

# **Webinar 2 – mHealth for Supply Chain Management for CCM**

August 29<sup>th</sup>, 2013

SCM Subgroup of the CCM Task Force

# Objective

This webinar with the SCM subgroup of the CCM Taskforce will provide examples of mHealth innovations currently in use and explore some of the ways mHealth can be used to enhance supply chain management within CCM programs.

## 4 Case Studies

- cStock in Malawi - Sarah Andersson
- ODK Scan in Mozambique – Emily Bancroft
- mTrac in Uganda – Davis Musinguzi
- CommTrack – Rowena Luk



# Introduction

mHealth for SCM for CCM offers a simple and effective way to improve:

- Communication between levels of the system
- Transmission of logistics data
- Visibility of logistics data up and down the supply chain

Increased visibility of community level data in SCM allows for:

- Better monitoring and managing of the supply chain
- Better planning and quantification

# Design Considerations

- Embedding technology as part of system strengthening intervention
- Review other software and build on them where possible
- Consider affordability and sustainability from the outset
- Focus on core workflows initially, don't overdesign
- SMS vs. GPRS
  - Decide whether to use existing phones or provide phones
  - Consider the number of users, data elements to collect and capacity of user base to use the technology



# cStock

Sarah Andersson

Country Technical Manager for the  
SC4CCM Project

# cStock: Problem Statement

## Malawi Baseline Assessment 2010

- **Product availability hampered by poor use and visibility of community level data**
  - **27%** of health surveillance assistants (HSAs) who manage health products had four CCM tracer drugs\* in stock on day of visit
  - **43%** HSAs submitting reports that contain logistics data to HC, and only **14%** of HCs reported passing that information to higher levels
- **Opportunity**
  - **94%** of HSAs surveyed had a mobile phone
  - **85%** had network coverage at least sometimes

\*cotrimoxazole, artemether lumefantrine 1x6 and 2x6, ORS

## Proposed Solution:

SMS-based system to manage reporting and resupply process: **cStock**



cStock was piloted in 6 districts from July 2011 to February 2013



# cStock: Design

cStock is a RapidSMS, open-source, web-based logistics management information system for community-level health products in Malawi, (CCM, FP and HIV testing).

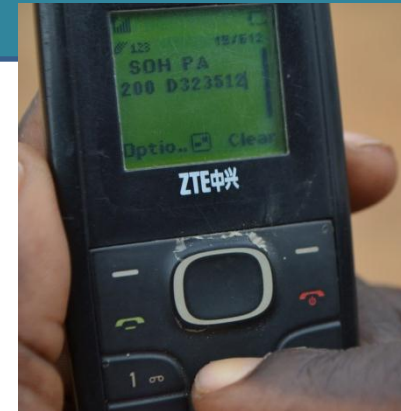
- HSAs and HC staff use their **personal phones** to report data via SMS on a toll free phone line.

**District, Zonal and Central staff** access HSA logistics data via **dashboard**



**Health Center** supplies the HSA based on SMS message

**HSA** sends SMS with SOH each month



Product Flow

Data Flow

## Streamlined resupply process

- **Minimal reporting:** HSA only reports stock on hand and receipts
- **cStock calculates consumption and determines resupply quantities:** System calculates consumption for individual HSAs based on past reports and determines the resupply quantities
- **No unnecessary travel:** HC receives resupply quantities for each HSA via SMS and notifies HSA either “order ready” or “out of stock”. HSAs only travel if products in stock

# cStock: Data Visibility

Log out sarah



# cStock



Dashboard

HSAs

Health Facilities

User Profiles

M & E

Message Log

Message Tester

Management

Help

Reporting Rate

Stock Status

Consumption Profiles

Alert Summary

Re-supply Qts Required

Lead Times

Order Fill Rate

Emergency Orders

## Stockout rates

District	% HSA with at least one stockout
Machinga	0.0%
Nkhatabay	0.0%
Mulanje	0.0%
Nkhotakota	0.0%
Nsanje	0.0%
Kasungu	0.0%

## Current alerts

	% HSAs
With EOs that HCs cannot resupply	13%
Resupplied but remain below EO	68%



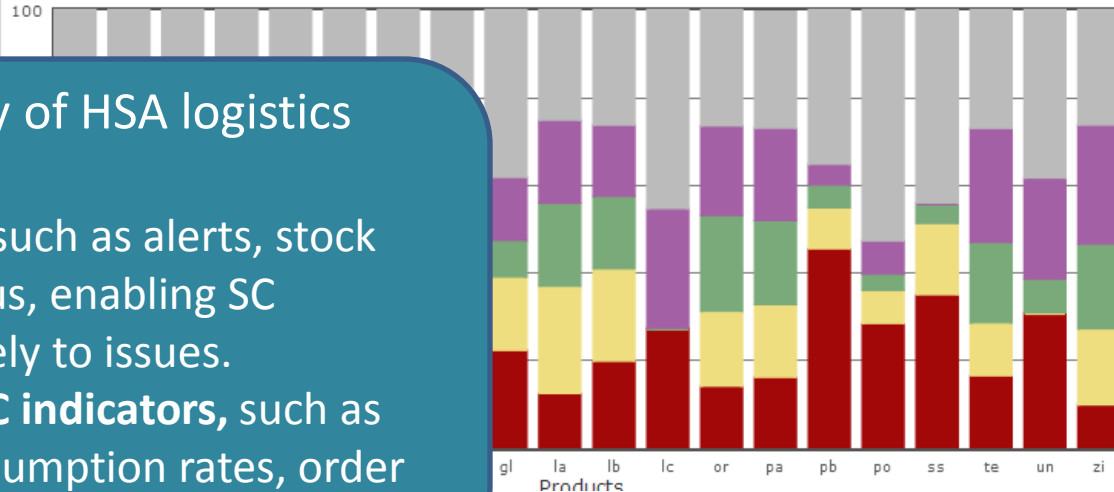
Current National Picture

## Current stock status by product

■ Stocked out ■ Under stock ■ Adequate stock ■ Overstocked ■ No Data

% of HSAs

100



The dashboard provides visibility of HSA logistics data at district / central level:

- cStock provides **real time data**, such as alerts, stock out rates and current stock status, enabling SC managers to respond immediately to issues.
- cStock calculates and displays **SC indicators**, such as reporting rates, lead times, consumption rates, order fill rates, for system monitoring and coordination.



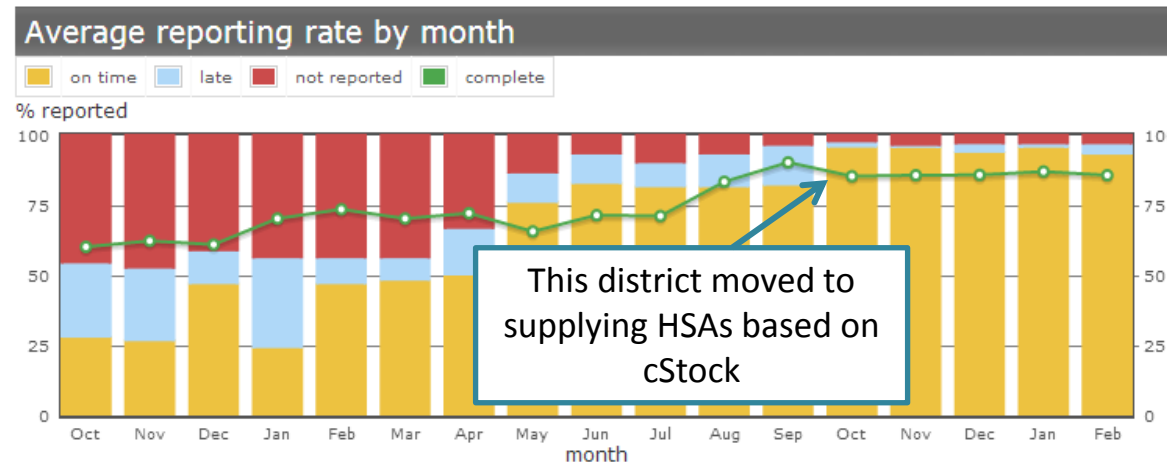
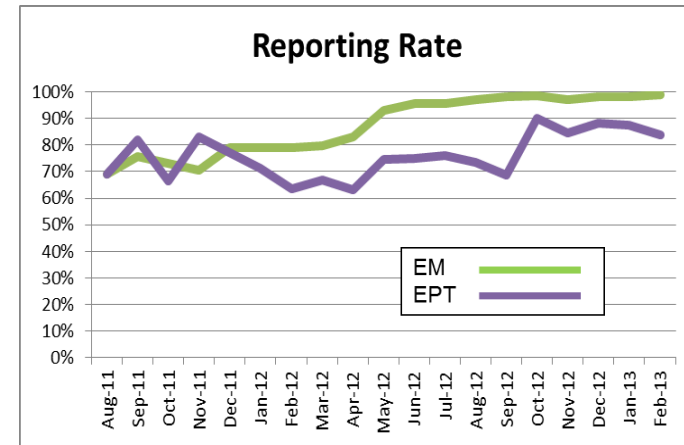
# cStock: Midline Evaluation, February 2013

- **Addressing a need: making data visible**
  - Since October 2012 reporting rates in cStock are **consistently above 80%**
- **Efficiency: time to prepare & submit requests and collect products**
  - Majority (56%) said preparing the SMS report took less than 20 minutes, while 92% said the paper report took more than 20 minutes
  - 57% of HC staff report prepacking products prior to HSAs arrival
  - 99% of HSAs found cStock saved them time in collecting products as they are “only forced to travel when our products are ready”
- **Acceptability: Use and trust in cStock**
  - 94% of HSAs primarily use cStock for requesting health products
  - 92% of Drug Store in Charges use cStock to determine the quantities to resupply to HSAs
  - 3 of 6 District IMCI Coordinators said they trust the cStock data more than the paper based reports, 1 of 6 said they trust it equally
- **Accuracy: comparing reported data with records**
  - 93% accuracy comparing qty requested in cStock and qty recorded on resupply worksheet
  - 72% accuracy comparing receipt qty in cStock with qty recorded on the resupply worksheet
- **Communication: linking HSAs to their resupply point**
  - *“We take cStock as a messenger, messenger between HSA and the health center it helps us to reduce mortality rate of under five.”* – HSA, Nkhatabay



# cStock: Successes and Lessons Learned

- **Combining an mHealth solution with processes for routine use of data** ensures sustained system use, better performance and managerial oversight
  - In 3 of the pilot districts (EM), District Product Availability Teams (DPATs) were formed linking HSAs, HCs and Districts



- **Linking reporting to resupply results in better reporting rates**

- **Use of personal mobile phones has contributed to rapid scale up of cStock**
  - 20 of the 29 districts (only 6 supported by SC4CCM) in Malawi will be using cStock by end of October 2013, two years since cStock was first implemented
- **A user-centered, iterative and rapid deployment approach** to system development contributed to broad acceptance and use of cStock in Malawi
  - A second development phase during the pilot focused primarily on improving data display on the dashboard and easier to use reports

# ODK Scan

Emily Bancroft

Program Director, Health Systems at  
VillageReach

# ODK Scan: Problem Statement

## Context

- Paper-Based systems are still the most prolific data collection method in “last mile” environments
- Despite proliferation of digital data collection systems, paper records remain standard practice.
- Is there a way to keep the data on paper, but capture and transmit it with limited burden on the health worker?



## Technology

- Android-based technology
- User captures an image of the form using the camera
- ODK Scan processes the data fields and aggregates data to upload into database when connectivity is available
- Currently limited to certain types of data capture (bubbles, tallies, yes/no, multiple choice)

# Form Anatomy

**Folha de Consumo Mensal de Medicamentos do APE**

Provincia: Marrão  
 Distrito: Mosca  
 Comunidade: 1  
 Nome do APE: Saly  
 Mês: Março Ano: 2013

Ficha a ser preenchida pelo APE e entregue a Unidade Sanitária de referência até dia 21 de cada mês, durante o período de estudo. Por sua vez, a Unidade Sanitária de referência entrega ao SDSMAS coordenador dos APEs.  
 Instruções: Para cada paciente tratado pinte, diariamente, uma bolinha na linha correspondente ao tratamento receitado. No início e no final de cada mês faça a contagem dos medicamentos que dispõe e usados, e preencha nos espaços em branco.

Medicamentos	Stock no Início do Mês	Total Recebido no Mês	Numero de Tratamentos Usados	Total Tratamentos Usado	Stock no Fim do Mês	Ruptura de Stock
SRO 1 bolinha = 1 pacote	25 Pacotes	10 Pacotes	●●●●● ●●●●●	50	20 Pacotes	Sim <input type="checkbox"/> Não <input checked="" type="checkbox"/>
Zinco 20 mg Crianças de 2 a 5 Meses 1 bolinha = 1 criança	10 Comprimidos	30 Comprimidos	●●●●● ●●●●●	39	✓ Comprimidos	Sim <input checked="" type="checkbox"/> Não <input type="checkbox"/>
Amoxicilina Crianças de 2 a 11 meses 125 mg 1 bolinha = 1 criança	100 Comprimidos	50 Comprimidos	●●●●● ●●●●●	30	~ Comprimidos	Sim <input checked="" type="checkbox"/> Não <input type="checkbox"/>
Amoxicilina Crianças de 1 a 5 anos 250 mg 1 bolinha = 1 criança	75 Comprimidos	25 Comprimidos	●●●●● ●●●●●	30	~ Comprimidos	Sim <input type="checkbox"/> Não <input checked="" type="checkbox"/>
Atenuato Supositório 50 mg (1-12 meses) - 1 supositório	50	100	●●●●● ●●●●●	13	~	Sim <input checked="" type="checkbox"/> Não <input type="checkbox"/>
Atenuato Supositório 50 mg (13-42 meses) - 2 supositórios	100	100	●●●●● ●●●●●	20	# Supositórios	Sim <input type="checkbox"/> Não <input checked="" type="checkbox"/>
Paracetamol 500 mg 1 bolinha = 9 comprimidos	25 Comprimidos	32 Comprimidos	●●●●● ●●●●●	29	# Comprimidos	Sim <input type="checkbox"/> Não <input checked="" type="checkbox"/>
Paracetamol 250 mg 1 bolinha = 9 comprimidos	17 Comprimidos	26 Comprimidos	●●●●● ●●●●●	24	# Comprimidos	Sim <input type="checkbox"/> Não <input checked="" type="checkbox"/>
Sal Ferroso 90 mg + Acido Fólico 1 mg 1 bolinha = 15 comprimidos	37 Comprimidos	103 Comprimidos	●●●●● ●●●●●	38	# Comprimidos	Sim <input checked="" type="checkbox"/> Não <input type="checkbox"/>
Tetraciclina Pomada 1 bolinha = 1 Tubo	5 Tubos	3 Tubos	●●●●● ●●●●●	23	# Tubos	Sim <input type="checkbox"/> Não <input checked="" type="checkbox"/>

**Folha de Consumo Mensal de Medicamentos do APE**

Provincia: Marrão  
 Distrito: Mosca  
 Comunidade: 1  
 Nome do APE: Saly  
 Mês: Março Ano: 2013

Ficha a ser preenchida pelo APE e entregue a Unidade Sanitária de referência entregue ao SDSMAS coordenador dos APEs.

cada mês faça a contagem dos medicamentos que dispõe

Medicamentos	Stock no Início do Mês	Total Recebido no Mês
SRO 1 bolinha = 1 pacote	25 Pacotes	10 Pacotes

Medicamentos	Número de Tratamentos Usados		
SRO	●●●●● ●●●●●	●●●●● ●●●●●	●●●●● ●●●●●

com um x):

Sim   
 Não

~  
Comprimidos

# Current Functionality

Folha de Consumo Mensal de Medicamentos do APE

Provincia: **Maputo**  
 Distrito: **Manhica**  
 Comunidade: **1 de Maio**  
 Nome do APE: **Cesaltina Cossa**  
 Mês: **Março** Ano: **2013**

Folha a ser preenchida pelo APE a entregar a Unidade Sanitária de referência até dia 21 de cada mês, durante o período de estudo. Por sua vez, a Unidade Sanitária de referência entregará ao SDCMS o computador dos APEs.

Instruções: Para cada paciente tratado (incluindo, diariamente, uma bolacha na linha correspondente ao tratamento realizado. No início e no fim de cada mês, a quantidade dos medicamentos que estão a usar, e preencha nos espaços em branco.

Medicamentos	Stock no Inicio do Mês	Total Recebido no Mês	Numero de Tratamentos Usados	Total Tratamentos Usados	Stock no Fim do Mês	Registos a Stock
SRO 1 bolacha = 1 pacote	75 Pacotes	10 Pacotes	50	50	20	50
Crianças de 2 a 5 Meses 1 bolacha = 1 criança	10	30	39	39	✓	50?
Crianças de 6 Meses a 5 Anos 1 bolacha = 1 criança	100	50	30	30	✓	39?
Crianças de 2 a 11 meses 125 mg	75	25	30	30	✓	30?
Crianças de 1 a 5 anos 200 mg	50	100	13	13	✓	26?
Adolescentes Suspendidos 50 mg (12-17 meses) 1 suspensão	100	160	20	20	✓	20?
Paracetamol 500 mg 1 bolacha = 0 comprimidos	25	32				
Paracetamol 300 mg 1 bolacha = 0 comprimidos	17	26				
Sal Paracetol 25 mg + Anala Parol 1 mg 1 bolacha = 10 comprimidos	37	103				
Sal Paracetol 25 mg + Anala Parol 1 mg 1 bolacha = 2 Tabletes	5	3				

ODK Collect > APE

Provincia

Maputo

Maputo

SRO Numero de Tratamentos Usados

50

ODK Collect > APE

Rupturas De Stock Zinco Comprimidos

Yes

No

1 2 3

SRO - Stock no inicio do Mes

75

Pacotes

Provincia  
Maputo

Distrito  
Manhica

Comunidade  
1 de Maio

Nome do APE  
Cesaltina Cossa

Mes  
Março

Ano  
2013

SRO - Stock no inicio do Mes  
25

Submissions Form Management Site Admin

Filter Submissions Exported Submissions

Form APE Filter no images

Save Save As Delete

Submissions per page 100

Filters Applied no images Add Filter

Display Metadata

Hide ... tetra\_image\_2

xformstarttime	xformendtime	provincia	distrito	comunidade	APE_name	mes	ano	SROstocknoinicio	SROstockrecebido	SROusado	SRO
Tue Dec 18 07:18:02 UTC 2012		Maputo	Marracuene	Abel Jafar	Alcinda Dzovela	December 2012	2012	20	5	15	5
Fri Dec 28 11:59:21 UTC 2012		Maputo	Manhica	Dluana	Leonardo ChaΦque	December 2012	2012	60	0	15	38
Fri Dec 28 12:21:10 UTC 2012		Maputo	Manhica	Barrica	Palmira Macuacua	December 2012	2012	26	75	12	81

Visualize Export Publish

# Integration of ODK Scan into APE Intervention in Mozambique

## Background

- **Goal was to design and pilot community health worker supply chain interventions to address:**
  - Product availability – *do APEs have life-saving drugs when they need them?*
  - Program supply chain visibility – *do partners and stakeholders have the right information at the right time to effectively manage the pipeline of commodities?*
- **Baseline: Challenges for APE Program Logistics**
  - Lack of standardized system for reporting logistics data or resupply
  - Limited APE ability to track data and store commodities properly at their homes
  - General concerns about transport for collection and supervision



# ODK Scan as part of a Larger Supply Chain Intervention

- Logistics & resupply process strengthening
  - Designing logistics process job aids and providing basic logistics training
- Storage practice strengthening
  - Providing select APEs with sturdy, secure boxes for commodity storage
- **Improvement of logistics visibility**
  - Designing and training APEs on an adapted logistics report form including consumption data
  - **Providing training and hardware to district supervisors for electronic data capture using ODK Scan**
- Improvement of environment for commodity availability
  - Conducting follow-up trainings and routine monitoring and supervision of the interventions





# Conclusions and Lessons Learned

- **Availability of consumption data from APEs is possible with the right training and supervision**
  - Data quantity: 81% submission rate over the project period
    - 68% submission rate when removing incomplete forms (months 4-6 is 72%)
  - Data timeliness: 82% submitted by the 5<sup>th</sup> of the following month using ODK
    - Note there was no set deadline for the data to be submitted
    - Health worker strike had a clear impact on submission date
  - Data completeness: 85% of submitted forms complete (95% in months 4-6)
  - Data accuracy: 80-85% accuracy on forms that were submitted and complete
- **ODK proved to be a reliable and useful tool that was quick to deploy for submitting data at a district level**
  - Smartphones available and working throughout the project with 1 broken in the last month due to a battery problem
  - District supervisors consistently reported being satisfied with the system, citing the facilitation of electronic form processing and sending
  - 10-13 minutes to process each form
  - All forms processed over 1-2 days
  - More functionality needed to capture numbers and other data points
  - Simplify form as much as possible to reduce errors and decrease completion and processing time

# Comparative Analysis

## Conclusions

- Paper is easier and cheaper to deploy, but fails to deliver better data utilization benefits over digital
- Digitizing data must improve to displace paper data collection's advantages
- ODK Scan's ease and cost of deployment challenges are likely less than direct digital approaches near term

Key Comparison Attributes		Existing approaches that use paper to collect but not digitize data at the service delivery level		Newer approaches that digitize data at the service delivery level	
		All paper system with aggregate data sent up to higher levels	Paper with data converted via PC-based data entry at a higher level	ODK Scan	Direct to digital via a mobile device – no paper
Cost and ease of deployment	<u>Physical environment</u>				
	Weak infrastructure	●	●	●	●
	Harsh conditions	●	●	●	●
	<u>Human environment</u>				
	Weak skill level	●	●	●	●
	Time to complete data collection	●	●	●	●
	User acceptance	●	●	●	●
	<u>Implementation</u>				
	Time to deploy	●	●	●	●
	Few dependencies	●	●	●	●
	Cost to deploy	●	●	●	●
	Ease of deployment	●	●	●	●
	Scalability	●	●	●	●
	Sustainability	●	●	●	●
Total cost of ownership	●	●	●	●	
Leads to form proliferation	●	●	●	●	
Benefits	<u>Data utilization</u>				
	Breadth of access	●	●	●	●
	Speed of access	●	●	●	●
	Quality	●	●	●	●
	Ease of use	●	●	●	●
	Portability	●	●	●	●
	Versatility (aggregated vs. granular)	●	●	●	●
	Empowers workers	●	●	●	●

● Strength vs. others

● Neutral vs. others

● Weakness vs. others



# mTrac

Dr Davis Musinguzi

Health Systems Strengthening Specialist at  
UNICEF Uganda



# Background

## **Challenges with HMIS Collection, Analysis, Usage of Data**

1. Compliance
2. Timeliness
3. Accuracy
4. Logistics
5. Infrastructure
6. Responsiveness

## **mTrac Objectives**

1. To adapt an application for mobile phones to collect routine HMIS data
2. through To strengthen data collection, analysis and usage by stakeholders in the supply chain.
3. To generate greater accountability in supply chain management.



**Community**

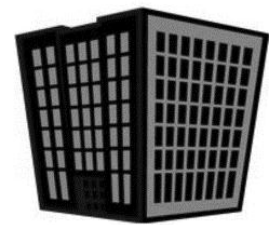
**Community Health Worker**



**Hospital**

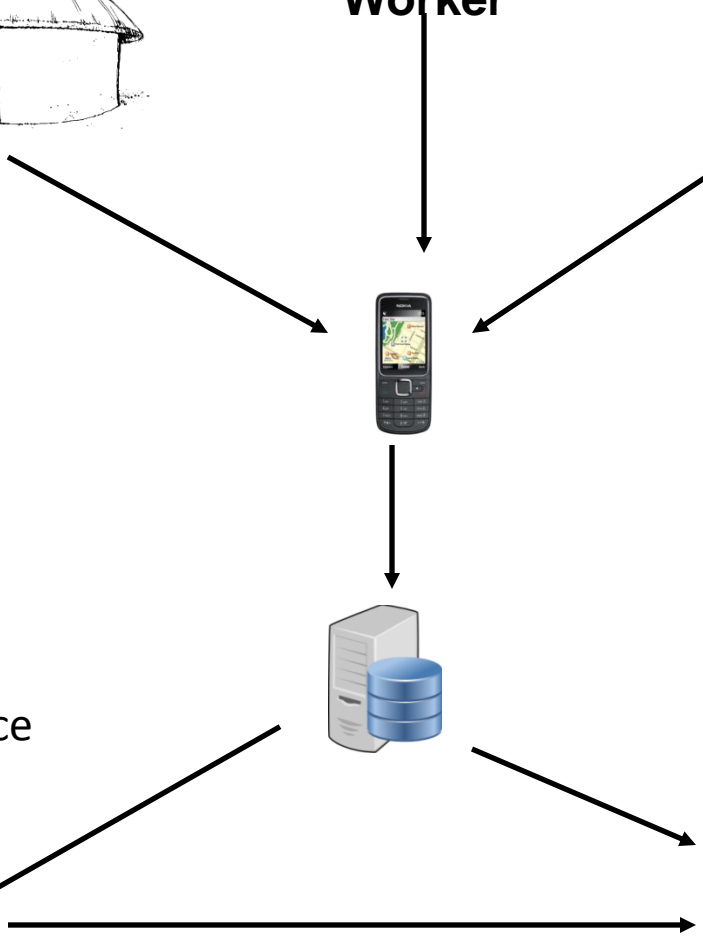


**District Health Office**



**Ministry of Health**

**Information Flow**





# Successes

- All 112 DHTs have been trained and provided the necessary equipment to support mTrac covering over 5000 Units.
- Over 20,000 Health Facility workers have been trained and registered in mTrac.
- Current reporting rates of the weekly HMIS stand at 60-70% of total Health Facilities
- mTrac has contributed to an improvement of facilities without stock outages currently at 88.1% in comparison to 74.8% at the start of the initiative.
- Various departments within the MoH are now using mTrac to communicate to the DHTs and HCs, conduct rapid surveys and polls.
- In 2012, 5472 actionable reports were received through the MoH's anonymous SMS Service Delivery Complaints hotline and nearly 70% successfully resolved.



# Lessons

1. The value of multiple stakeholder engagement and government ownership
2. Basing any mobile reporting on existing and up-to-date HMIS tools
3. The value of training District Health Management Teams on ICT
4. Use of SMS Communications, reminders & weekly recognition
5. Engaging technical programs to demand for real time HMIS data through analysis reports for data use
6. Utilising the existing personal mobile phones owned by Health Facility Workers
7. Leveraging Peer (DHT) led Support Supervision for sustainability

# CommTrack

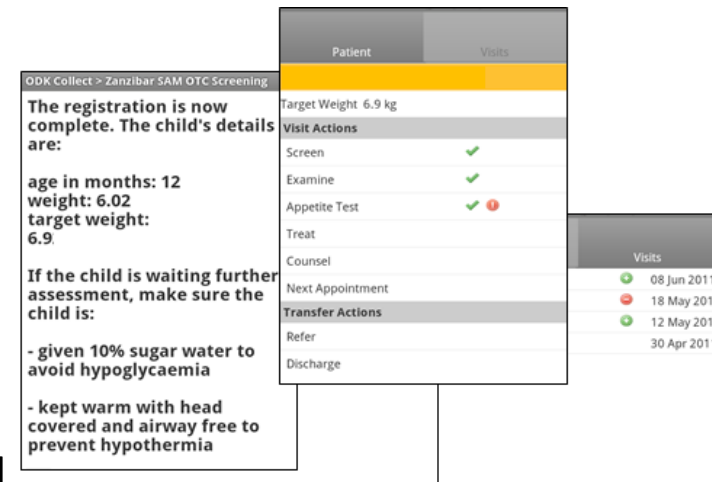
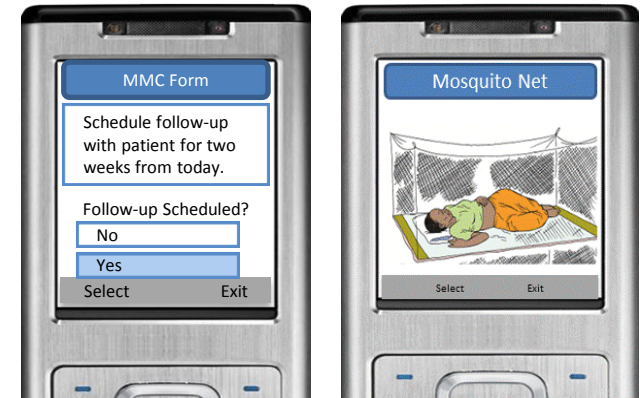
Rowena Luk

VP of Strategy at Dimagi and Product  
Owner for the CommTrack mobile logistics  
solution



# mHealth, Supply Chain and CCM

- **Dimagi:** providing Open Source mHealth tools and implementation services for more than 130 projects in 30 countries
- **SMS for Logistics**
  - cStock in Malawi: 1800 HEWs → drives replenishment!
  - mTrac in Uganda: 7059 VHTs, 3000 facilities
  - The Early Warning System in Ghana: 500 facilities
  - ILSGateway in Tanzania: 4,500 facilities
  - UNICEF Bednets: largest campaign of its kind at the time
- **SMS for CCM**
  - ICCM with 150 CHWs in Mozambique and Uganda with Malaria Consortium, including decision support, respiratory rate counter, and stock management
  - CommCare evaluated for C-IMCI in Malawi as part of an RCT by D-Tree International, showing significant improvements in protocol adherence
  - Multi-country C-MAM module being developed by World Vision, deployed by Real Medicine Foundation in India



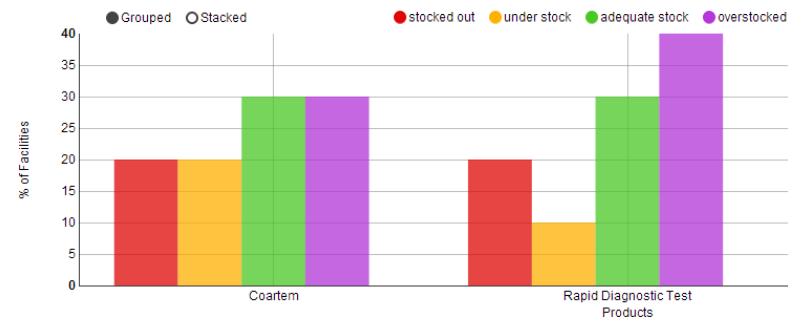
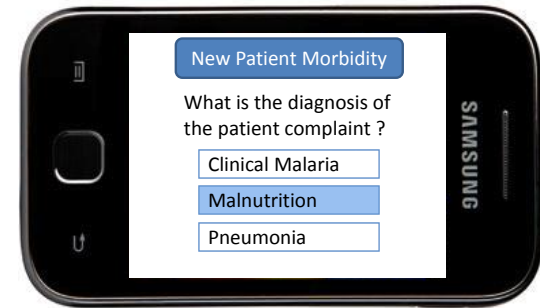
# Challenges & Sustainability

- What happens after the project is done?
- Growing pains
  - scale volume
  - scale for different programs
  - scale for organizational change
- Playing nice with other systems
- Duplicate efforts
  - Servers
  - Features
- Identifying local software support
- Fostering a data-driven culture



# Our Strategy: CommTrack

- Core, reusable logistics functionality from cStock, ILSGateway, EWS, and mTrac
- Shared resources invested in hosting, support, scale-up, testing, and continuous development
- Easy online signup: get started quickly, learn fast
- Currently in Beta release
  - Deployed: India to track ORS & Zinc at outlets in 14 states
  - Upcoming: Senegal and Nigeria to track family planning commodities, Burkina Faso for CHWs to track malaria commodities
- SMS or Mobile App
  - SMS: Easy, lightweight rollout
  - Mobile App: Integrated approach for CCM: protocol support, respiratory counter, patient follow-up, commodity tracking
- Challenge: ongoing tension between short-term project-specific needs and long-term generic features and authoring tools



Product	Stocked Out	Understocked	Adequate Stock
Coartem	20.0%	20.0%	30.0%
Rapid Diagnostic Test	20.0%	10.0%	30.0%
Sulfadoxine/Pyrimethamine	10.0%	20.0%	40.0%

# Summary

- Embedding technology as part of larger system strengthening intervention
- Review other systems and build on them where possible
- Consider affordability and sustainability from the outset
- Focus on core workflows initially, don't overdesign
- SMS vs. GPRS

# Links

- <http://sc4ccm.jsi.com/countries/malawi/>
- <https://confluence.dimagi.com/display/Imis/Lessons+Learned>
- <http://www.commtrack.org>