

# *Mobile Technologies & Community Case Management*

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*Solving the Last Mile in Health Care Delivery*

# 1

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## *Understanding Community Case Management*

### Contents

#### Understanding Community Case Management

- 4 What is Community Case Management?
- 5 Community Case Management Challenges
- 7 What is a Community Health Worker?
- 8 Mobiles & Real-Time Information
- 10 A framework for leveraging the power of mobile phones and real-time information

#### Workshop

- 14 Workshop Goals
- 18 Workshop Process

#### Focus Areas

- 22 Bridging the Gap between Supply and Health Groups
  - 26 Giving Voice to Demand
  - 30 Building Capacity through Incentives
  - 34 Solution Highlights
  - 36 Design Principles
- 
- 40 Participants
  - 42 About

### Introduction

Mobile phones can change the way healthcare is delivered in the most rural and underserved parts of the world. There is now a way to have real-time, two-way communication with communities that are beyond the periphery of formal health systems.

A child gets sick in a remote village in Malawi. She is undernourished and there is over a 50 percent chance that she has either pneumonia, diarrhea or malaria. The nearest health clinic is a day's walk away and her family can barely afford to take her. A Community Health Worker (a volunteer member of the community, trained to diagnose, treat and refer) can mean the difference between life and death.

Largely unsupported by the formal health system, this Community Health Worker is often unable to make a timely and accurate diagnosis. One solution to the disconnectedness, these problems of distance, time, and access to information, exists in the increasingly ubiquitous mobile phone.

Now, the Community Health Worker can use her phone to get information, ask advice, re-order life-saving drugs, and receive feedback from the otherwise-distant formal health system. Additionally, these interactions provide vital traces, at a national level, of activities and needs that were previously impossibly far away, creating the ability for realtime monitoring and accountability.

To explore this unique solution-space UNICEF and frog brought together public health, mobile health and design constituencies to create an adaptable model for how mobile can best support Community Health Workers as they diagnose, treat and refer the most common killers of children.

# What is Community Case Management?

To bridge the access gap to basic healthcare, Ministries of Health in developing countries increasingly rely on existing front-line community health workers to diagnose, treat and refer children from remote communities with common childhood illnesses. Integrated Community Case Management is a strategy whereby front-line health workers are trained, supplied, and supervised to deliver treatments in the community to children with pneumonia, diarrhea, and malaria and sometimes dysentery, newborn sepsis and acute malnutrition.

Community Case Management is not a new strategy. It has existed at small scale for decades and at large scale for single diseases for years (such as pneumonia control in Nepal). What is new is the priority that global development partners and governments have given to large-scale adoption of Community Case Management as a critical link in the healthcare system.



## Community Case Management Challenges

“We do not need a new science or new gadget to address the challenges we face today. What we need is to remove the bottlenecks that prevent these population groups from sustainably accessing essential services.”

—Nicholas Alipui, Director of UNICEF Programmes

### Incentives

*Motivating community health workers and citizens to participate in Community Case Management services.*

### Quality of Care

*Fostering successful case management through effective diagnosis, treatment, referrals, and follow-up.*

### Training

*Sharing knowledge and tools to aid Community Health Workers and increase their capacity to handle Community Case Management services.*

### Retention

*Celebrating and recognizing the efforts of Community Health Workers to foster high morale and engagement.*

### Monitoring

*Analyzing and aggregating data to trigger feedback and dialogue.*

### Supervision

*Strengthening links between the community health worker and health system, relying on local solutions as often as possible.*





# What is a Community Health Worker?



A Community Health Worker is a trusted member of the community—a mother or father, a local farmer or business owner—who serves as the primary link in healthcare delivery for many under-served populations. She spends the time she has to spare as a healthcare extension worker, creating a crucial bridge between the community and the healthcare system. She has recognized the suboptimal state of her community's health, and is motivated by the opportunity to improve it. She gains recognition and respect within the community and is rewarded by small incentives provided by the healthcare system and NGOs in exchange for her extension worker work.

Through the minimal training she receives from the clinic, NGOs and the Ministry of Health, she educates the community on healthcare and health-related topics of daily living, like safely preparing food. She sometimes assumes the role of healthcare worker, and often helps out around the understaffed clinic with record keeping, patient intake and a variety of clerical and clinical duties. Through her existing position as a community leader, she is the liaison between the community and the clinic, providing medicine, information and enabling transportation to clinic visits when necessary.



# Mobiles & Real-Time Information

Disparities and inequities are increasing in the world today particularly around access to health services. How do we remove the bottlenecks that prevent the most underserved population groups from sustainably accessing essential services? One of the key bottlenecks is the ability to know where disparities are the greatest so that resources can be targeted more effectively.

The expanded reach of mobile devices and wireless networks may prove to be valuable tools in improving services. However, in order to increase the impact of integrated Community Case Management, they must be used in a way that maximizes their capabilities to provide breadth instead of depth and to capture every interaction in realtime. UNICEF and its partners are beginning to explore new ways in which mobile technologies can help them answer these questions in real-time:

*Are we reaching the right people?*

*What are the returns on our investments?*

*How can we make mid-term course corrections to our programmes based on feedback from real time data?*

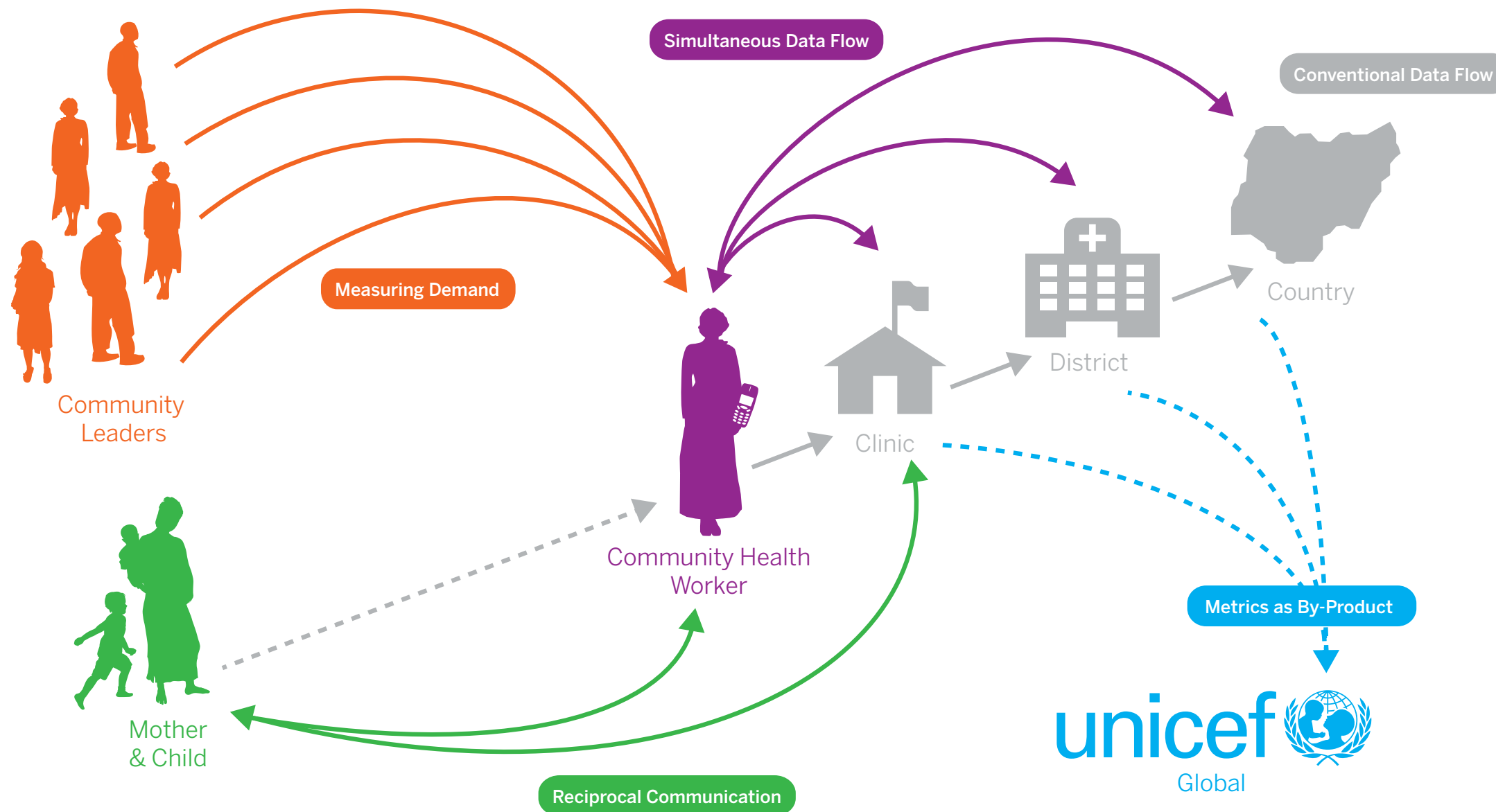
*How can we get the few key pieces of information we need that can help programme managers act in time?*

*Can mobiles help us improve programmatic outcomes and increase impact?*

*And how can we engage the people we serve in this process?*



# A framework for leveraging the power of mobile phones and real time information



**Conventional Data Flow:** Mobile technologies were originally viewed as a more efficient means of data collection, replacing printed forms. This data was integrated into existing processes in which information flows in one direction to support oversight and decision-making.

**Simultaneous Data Flow:** Much more powerful results can be achieved when this data is shared simultaneously with participants throughout the ecosystem in a timely manner. Tailored views of the information are essential to ensure that the data is useful to different participants.

**Reciprocal Communications:** Engagement between participants is greatly enhanced by the simple power of conversation, recognizing the personal and social nature of mobile phones. Simple forms of feedback and acknowledgement have been shown to dramatically increase the use and appeal of these services.

**Measuring Demand:** Mobile technologies can open up a dialogue with communities to drive demand for services and monitor needs across diverse communities allowing service providers to predict as well as react to health needs and creating a positive feedback loop that builds over all trust in the healthcare system.

**Metrics as a By-Product:** The most effective metrics can be captured as a by-product of human-centered design and increased engagement across a range of participants. Services created with a metrics-first are often burdensome and alienating to health workers as they don't provide any immediate benefits or acknowledgement for their work.

# 2

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## *Workshop*

*How can we apply mobile phones and real-time information to strengthen community case management?*

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*We brought together a community of international experts in public health and mobile technologies to answer that question.*



# Workshop Goals

A one-day gathering in New York City which brought together key stakeholders from public health programming and mobile health implementers to build alignment around how mobile phones can support the tools, processes and systems of integrated Community Case Management. The workshop was hosted and facilitated by frog, a global innovation firm and UNICEF partner. The first order goal of the workshop was for the two communities to share best practices and explore innovative ways to integrate mobile technologies into Community Case Management. This supported the second order goal: to better support community health workers to serve underserved communities more effectively and improve key child survival outcomes. In this collaborative and action-oriented workshop we:

*Generated a provisional model for how the different layers of healthcare providers and their user experience fits together.*

*Identified key opportunities for alignment in the planning and prioritization process to support this integrated user experience.*

*Discussed specific local and regional needs in order to integrate the appropriate flexibility for location-specific customization.*

*Generated a set of guiding principles for enhancing Community Case Management and the role of the Community Health Worker through mobile technologies.*











### Workshop Process

1

#### Knowledge Shareout

A workshop's success is driven by the collective expertise and knowledge available in the room. Our first step was to share successes and failures from our varied perspectives and experiences in healthcare, government and technology (and their intersections).



2

#### Scenario Building

Scenarios help envision people using a future tool or service in a specific situation. Divided into groups, we imagined an ideal service or process centered around a specific Community Case Management focus area.



3

#### Provocation Exercise

Building on our scenarios, we overlaid perspectives and potential practices inspired by global companies. How would DHL or Nokia handle Community Case Management challenges?



4

#### Concept Generation

From the provocation exercise, each group created 2 to 4 new concept ideas related to their specific focus area, and presented them to everyone. Focus areas included supply chain, demand generation and incentives.



5

#### Solution Voting

UNICEF country representatives used dots to select the concepts they found most compelling. The top 6 concepts were then used as the focus for further refinement in the Data Flow Exercise.



6

#### Data Flow Exercise

The goal of this exercise was to illustrate the ways in which data flows back, forth, and between users in the chain of communication. Identifying users goals, actions and feedback illustrated good opportunities for mobile technologies—as well as opportunities where other methods were more appropriate.

# 3

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## *Focus Areas*

### *Bridging the Gap Between Supply and Health Groups*

As Community Health Workers take on responsibility for more front-line care and case management, it is critical that they have adequate supplies to support their expanded activities. How can we use communication technology to ensure that the necessary supplies are available to respond to needs?

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### *Giving Voice to Demand*

Much of the effort in program planning goes toward the delivery of products and services. Community Health Workers are embedded in the communities they support, driving program awareness and responding to demands. How can we use communication technologies to give a stronger voice to community demand for Community Case Management services through Community Health Workers on the front line of care?

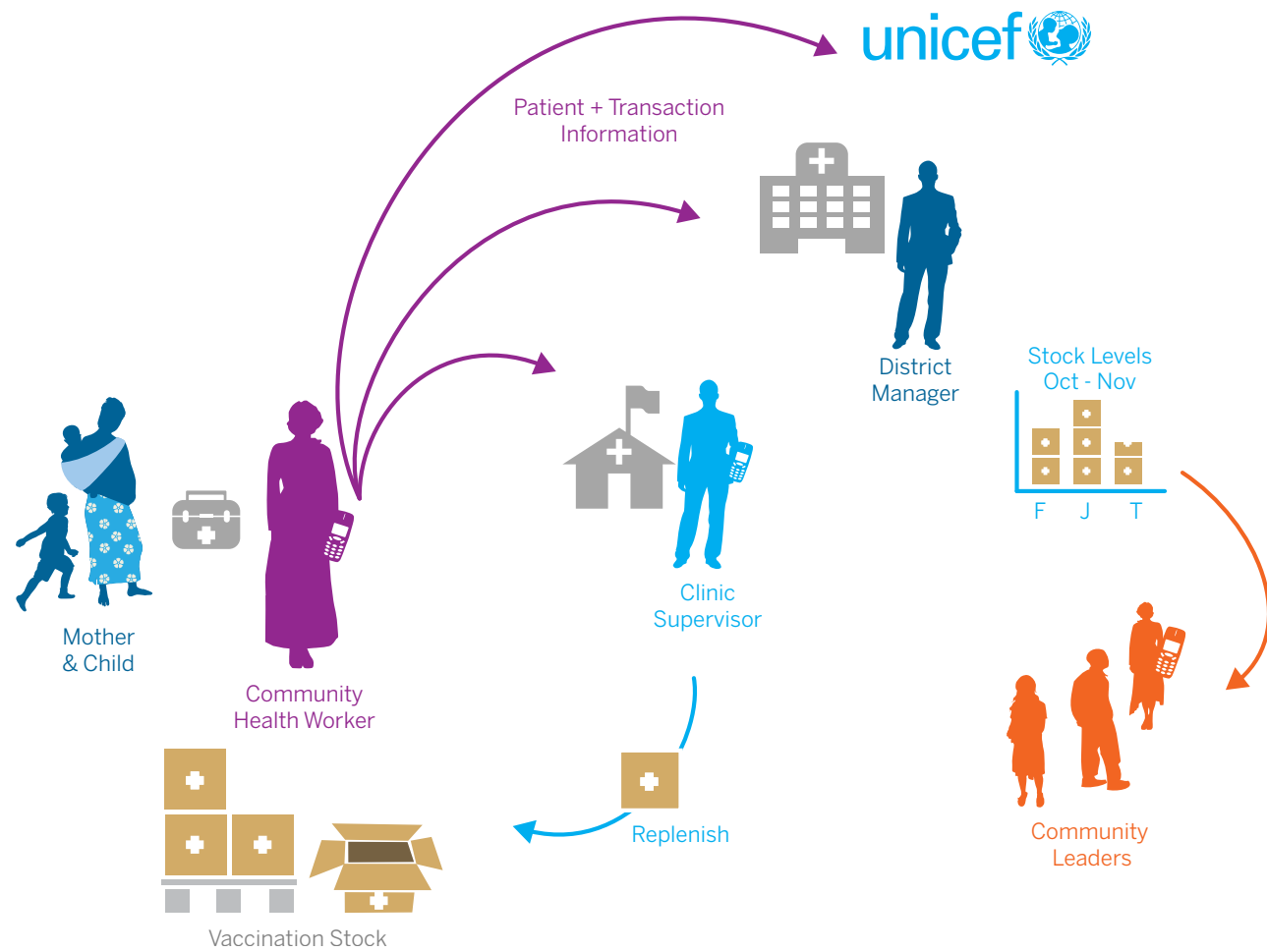
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### *Building Capacity through Incentives*

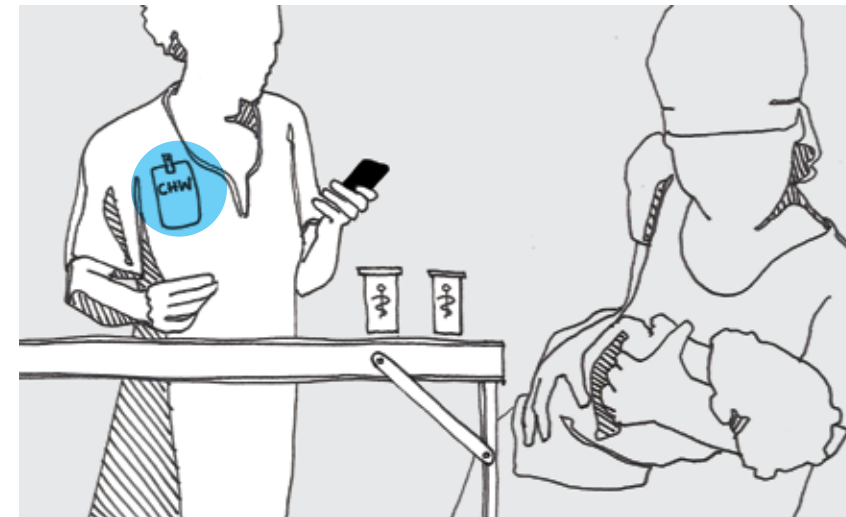
The policies and organizations that support Community Health Workers vary tremendously from region to region. Yet in almost every case there is a huge challenge in building capacity and rewarding performance in meaningful ways. How can communication technologies help us test different forms of recognition and reward to improve performance and engagement, particularly as Community Health Workers take on more responsibilities for case management?



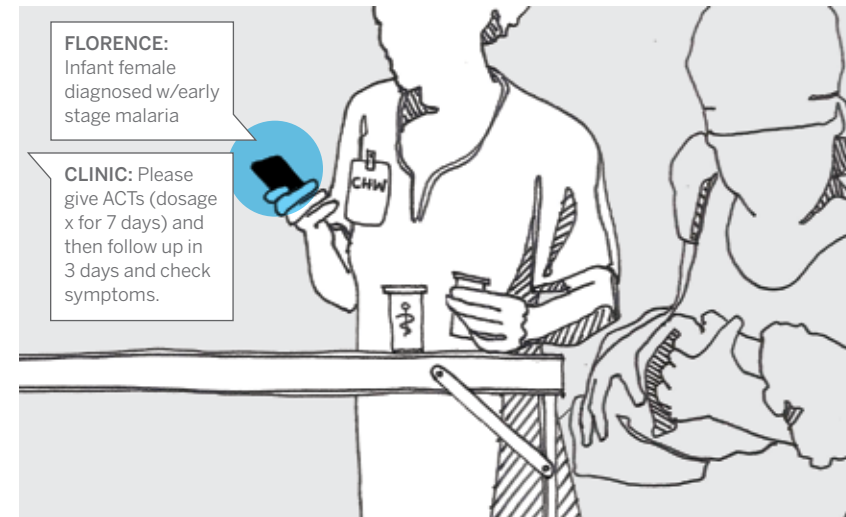
# Bridging the gap between supply and health groups



Illustrates Challenges:  
*Quality of Care / Monitoring / Supervision / Training*



**1**  
 Community Health Worker  
 Florence is with a mother and her child. Florence diagnoses the child with malaria and gives the mother anti-malarial drugs. She inputs this transaction and other patient information (name, sex, age, address, symptoms) into her mobile phone and sends it to the database.



**2**  
 Immediately following the input of the transaction into her phone, Florence receives an instant follow-up message that states "Thank you for the update. Please give ACTs (dosage x for 7 days) and then follow up in 3 days and check symptoms."

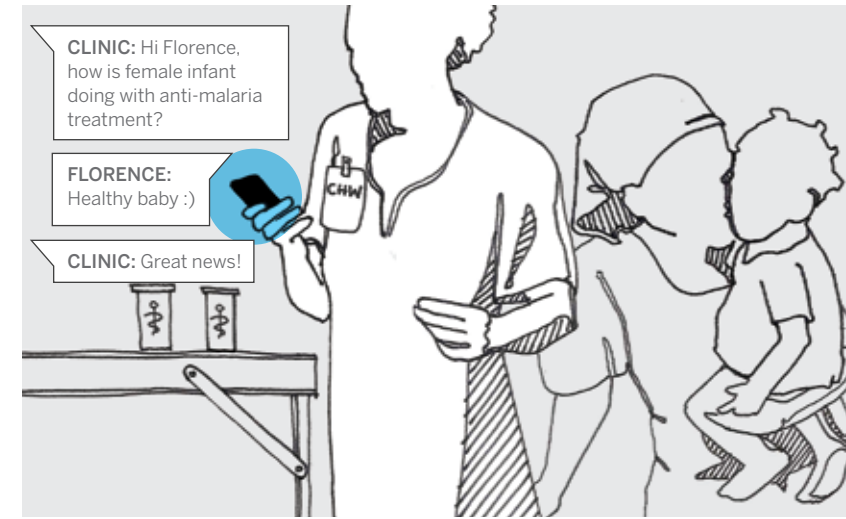


**3**  
 This transaction data is received and aggregated through a database engine that reports real-time supply stock information back to the District, Regional, and National offices. An administrator reviews a dashboard showing stock supplies of various drugs and vaccines by region. He can easily troubleshoot stock overages and deficiencies, and send action requests back to regional offices to reallocate stock between their clinics.



4

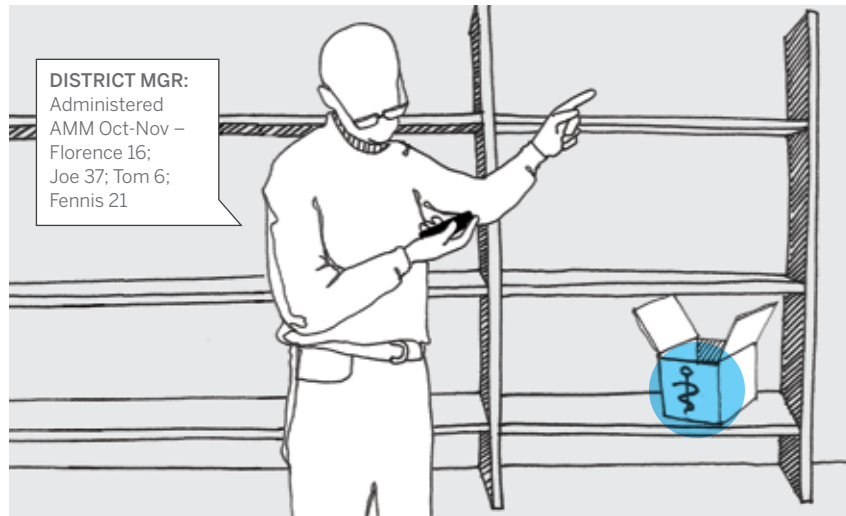
This transaction data is simultaneously received and incrementally reported to the NGO and public/private sectors to inform them of stock usages.



7

One week later, Florence receives an SMS message prompting her to give an update on the baby to whom she prescribed the anti-malarial drug. Did the treatment work?

Florence inputs a follow-up response, which is again cycled back into the system and she receives a friendly message back acknowledging receipt of the information and thanking her for her continued work in the community.



5

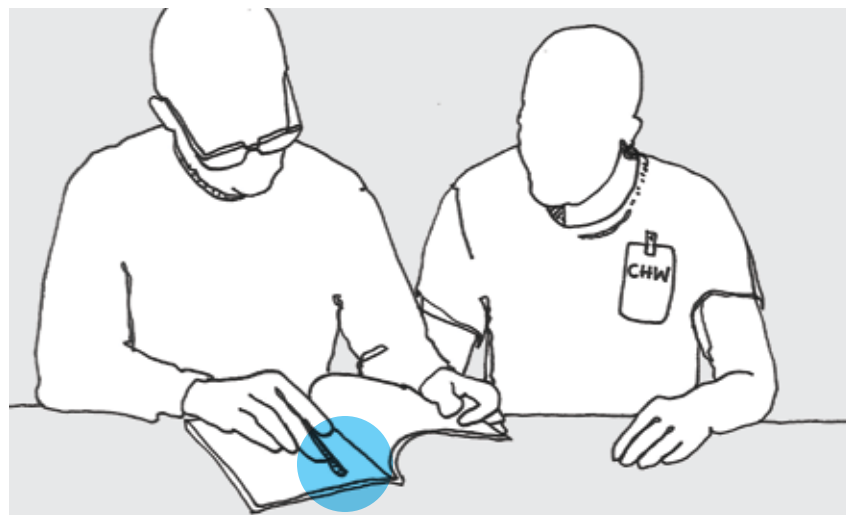
Meanwhile, Florence's local clinic is low on malarial drugs. They receive a proactive update via SMS that a new shipment is on its way. They also receive a report that Joe has been administering a higher percentage of anti-malarial drugs compared to the other Community Health Workers in the district.



8

The data is fed back from the District Manager to the community. He sends an SMS message to the Village Health Committee Leader with positive stats: "76 children got healthier from seeing a Community Health Worker or clinic in your village this month."

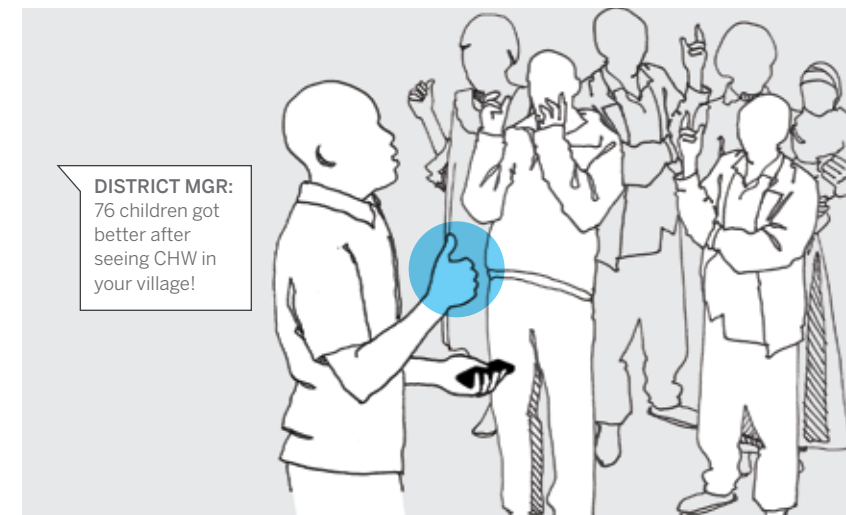
Joe receives the same message with positive affirmation of his work to help the children in his community.



6

The clinic Supervisor goes to meet with Joe in person. He intervenes by reviewing diagnostic steps to ensure that he is not overlooking other conditions.

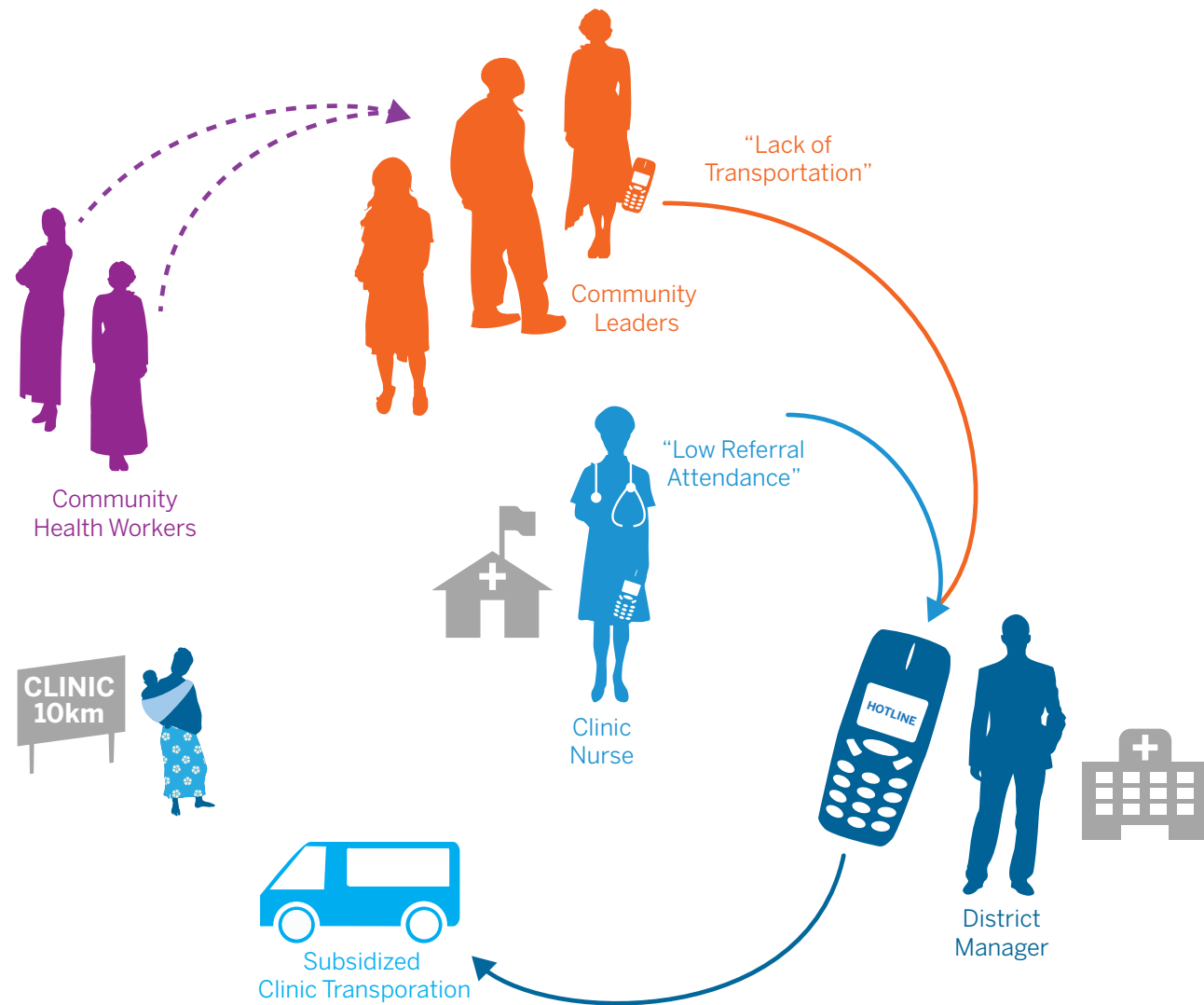
He also proactively brings with him new supplies based on reporting of his other drug supply levels.



9

The Village Health Committee in turn relays this information back to their community via word of mouth.

# Giving voice to demand



Illustrates Challenges:  
*Incentives / Quality of Care / Monitoring*



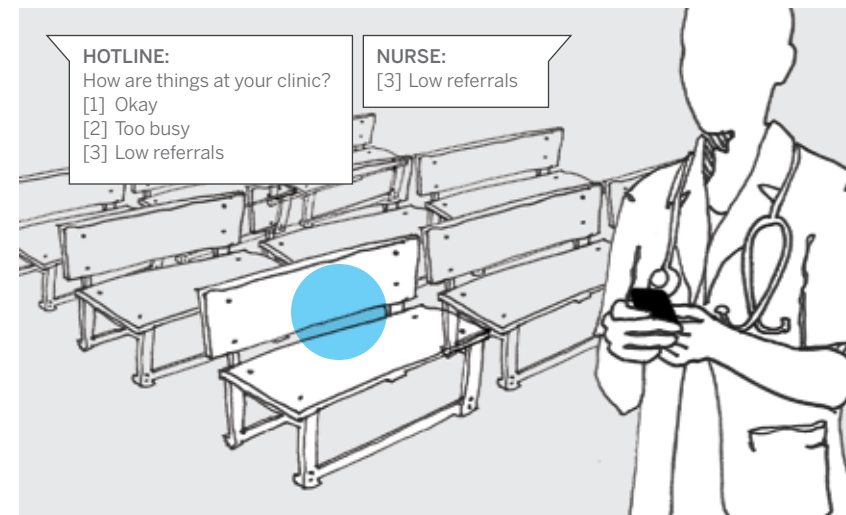
1  
 In Village X, members of the Village Health Committee hear from a local woman that a Community Health Worker referred her child to the nearest clinic, but it is too far and expensive for her to travel.

The Village Health Committee members note that this is a continuing problem that has prevented the children in the village from receiving proper treatment.



2  
 Periodically, the leader of the Village Health Committee receives an SMS text stating they can report concerns or issues to the district manager Hotline. He is provided a series of prompts via SMS to rapidly record the concern.

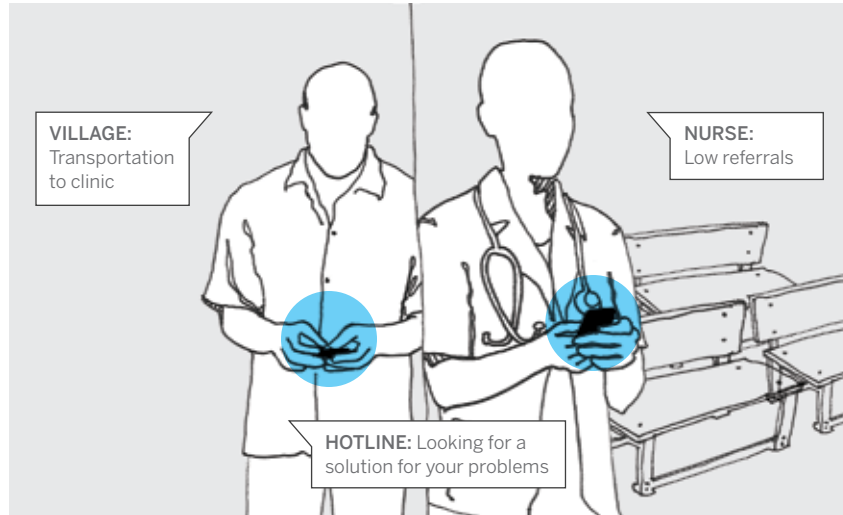
The prompt provides a list of common problems that reduce the quality of care. He selects "#3 Transportation to clinic" as a major issue.



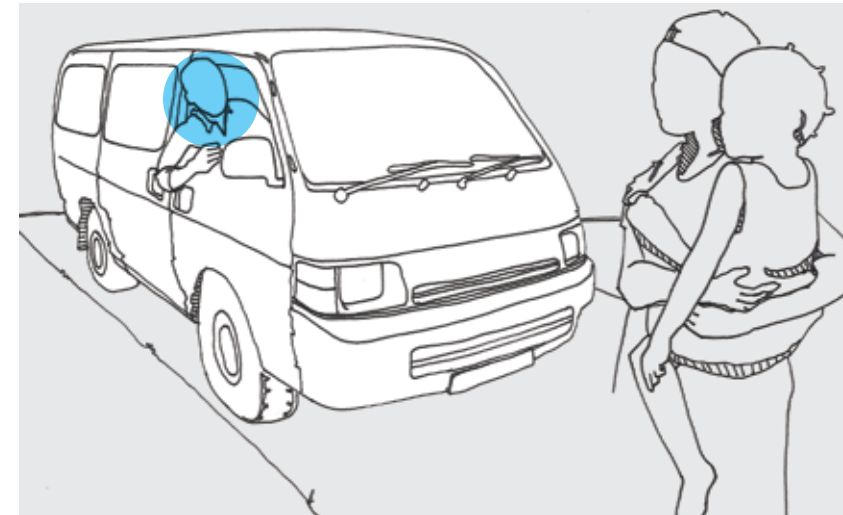
3  
 Meanwhile at the nearest clinic, a Nurse is also prompted via SMS message to take a poll survey on "How are things at the clinic?"

She selects "#3 Low referrals" from a list of common or recurring issues.





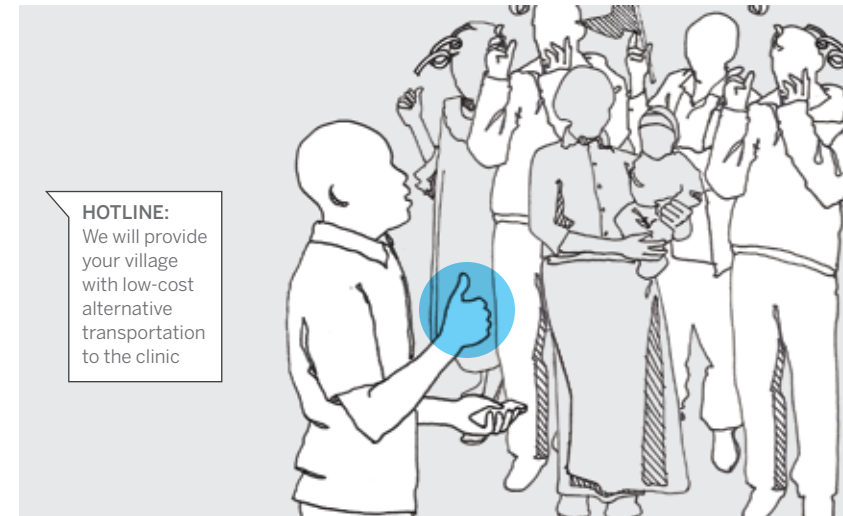
4  
The Village Health Committee leader and Nurse both receive an SMS message immediately thanking them for using the Hotline. It also explains that their concerns will be reviewed and a status update will be provided in one week.



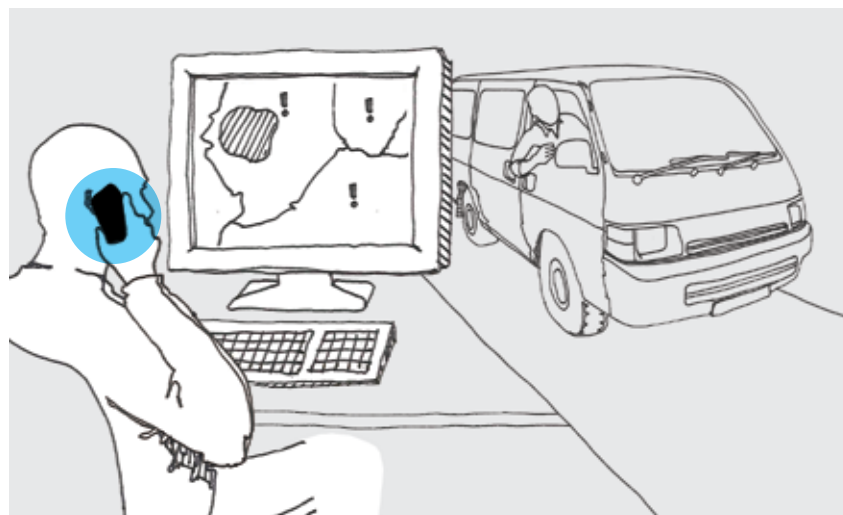
7  
A text is sent to the Village Health Committee in Village X letting them know that transportation to the clinic will now be supported through the new taxi program.



5  
Administrators at District and National levels view aggregated hotline and poll data to troubleshoot areas. They review top unmet needs, such as clinic access, and quality of service trending data for Community Health Workers.



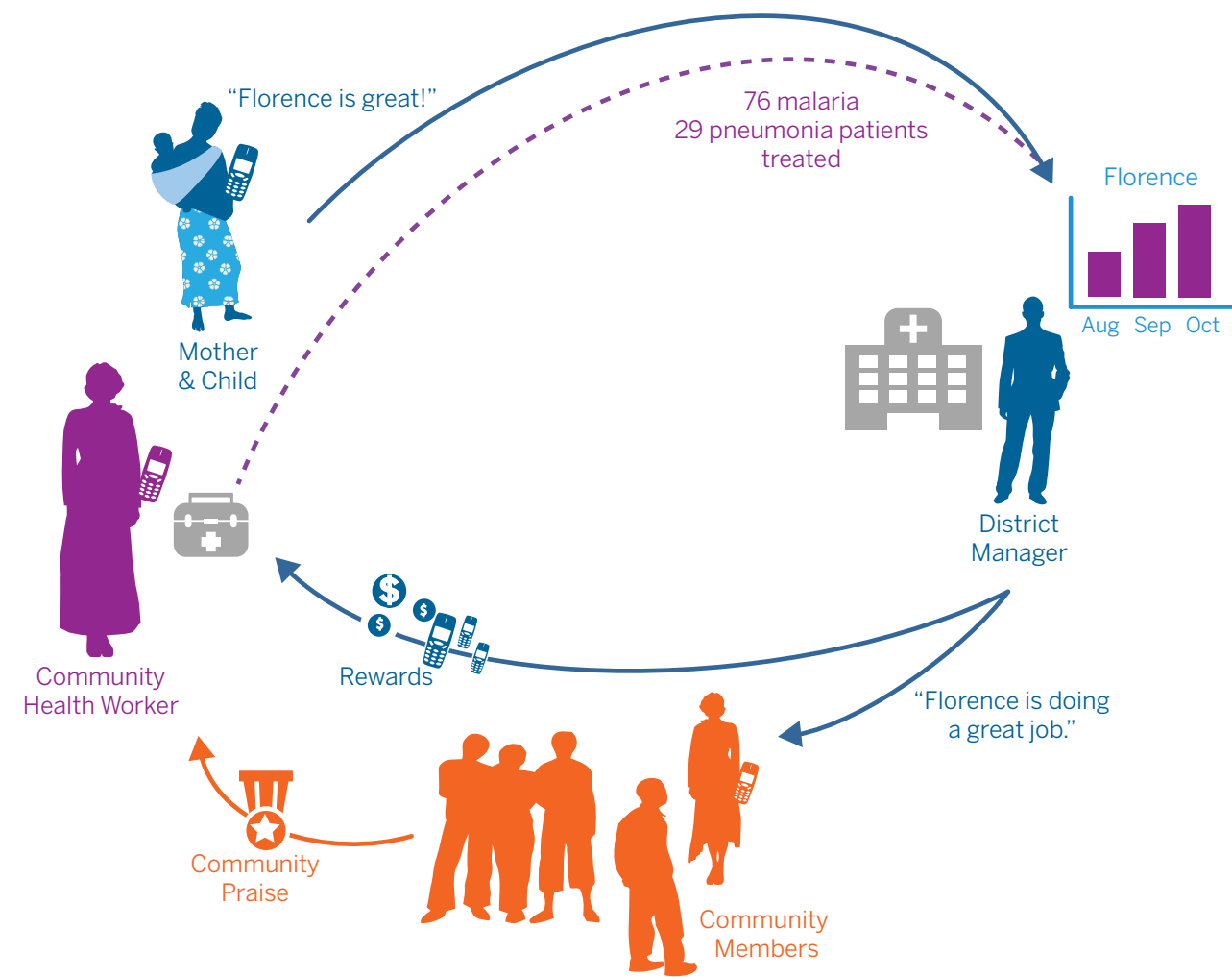
8  
The Village Health Committee shares the news of transportation to the clinic with their village via word of mouth.



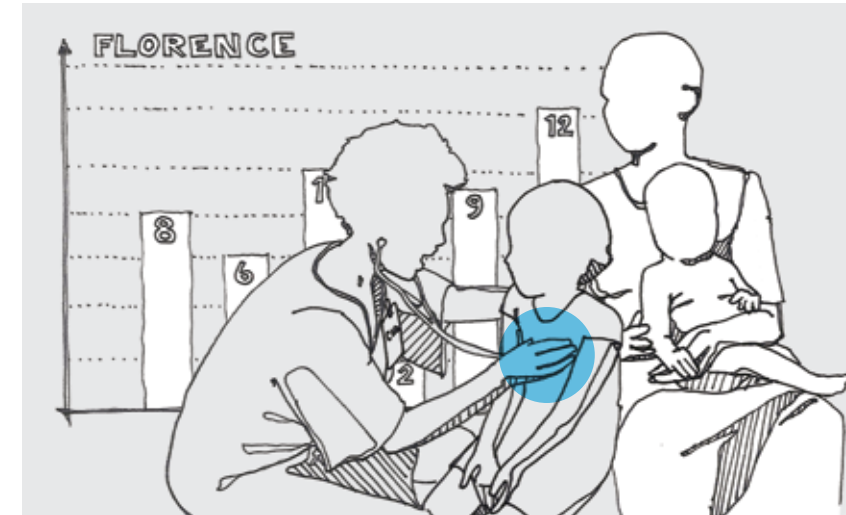
6  
At the national level they realize that the root of many problems for Village X, including perceived quality of health services, is lack of access to the clinic.

They send a note to the Regional Manager to work with local taxi drivers in Village X to help with transportation issues.

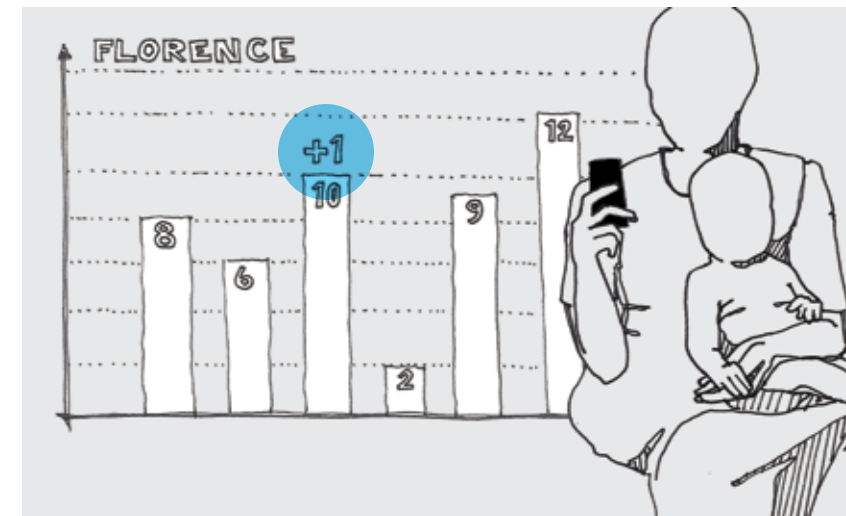
# Building capacity through incentives



Illustrates Challenges:  
*Incentives / Training / Retention / Monitoring*



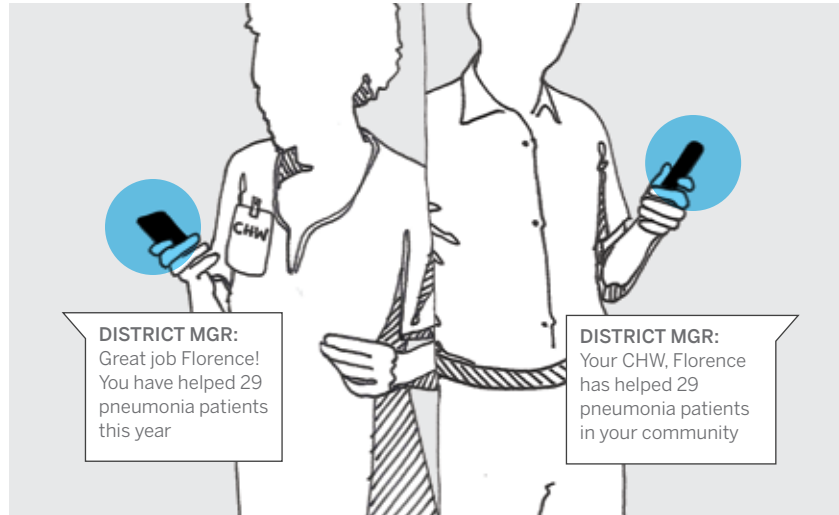
1  
 Community Health Worker transactions with villagers are being recorded and tracked by the Community Case Management database engine.  
 Florence, a Community Health Worker, is directly linked with the percentage of increasing demand for regular checkups and treatments in her community.



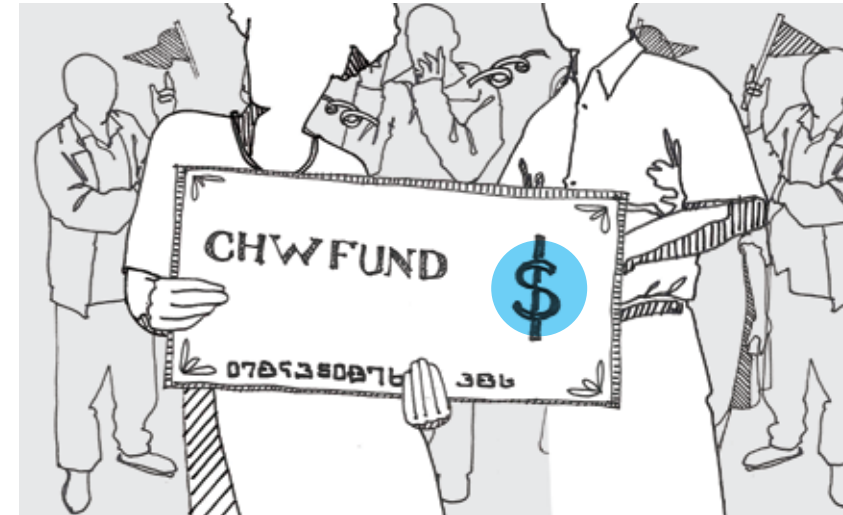
2  
 Citizens of Village X are able to rate the performance of their Community Health Workers via SMS, providing qualitative information about the responsiveness and quality of care they are receiving.



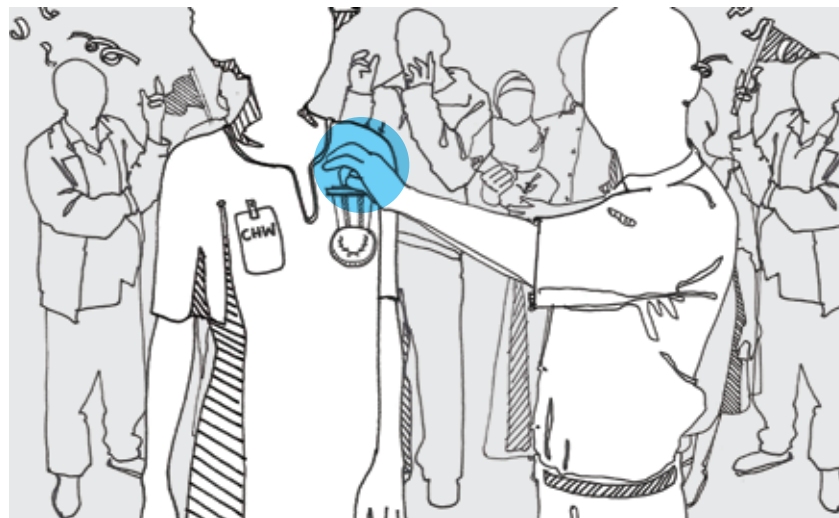
3  
 Florence is noted as being a high-performing Community Health Worker from both number of transactions and feedback from actual patients. The clinic and district office gets a report on these high performing Community Health Workers on a regular basis.



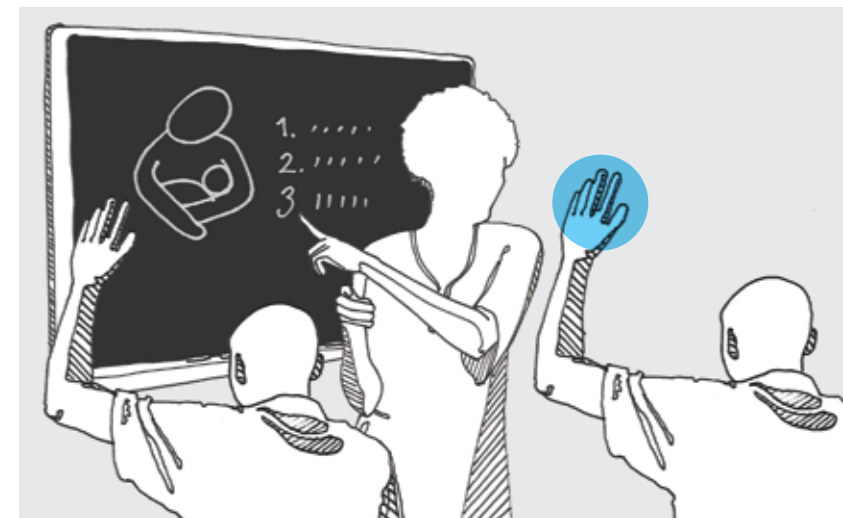
4 The district office sends a message to the Village Health Committee, and directly to Florence, with positive feedback and her stats: “Florence has treated 29 cases of pneumonia and her patients have given her a 99% approval rating.”



7 At incremental periods throughout the year, they reward a set of high performing Community Health Workers delivered in the form of money, new mobile phones, or resources for training.



5 The Village Health Committee puts together a local ceremony and provides her with a Community Health Worker badge of excellence. This in turn builds more trust for Community Case Management among the villagers.



8 Florence is empowered to train another village member as a Community Health Worker to assist her in her duties. She acts as a mentor and now both of them can handle the increasing number of cases in their village.



6 Meanwhile, the District office tracking high-performance Community Health Workers in their villages. They have a special fund set aside for incentivizing the highest performers.



# Solution Highlights

## 1: Bridging the gap between supply and health groups

SMS data collection at point of transaction to increase accuracy of stock level reporting

Real-time feedback to clinics, Community Health Workers, village leaders and community on status of actions

Distributed reporting of supply levels and drug efficacy, allowing for proactive planning and local and national levels

Reduced restock supply cycles based on real demand

## 2: Giving voice to demand

Instant SMS feedback collected at the community and clinic levels leading to increased demand and quality reporting

Aggregation of demand-based data from clinics and community, enabling quicker troubleshooting from program management

Real-time feedback to clinics, Community Health Workers, village leaders and community on status of actions

Faster reporting of concerns and issues that might not have otherwise been identified

## 3: Building capacity through incentives

Performance tracking enabled at individual and district levels

Capturing and tracking data at point of transactions that link Community Health Workers with patient outcomes

Enabling 2-way communications and ratings directly from citizens

Real-time feedback that prompts motivation and behavior change for Community Health Workers

Accelerated Community Health Worker improvement and mentorship enablement

Improving community trust for Community Health Workers through better alliance with Village Health Committee



# Design Principles

These principles emerged as a result of the exercises and workshop.

## *Set Boundaries and Scope*

When choosing areas for mobile technology application, focus on the interactions that will be best enabled and enhanced with mobile. Setting boundaries for the solution prevents overcomplicating or overburdening the system.

## *Apply Mobile Where Appropriate*

Mobile is not a panacea—it has big benefits for some interactions, but in some cases analog might actually still be best. Mobile is a tool, not the total solution.

## *Design for the Person*

Design for people, rather than for the system. Designing for people and their everyday interactions assures that you will uncover and solve for the right problems.

## *Consider Value of Efficiencies*

Create communications efficiencies in and across your organization. Rather than forcing hierarchical, linear chains of communications, look for overlaps in data that can be distilled for different points in the system.

## *Consider Scale from the Outset*

Think about creating solutions that can be used elsewhere, that can grow with technology, that can take on more participants. In other words, don't design yourself into a corner

## *Consider that Technology Changes Much Faster than the Health Domain*

Design for the ideal, and trust the technology to fill in. Technology changes rapidly, while the health sector is much more slow to change. When designing for mobile, you have to remember that by the time you design a system, features or capabilities might have already changed in the market.

## *Design for Flexibility and Reciprocity*

Design for 2-way communications. Keep in mind the need for flexibility and reciprocity of communications (e.g. if you pull knowledge from a community, you should push back information to that same community). Mobile is great at both of these.

## *Motivate the Private Sector*

Private sector partners are great, but consider their incentives to invest. What is there to gain in the health domain or technology sector? Who might the big partners be?

## *Embrace Collaboration*

Foster “communities of practice” or ad hoc sharing networks within UNICEF and its partners. Share knowledge of initiatives and pilots, what's working or not, build on and leverage existing systems, bundle different pilots together in larger rollouts.

“The work you are doing gives us the opportunity to answer these important questions in real-time. Fast enough to impact how we manage our programmes, report to our donors, and have a direct effect on the lives of children.”

— *Nicholas Alipui, Director of UNICEF Programmes*

“We have taken for granted that [because the problems are complicated,] the solutions are going to be complicated. But simple things can go a long way.”

— *Bernard Kasawa, UNICEF Coordinator MNCH/PMTCT Initiative Luapula Province, Zambia*

*The principles and recommendations in this report serve as guidance for 190 UNICEF country offices as they integrate real-time monitoring and mobile technologies into their programming to*

*improve the quality of outcomes and empower communities health workers around the world.*





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## About UNICEF

UNICEF works in 190 countries and territories to help children survive and thrive, from early childhood through adolescence. The world's largest provider of vaccines for developing countries, UNICEF supports child health and nutrition, good water and sanitation, quality basic education for all boys and girls, and the protection of children from violence, exploitation, and AIDS. UNICEF is funded entirely by the voluntary contributions of individuals, businesses, foundations and governments.

[www.unicef.org](http://www.unicef.org)

## About frog

frog works with the world's leading companies, helping them to design, engineer, and bring to market meaningful products and services. With an interdisciplinary team of more than 1,600 designers, strategists, and software engineers, frog delivers connected experiences that span multiple technologies, platforms, and media. Clients include Disney, GE, HP, Intel, Microsoft, MTV, Qualcomm, Siemens, and many other Fortune 500 brands. Founded in 1969, frog is headquartered in San Francisco, with locations in Amsterdam, Austin, Boston, Chennai, Bangalore, Gurgaon, Johannesburg, Kiev, Milan, Munich, New York, Seattle, Shanghai, and Vinnitsa. frog is a company of the Aricent Group, a global innovation and technology services firm.

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## About Mobile Mandate

Mobile Mandate is a collaborative platform that amplifies the positive social impact of mobile technologies through the transformative power of design. Mobile Mandate leverages the skills, talents, and capabilities of frog and Aricent to bring about positive change in the world through the exploration of innovative models for service delivery. UNICEF's Tech4Dev organization is a signature Mobile Mandate partner on a number of programs including Project Mwana, an mHealth initiative to strengthen health services for mothers and infants in East Africa. Other Mobile Mandate programs include Project Masiluleke, an mHealth initiative to battle AIDS in South Africa; Movirtu, a phone-sharing system in Kenya; as well as Mobile Money Afghanistan, a research project that investigates the use of mobile phones for noninstitutional banking in Afghanistan.

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