportive Supervision	Each two months; Officials of MoH ensure the direct delivery and formative supervision of health workers in multiples components of supply chain. And ensure the training according needs

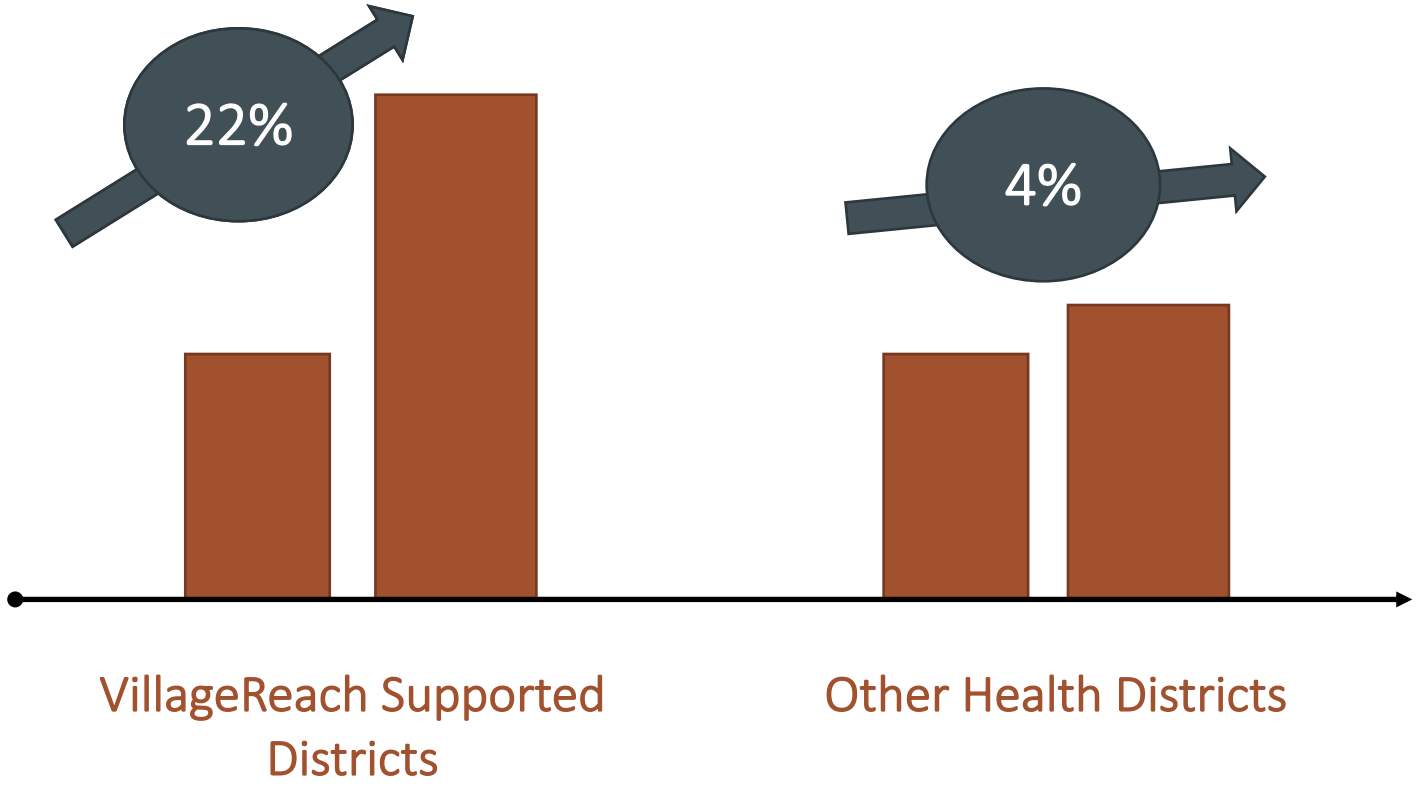
Our Impact in DRC

C. Our Impact in DRC

22%

Increase in average monthly vaccine consumption in VillageReach intervention areas, compared to 4% in control areas

- Acasus Evaluation, 2017-2018

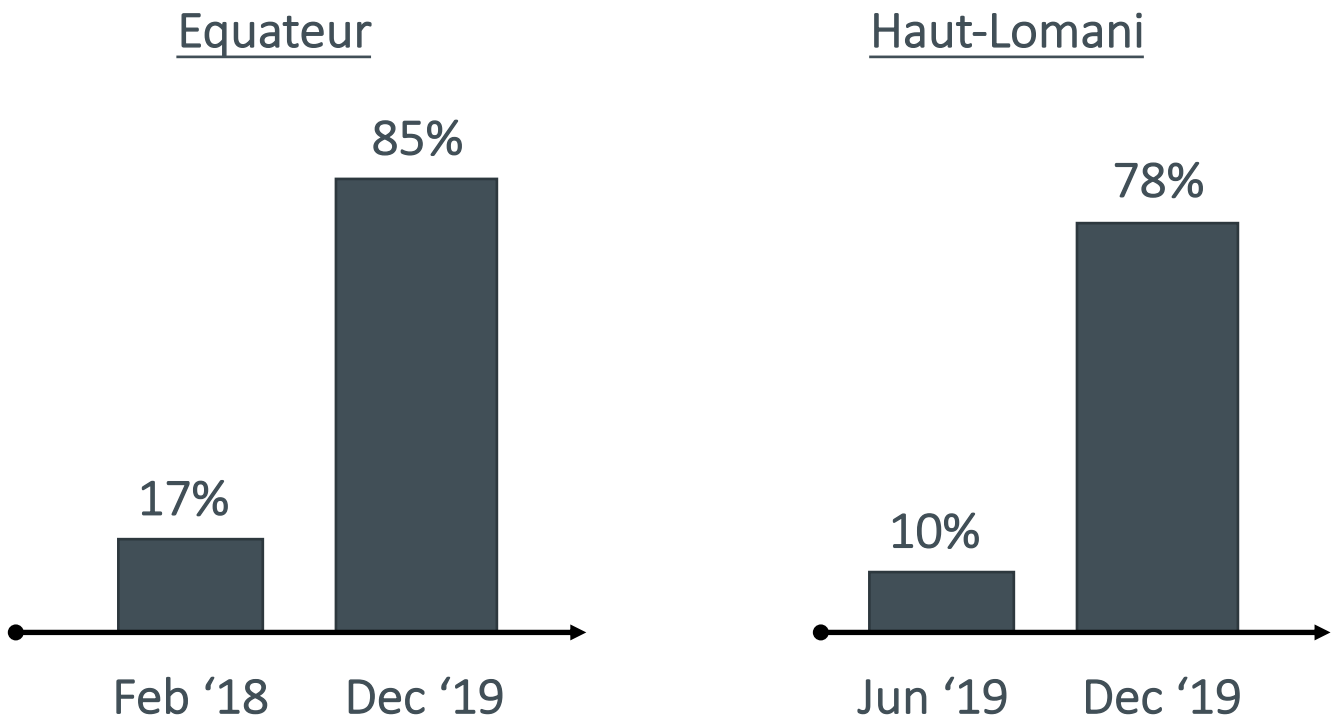


Our Impact in DRC

> 75%

of health facilities with complete availability of vaccines in Equateur and Haut-Lomami due to the NGCA intervention

-NGCA Program Data, 2018-2019

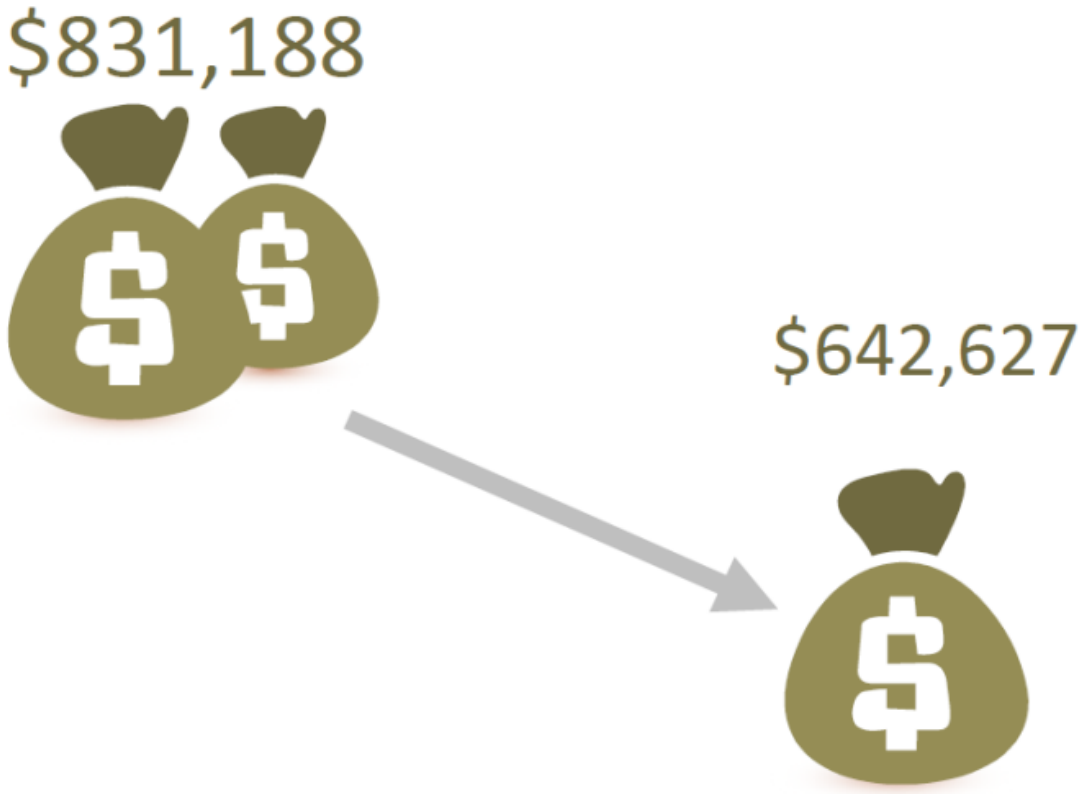


Our Impact in DRC

~ 20%

Decrease in total supply chain costs due to streamlined distributions

- NGCA Financial Study Endline 2020

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Thank you

Building a more resilient supply chain through redesign

Dr Francis Dien Mwansa, EPI Manager, Zambia Ministry of Health

Cheryl Rudd, Director, Primary Care/HSS, Centre for Infectious Disease Research in Zambia

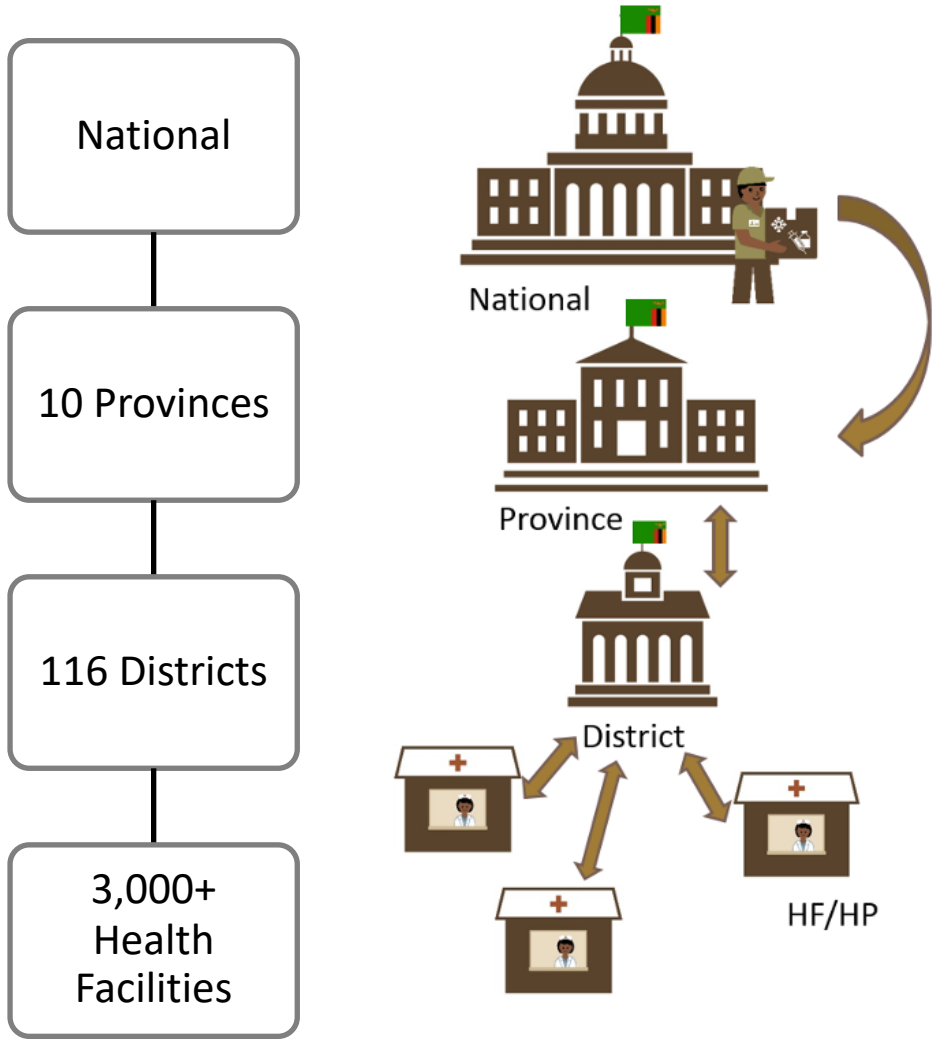
16th TechNet Conference

Shaping a resilient and adaptive immunization program

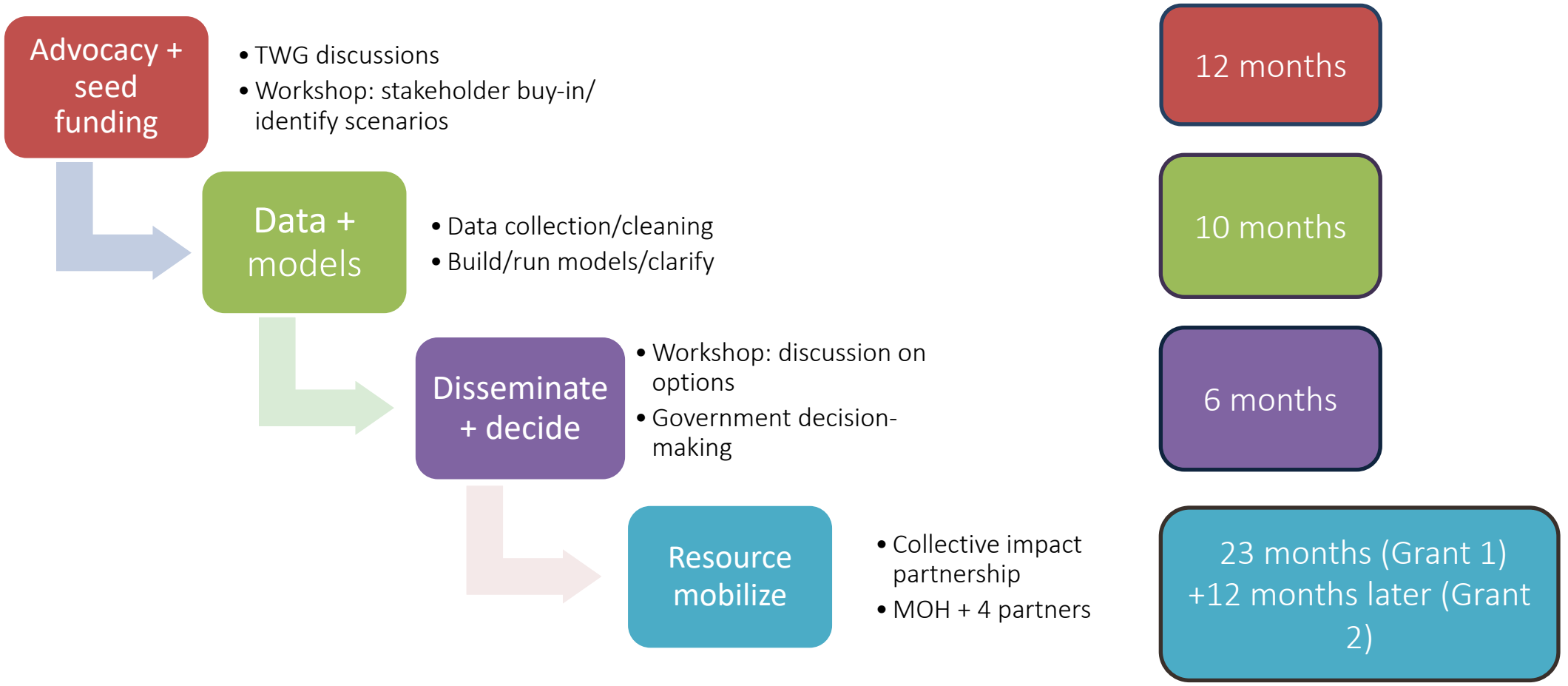
Reasons to optimise the immunisation supply chain in Zambia

- Reduce costs
- Improve stock management
- Reduce workload/disperse workload
- Improve cold chain uptime
- Appropriately trained human resources to manage immunisations
- Increase coverage
- Visibility of stock at lower levels
- Data driven decision making (inc. forecasting/quantification)
- Improve communication

Current EPI supply chain



Steps taken in iSC system design



Selected options to model

Change	Change vaccine delivery frequency • 1 month • 1.5 months • 2 months
Optimise	Optimise transport through multi-stop routes
Change	Change hierarchy of the supply chain • Province to health facility • District to health facility • Regional hub to health facility
Ignore	Ignore administrative boundaries

Modelling results: current supply chain

	Logistics cost per dose		HF staff time spent in vaccine logistics	
	1-month	2-month	1-month	2-month
Current Province to District to Health Facility	ZMW2.83	ZMW2.69 *5% savings*	50+ FTE	25+ FTE
Scenario A District to Health Facility (multi-stop)	ZMW2.62 *7% savings*	ZMW2.58 *9% savings*	50+ FTE	25+ FTE
Scenario A + 25% buffer stock at Province	ZMW2.90 *2% increase*	ZMW2.83		
Scenario B Province to Health Facility (multi-stop)	ZMW2.53 *11% savings*	ZMW2.39 *16% savings*	3+ FTE	3+ FTE
Scenario B + 25% buffer stock at District	ZMW2.57 *9% savings*	ZMW2.44 *14% savings*		
Scenario C Regional hub to Health Facility (multi-stop)	ZMW2.85 *1% increase*	ZMW2.50 *12% savings*	3+ FTE	3+ FTE

Modelling results: optimised supply chain

	Logistics cost per dose		HF staff time spent in vaccine logistics	
	1-month	2-month	1-month	2-month
Current Province to District to Health Facility	ZMW2.83	ZMW2.69 *5% savings*	50+ FTE	25+ FTE
Scenario A District to Health Facility (multi-stop)	ZMW2.62 *7% savings*	ZMW2.58 *9% savings*	50+ FTE	25+ FTE
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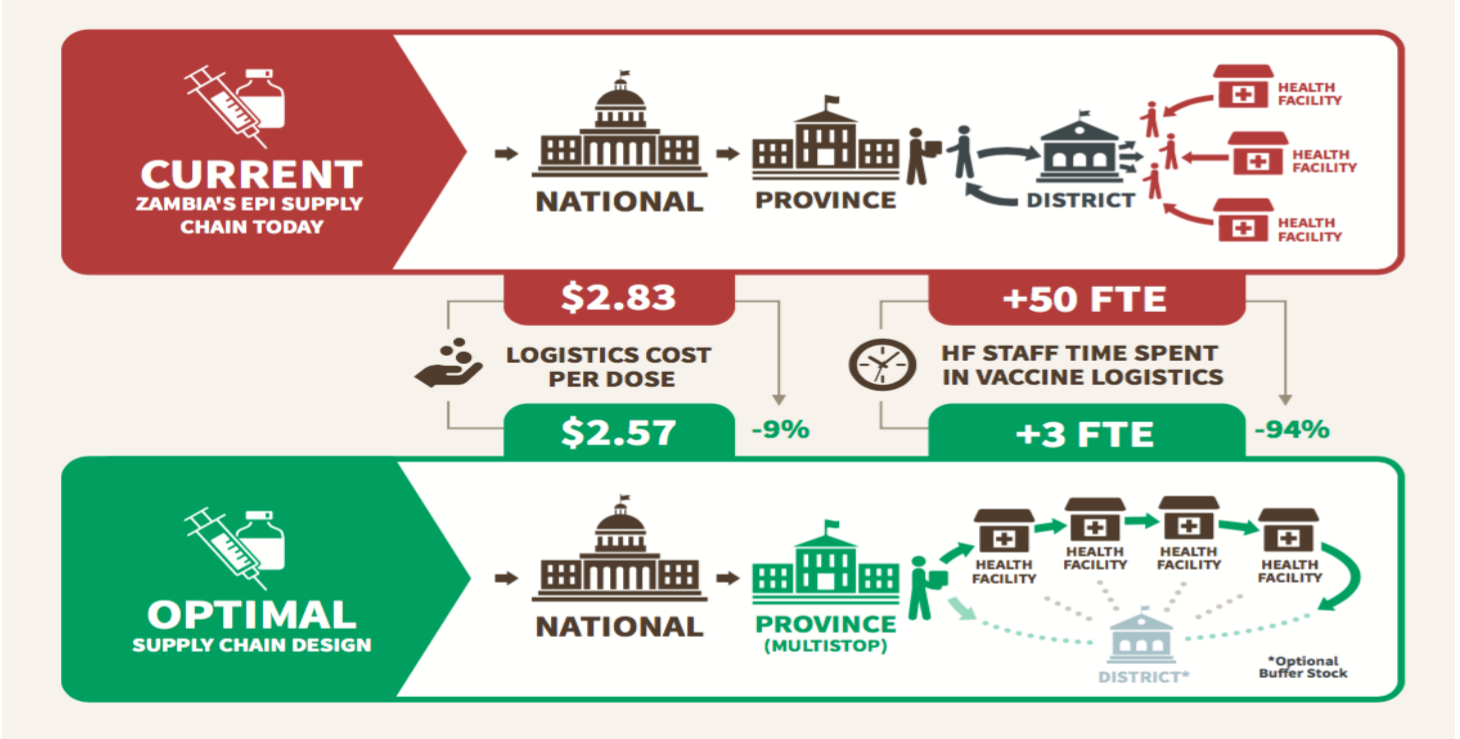
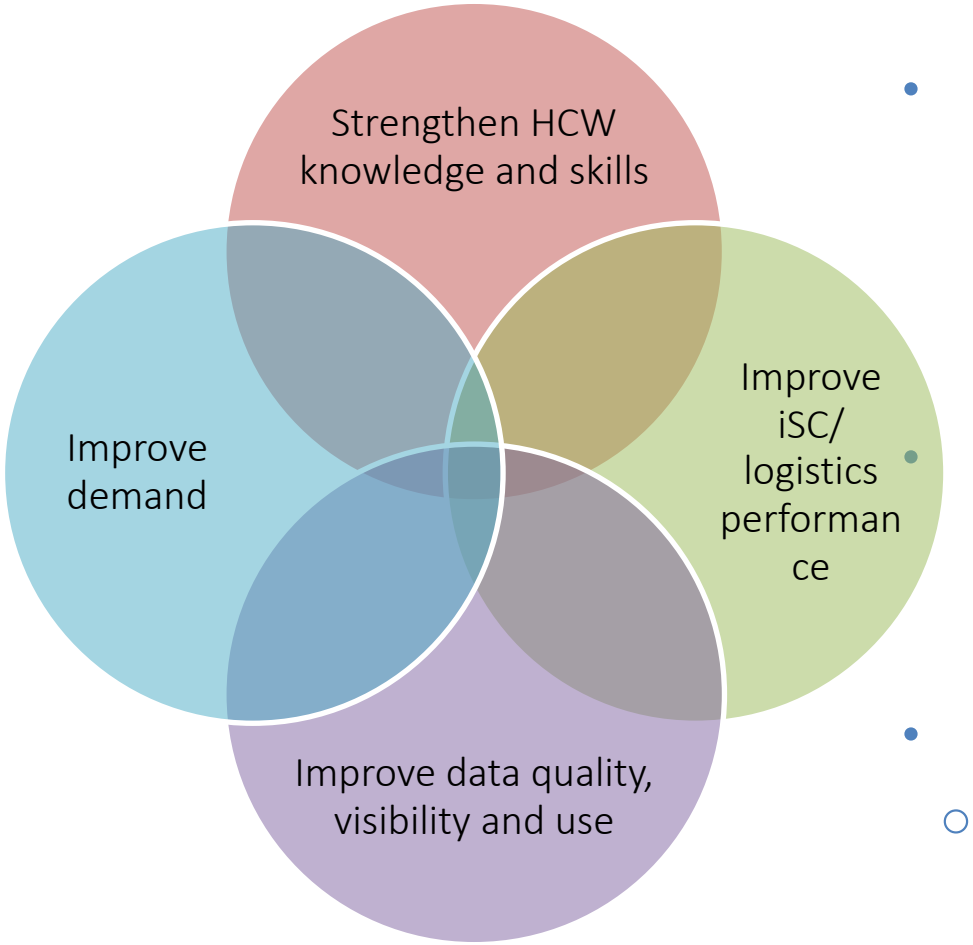
Recommended option

- Multi-stop, direct delivery from province to health facilities
- Still maintaining buffer stock at districts
- Less optimal in terms of cost, but better fit for Zambian context



EPI-OPT

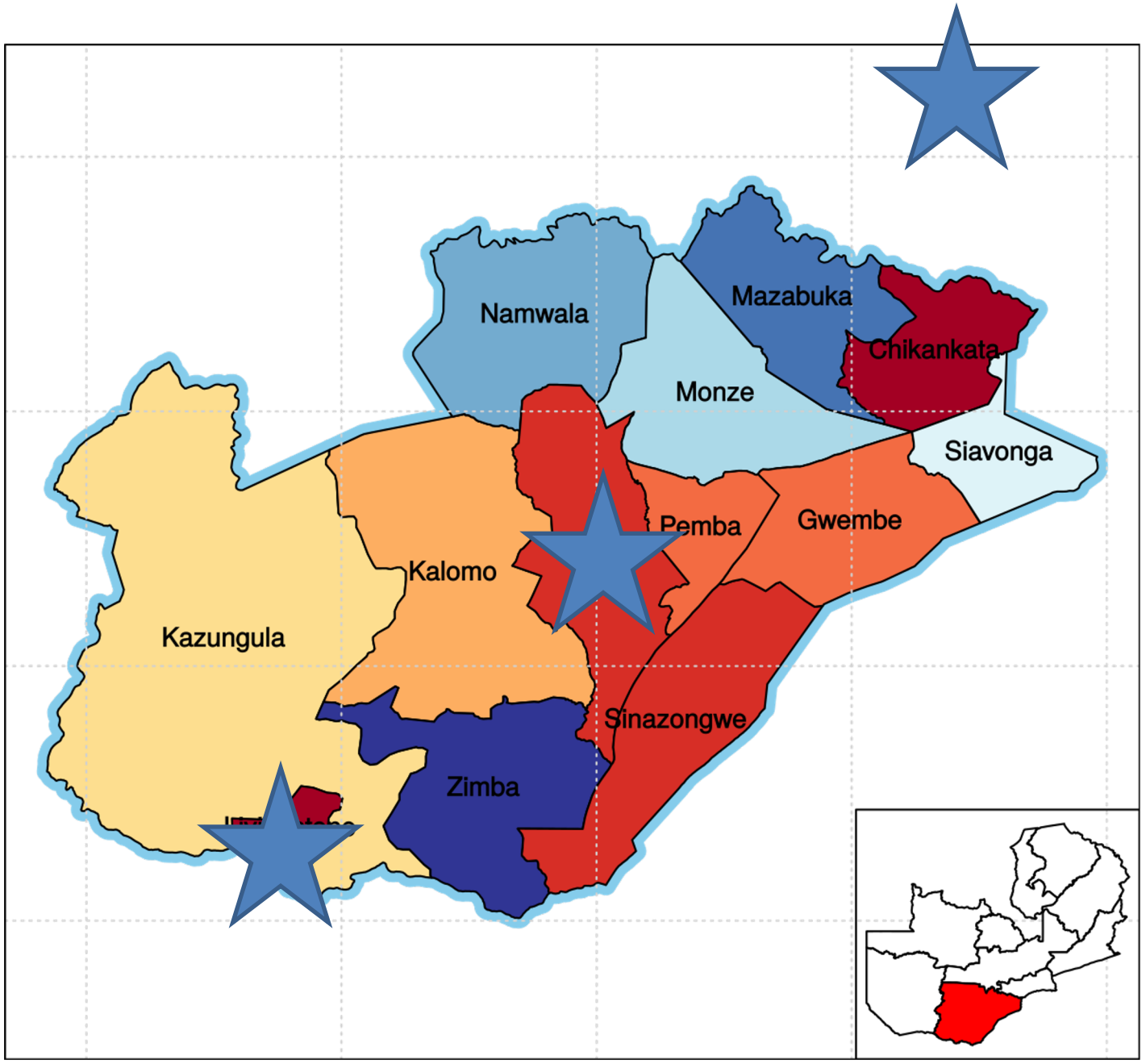


- Embarked on a multi-partner, collective impact approach where system design is one part of improving EPI
- Worked together to mobilise resources to roll-out in 2 provinces
- Goals:
  - Improved, more equitable coverage rates
  - Improved EPI data accuracy

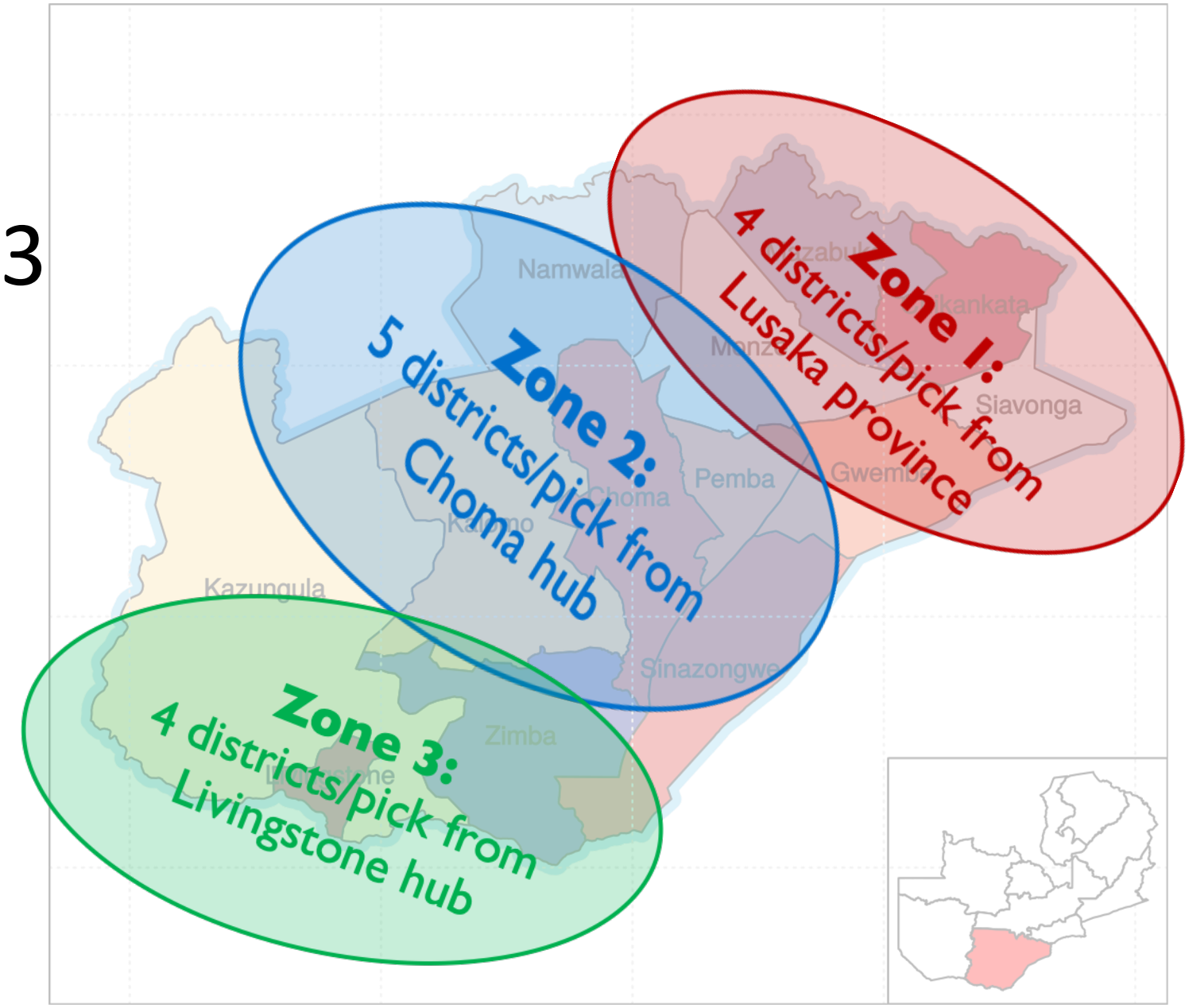
What supply chain redesign is being implemented?

- District Pharmacists or MCH coordinators conduct the delivery
- District staff collect from the province
- 2-3 days of direct delivery, multi-stop loops in their district + ignore boundaries for HFs closer to them
- Provide supportive supervision during visits beyond logistics
- HCW exchange with districts that are doing well—accompany poorer performing ones

Mapping the province for optimisation



Province broken into 3 delivery zones



Preliminary supply chain results

- Results from 289 health facilities in 1 province
- 6 months of implementation

Indicator	Baseline	Q2
% of HFs had full stock availability	67%	91%
% of HFs were conducting monthly physical stock count	21%	71%
% of HFs with adequate stock levels (between min and max)	67%	49%
Functional vaccine frig	89%	91%
Physical count of each antigen matches stock control card	21%	71%
% of HF with timely submission of EPI data	71%	97%

Challenges faced

- Late submissions of facility returns forms and requests before vaccine delivery
- Gaps in knowledge on average monthly consumption calculations and forecasting
- Incomplete/missing data from source documents such as the U5 register
- Need to strengthen data verification and collection processes at district level
- Poor communication across district departments (MCH-Pharmacy-Health Info)

Spill over benefits

- Districts have ownership and consistent contact with HFs during vaccine delivery
- Vaccine delivery utilised for supportive supervision
- Starting to integrate with essential medicine distribution where possible
- Some districts supplying own vehicles and drivers for increased sustainability

Benefits of Immunization Supply Chain Redesign: analysis results from Madagascar, Guinea and Niger

Olamide Folorunso
Supply Chain Strengthening Centre, UNICEF

16th TechNet Conference
Shaping a resilient and adaptive immunization program

System Design- Background

System Design Approach

Analyzing and modifying supply chain components, such as the storage and distribution, with the goal of **improving availability** of and **access** to essential products and services.

Often, the System's Design is the barrier to performance improvement…

Approach Pillars

Evidence-based

Quantitative and Qualitative Data driven approach

Stakeholder-driven

National and Sub-National stakeholders inform analysis, in collaboration with Implementing partners

Context-dependent

Adapted to individual country and sub-national contexts

Program-Oriented

Analysis outputs inform both supply chain and program decisions

Common System Design Alternative Scenarios

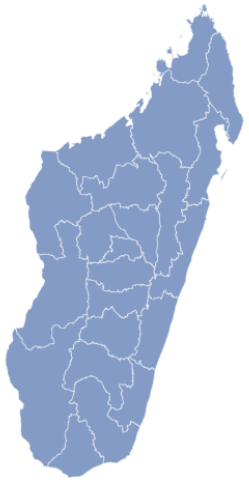
Typical alternative supply chain scenarios that country stakeholders and partners prioritize include:

Supply Chain Innovations

Last mile delivery strategies such as drone distribution, Different vial sizes and presentation etc.

Madagascar, Guinea and Niger- Country and Supply Chain Overview

Demography and Performance Overview

	Madagascar	Guinea	Niger
			
Population[1]	26.3m	12.4m	22.4m
DTP3 Coverage[2]	75%	45%	79%
<5 mortality per 1,000 live births (2018)[3]	54	101	83
EVM Composite Score[4]	60.3% (2014)	40.2% (2015)	75.5% (2019)

1 United Nations. "World Population Prospects: The 2019 Revision." population.un.org. United Nations Department of Economic and Social Affairs, Population Division. 2019. https://population.un.org/wpp/
2. World Health Organization, UNICEF. WHO-UNICEF Estimates of DTP3 Coverage, 2019. https://apps.who.int/immunization_monitoring/globalsummary/timeseries/tswucoveragedtp3.html. Accessed June 17, 2020.
3. UNICEF. UNICEF Data Warehouse Under-5 Mortality, 2018. https://data.unicef.org/topic/child-survival/under-five-mortality/. Accessed June 17, 2020.
4. Global EVM Analysis

Supply Chain Overview

	Madagascar	Guinea	Niger
			
Regions/Province	22	8	8
Districts/Prefectures	114	38	72
No. of Facilities providing immunization	2, 666	413 Health Facilities, 849 Health Posts	1, 437
Supply Chain Tiers and Delivery Frequency	1. Central *(Quarterly to districts)* 2. Region *(not operational)* 3. District 4. HF with *CCE (collect monthly from district)*	1. Central *(Quarterly to district)* 2. District 3. HF with CCE *(Monthly pick-up from district, health posts (HP) with no CCE collect from HF for immunization sessions)*	1. Central *(Quarterly to region)* 2. Region *(Monthly to district)* 3. District 4. HF with CCE *(Monthly pick-up from district, health posts with no CCE collect from HF for immunization sessions)*

Madagascar, Guinea and Niger- System Design Scenarios

Stakeholder prioritized scenarios

Common scenarios across
Three countries: Change in delivery frequency and Optimizing number of supply chain tiers and storage capacities
Two countries: Network optimization, Direct delivery, Integration and Use of drones for deliveries

Common Theme	Guinea	Madagascar	Niger
Change in delivery frequency	**Change delivery frequency between tiers** Four regional stores (2a) **deliver to district bimonthly instead of monthly**	**Change delivery frequency to bimonthly** from district to HF	**Change delivery frequency from central to zonal**
Number of Supply Chain tiers	**Four new regional EPI stores** in Labé, Kankan, N'Zérékoré, and Kindia **Eliminate district tier**: regional stores deliver directly to HFs	Operationalize all **22 regional stores** Consolidate regions into **9 zonal hubs between central and district levels**	**Eliminate regional tier**, establish direct delivery from districts to HFs, integrate oxytocin **Eliminate district tier,** establish an additional central store, integrate oxytocin
Optimize network/distribution	Establish regional stores while **ignoring administrative boundaries**	**Ignore administrative divisions** to optimize routes between each tier	
Drones for delivery	Use **AAVs to serve remote areas**	Use **drones/autonomous aerial vehicles (AAV) to serve remote areas**	
Integration opportunities between iSC and other supply chains	**Integrate vaccines into the five regional PCG stores**		**Integrate oxytocin into the current iSC**
Direct (Push) delivery to lower levels	Regional stores **deliver directly to HFs** quarterly instead of monthly		Mixed system; two staging and central stores, some regional stores, **central to district delivery in three regions.**

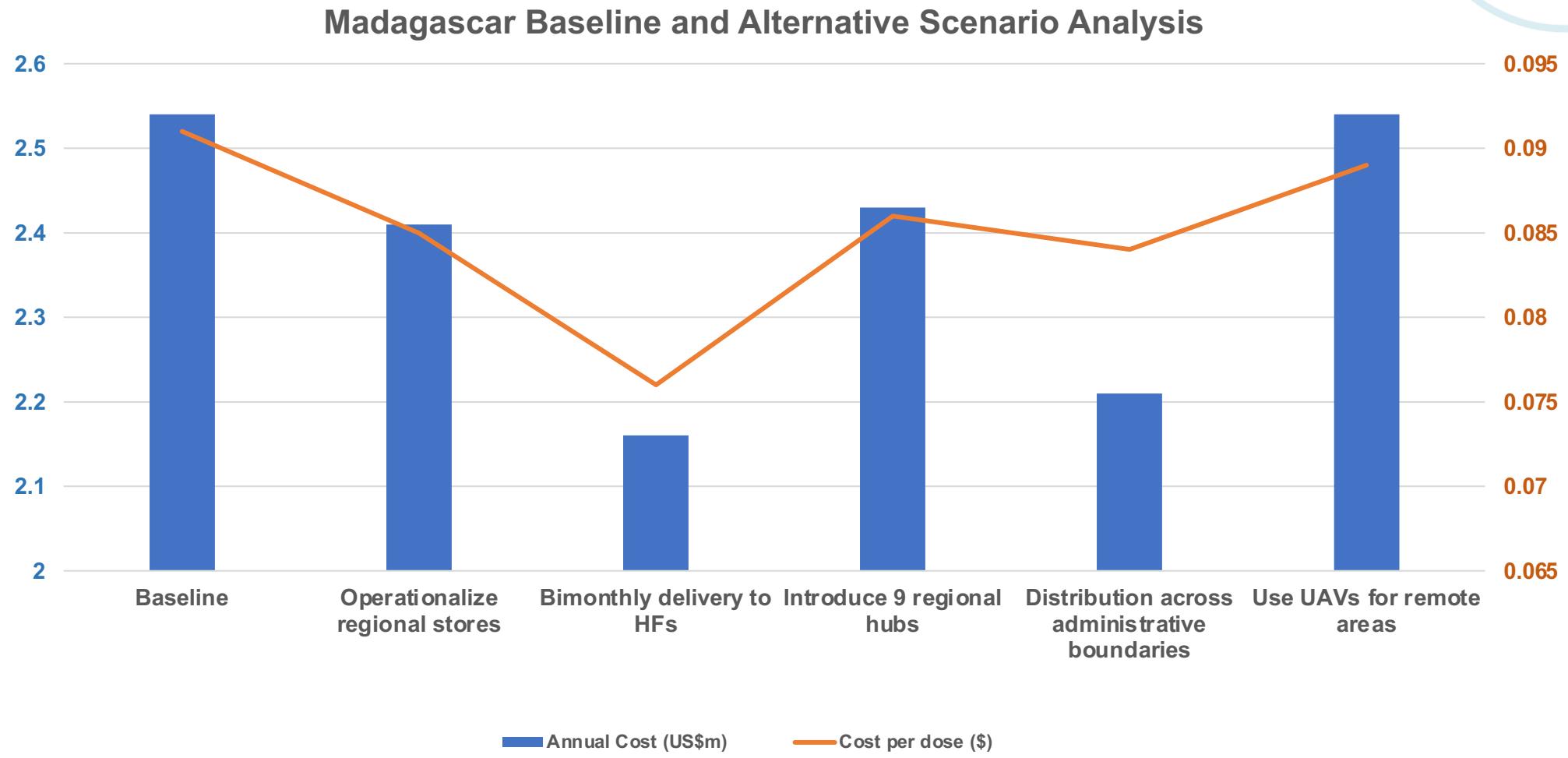
Analysis Indicators

Six (6) quantitative and qualitative indicators were used to compare baseline and alternative scenarios, guiding stakeholders decision making

Quantitative Indicators	Qualitative Indicators
• Total Supply Chain cost (annual, less product cost)	• Risk of mishandling products
• Cost per dose delivered to a service delivery point	• Logistics burden on health care worker
• Cold chain capacity utilization	• Feasibility to implement redesign

Madagascar, Guinea and Niger- System Design Analysis Results

Madagascar Analysis Results (1/2)

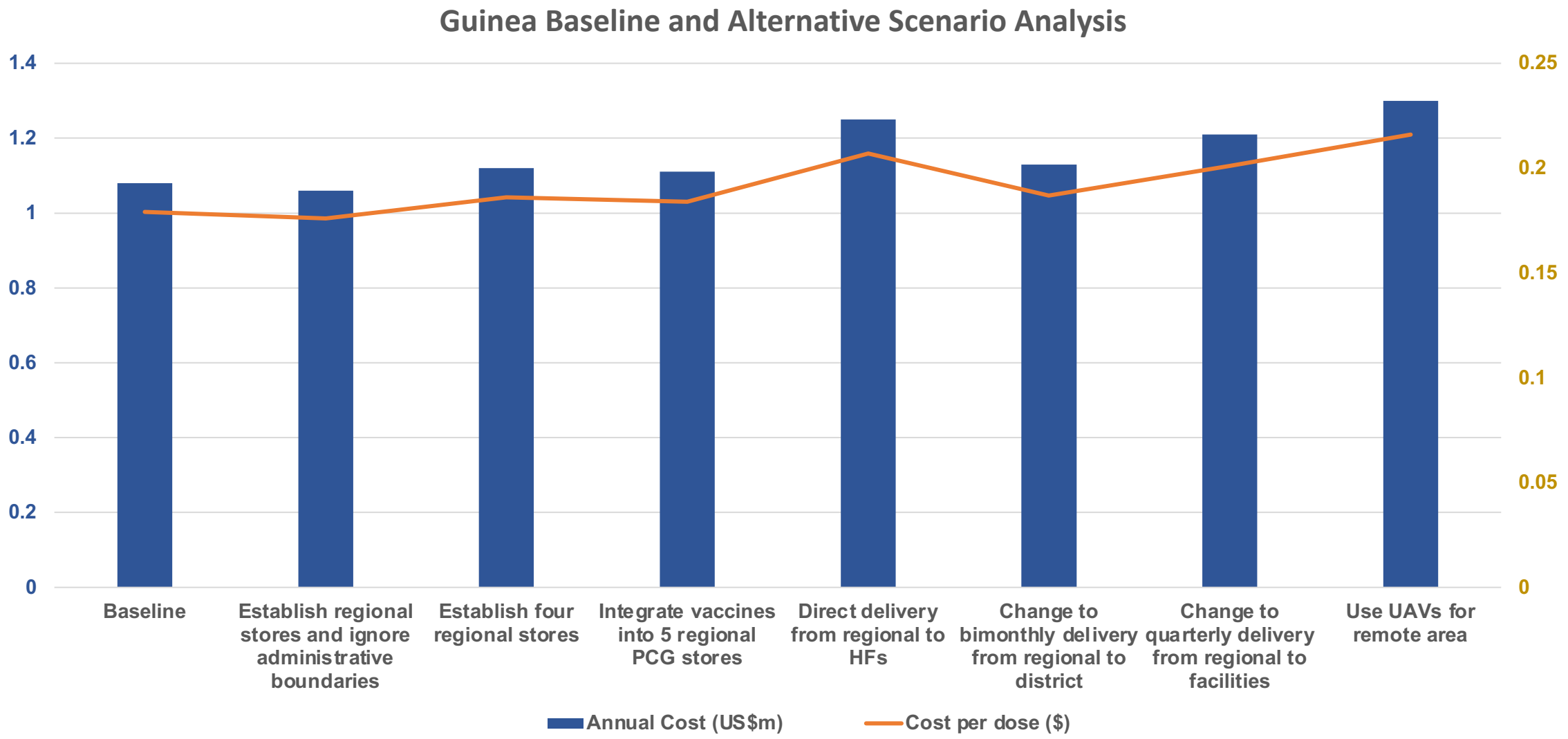


Madagascar Analysis Results (2/2)

	Risk of Mishandling	Logistics Burden on Health Care Workers	Feasibility of Implementation
Operationalize regional stores	🟡	🟡	🟢
Bimonthly delivery to HFs	🔴	🟢	🔴
Introduce 9 regional hubs	🟡	🟡	🟡
Distribution across administrative boundaries	🟡	🟢	🟡
Use UAVs for remote areas	🟡	🟢	🟢

🔴 Negative Impact 🟢 Positive Impact 🟡 Limited Impact

Guinea Analysis Results (1/2)



Guinea Analysis Results (2/2)

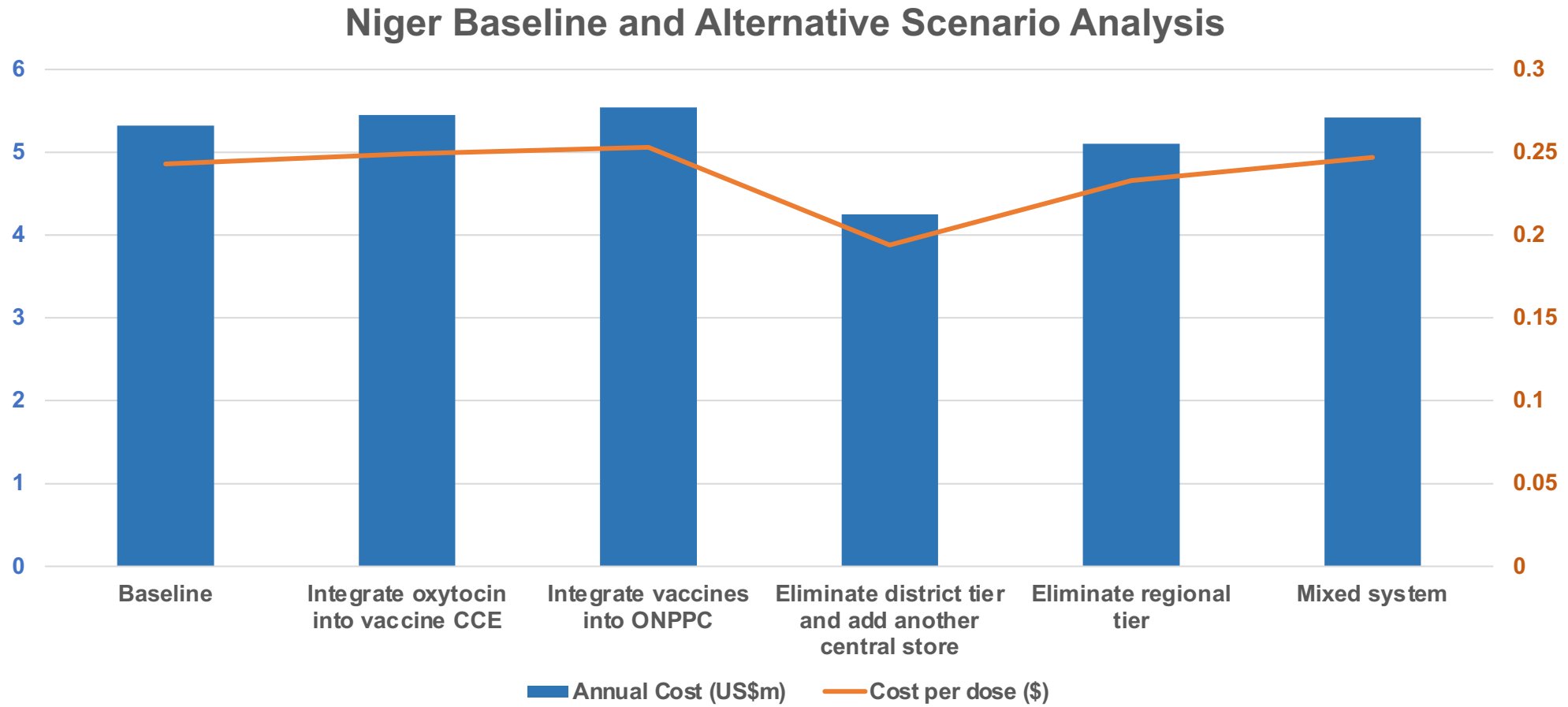
	Risk of Mishandling	Logistics Burden on Health Care Workers	Feasibility of Implementation
Establish regional stores and ignore administrative boundaries			
Establish four regional stores			
Integrate vaccines into 5 regional PCG stores			
Direct delivery from regional to HFs			
Change to bimonthly delivery from regional to district			
Change to quarterly delivery from regional to facilities			
Use UAVs for remote area			

 Negative Impact

 Positive Impact

 Limited Impact

Niger Analysis Results (1/2)



Niger Analysis Results (2/2)

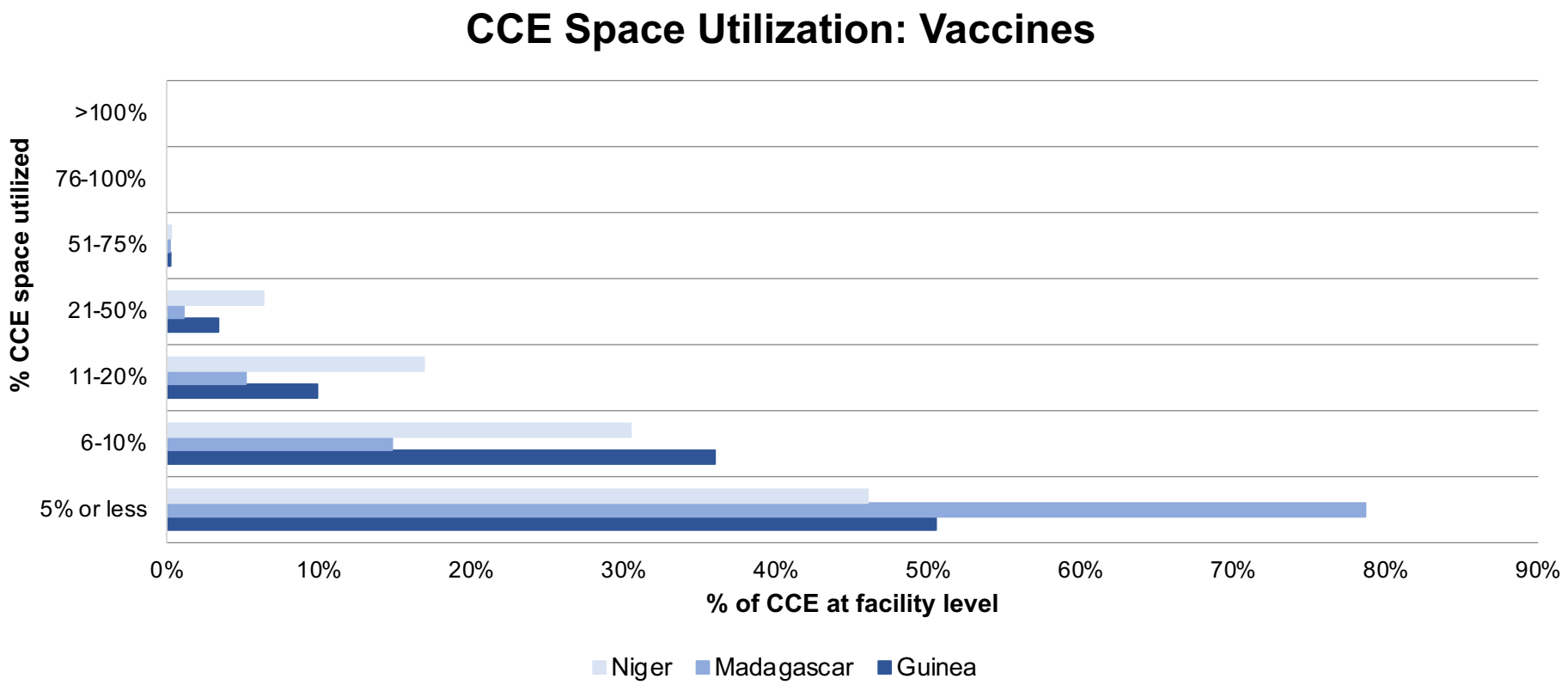
	Risk of Mishandling	Logistics Burden on Health Care Workers	Feasibility of Implementation
Integrate oxytocin into vaccine CCE			
Integrate vaccines into ONPPC			
Eliminate district tier and add another central store			
Eliminate regional tier			
Mixed system			

Negative Impact

Positive Impact

Limited Impact

Cold Chain Utilization: Facility level



Madagascar, Guinea and Niger System Design Analysis- Lessons

Lessons

- Common system design scenarios *with three countries align with those from previous system design countries including Nigeria, Mozambique, DRC, Pakistan etc.*

- Increasing consideration of rational integration between iSC and other Supply chains as well as innovations such as drone use- *more guidance on policies advocacy, standard operating procedures and implementation support required*

- While cost implications guide decision making, stakeholders prefer program (performance) related indicators

- Low health facility cold chain capacity utilization in countries- *efficiency and market shaping opportunities*

- Achieving stakeholder scenario prioritization and decision making is often challenging but critical

- Matching stakeholder prioritized scenarios with resources could impact implementation

Collective Partnership