



Community Health Worker Challenges

Access

- Many eligible beneficiaries not enrolled
- Missed visits and referrals
- Inefficiency
- High CHW attrition

Quality

- Short visits
- Key steps skipped
- Sensitive issues avoided
- Insufficient training

Experience

- Jobaids left at home
- Low credibility
- Messages not engaging

Accountability

- Monitoring reports delayed
- Only aggregate data delivered
 - Data quality low





Community Health Systems

Community Health Workers (CHW)



Positive health outcomes

Better CHW performance



Better health outcomes







Roadmap for Rest of Talk

- Dimagi and CommCare
- Stories from India
- Evidence
- Partnerships





DIMAGI AND COMMCARE







Dimagi's Experience

- Social enterprise founded in 2002 at Harvard and MIT Media Lab,
- About 40 staff worldwide
- Offices in Boston, USA; New Delhi, India; and Cape Town, SA
- Core Funding: Bill and Melinda Gates Foundation, IDRC, UN Foundation, Norwegian Government, Rockefeller Foundation, USAID, Vodaphone Foundation, Wellcome Trust

Unique focus

- ➤ Open Source Products
- ➤ Enterprise-class cloud hosting with economies of scale
- Turnkey configurable solutions that do not require software developers to deploy





Dimagi Products

CommCare

Data and Workflow

- Data collection and case management solution
- Java feature phones or Android smartphones & tablets



CommConnect

Communication

- Secure and scalable
- 2-way SMS-based applications
- Any SMS-enabled mobile device.



CommTrack

Logistics

- SMS point of service logistics management systems
- Manage inventory and logistics for remote sites.



Implementation Services: technology enablement, design, and support





Case Management: Improving Service Delivery







Login

Find Client Case

View Client Summary





Fill Out a Form: Checklist for Pregnancy Danger Signs







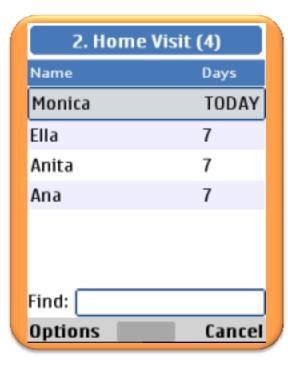


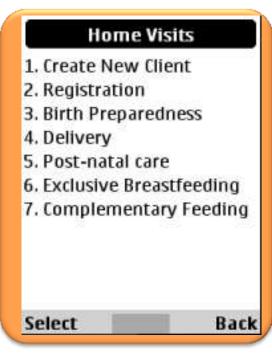






Addressing CHW Challenges







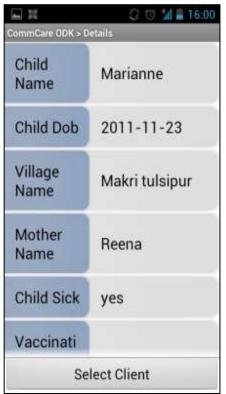
| ▲ Last 30 Days | ≎ Last 60 Days | | Ever |
|----------------|--|---|---|
| 54 (77% of 70) | 70 (93% of 75) | 75 (99% of 76) | 76 |
| 41 (67% of 61) | 61 (95% of 64) | 64 (89% of 72) | 72 |
| 36 (77% of 47) | 47 (100% of 47) | 47 (100% of 47) | 47 |
| 35 (83% of 42) | 42 (100% of 42) | 42 (89% of 47) | 47 |
| | 41 (67% of 61) 36 (77% of 47) 35 (83% of 42) | 41 (67% of 61) 61 (95% of 64) 36 (77% of 47) 47 (100% of 47) | 41 (67% of 61) 61 (95% of 64) 64 (89% of 72) 36 (77% of 47) 47 (100% of 47) 47 (100% of 47) 35 (83% of 42) 42 (100% of 42) 42 (89% of 47) |

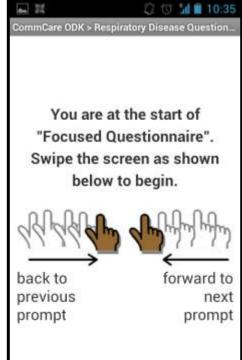




Also available on Android Platform













CommCare: Mobile Solution for Frontline Workers



Manage Data

Use CommCare Mobile for complex data collection, submitted to the web in real-time



Manage Clients

Use "case management" to track client data



Engage with Multimedia

Use images, audio, and video to educate and engage frontline workers and their clients.



Monitor & Support Workforce

"Active Data Management" utilizes the data you collect to focus on the continuous performance improvement of your workforce.



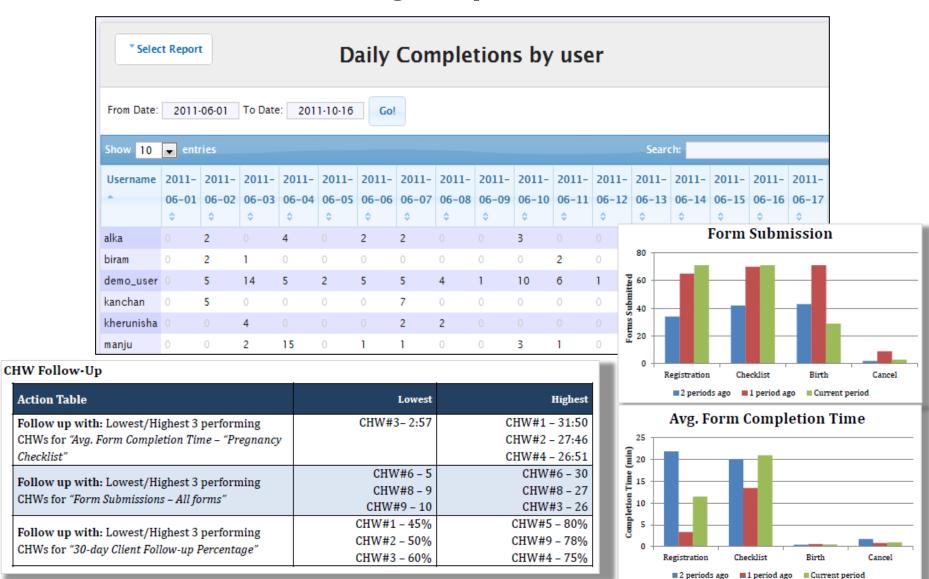
Manage Apps and Users

Remotely manage your CommCare application and mobile workforce from our web-based application.





Worker Monitoring Reports

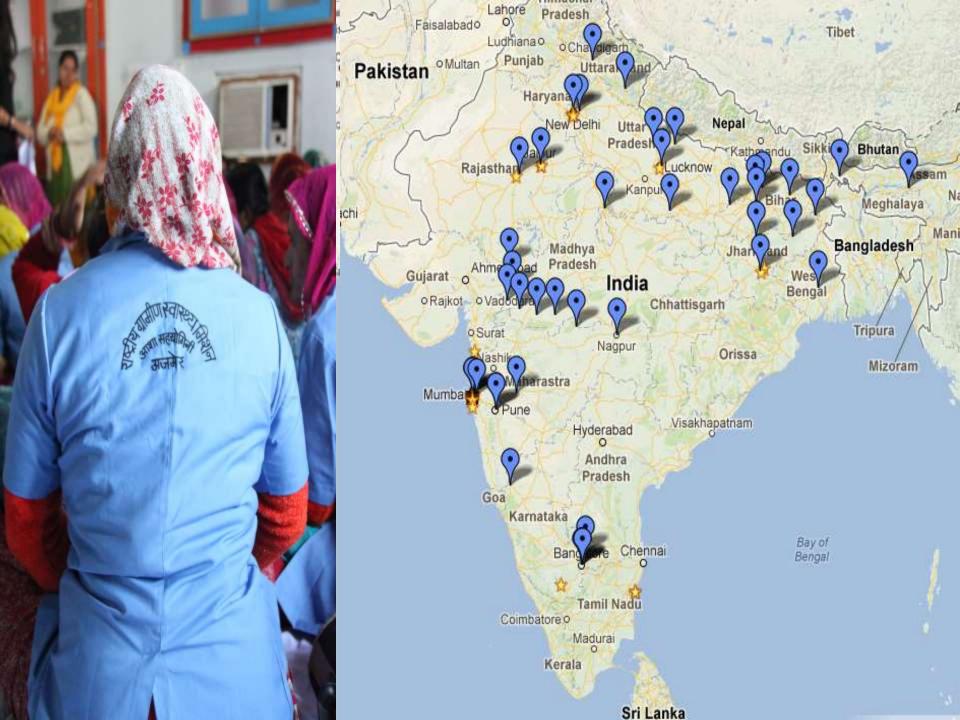




Checklist"

Implemented in 25 countries worldwide...





WHAT WE'VE LEARNED









Content specification for technology requires a systematic assessment of your current protocols

- Be more specific
- Uncovers vague and unclear processes
- Be creative





Paper

Mobile Application





•Data collection/Surveys:

- Display conditions
- Validation constraints
- Open-ended questions vs. choices

Workflows:

- Is there redundancy?
- Organize content to reflect CHWs visit schedule

Media Integration

- Craft the counseling messages with care
- Audio messages will be standardized for all beneficiaries





What do you want your application to do?













Guided Counseling and Care Tracking



Non-Guided Counseling (Chapters & Lessons)



Recommended Counseling (Mixed Method)





Workflow Support/Protocol Guidance



Worksheet - Part One - Content

1. Who are the beneficiaries of the CommCare application?

Example: Pregnant women and newborn infants.

2. Who are the users of the CommCare application?

Example: Government community health workers who visit women during their pregnancies and

for the first 30 days after birth.

Toyt that should

Add husband name or other details? What happens if duplicate names?

Add constraints for age.

< or > a particular age?

5. What data points do you want to collect? P data element. The table below contains a fe

Any constraints on date? Cannot enter future date or passed a certain date (10 months from now?)

ple below for each

(Ontional) Audio file When message

| | Description | Type (Number, Yes/p Multi-Select, Date | gle-select, e text) | When dat | a will be | |
|---|--------------------------------------|---|------------------------|--|-------------|--|
| | Full name | Free text | | Mother re | gistration | |
| | Age | Number | What happens if | f woman is | istration | |
| | Last menstrual date | Date | not sure if she r | | istration | |
| | Have you had a tetanus booster? | | | | ow-up visit | |
| | Where did you give birth previously? | Multi Select (at home, hospital) | at clinic, in | Mother follow-up visit Mother follow-up visit trimester mothers only | | |
| × | Do you have a birth plan? | Yes/no | | | | |

How many days after the last menstrual date should we calculate the third trimester?

 What counseling messages do you want to support? Please add one row to the table below for each counseling message. The table below contains a few example counseling messages.

(Ontional) Image that will

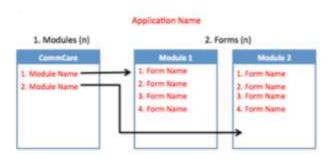
is very important for babies.

| appear on phone | accompany text | that can be played by user | will be given |
|----------------------------|--|------------------------------------|--|
| Exclusive breastfeeding | Giving only breast milk until 6 months of age with no other fluids or food, including water, | Picture of a mother breastfeeding. | Mother follow-up visit (3 rd trimester mothers) |

For child, would you like this message to disappear after 6 months of age?



Worksheet - Part Two - Case Management



In the spreadsheet below, please fill in 1) the names of your application's modules 2) the names of forms within each module.

| Module Name | Form Name | |
|---------------|------------------------|--|
| Mother Module | Registration Checklist | |
| | Pregnancy Checklist | |
| | Birth Checklist | |

| Case Type (n) | | | | |
|-------------------------|----------------------------------|--|--|--|
| Name | EDD | | | |
| Meena Soni | 02/12/12 02/02/13 | | | |
| Kusum Kiran Leena | 03/10/12 04/06/12 01/11/13 | | | |
| Search: | 8 8 | | | |

| Please define variables for the case list. Examples in | Indicate an 'x' in the column that applies. See Tip #2. | | |
|--|--|-----------------------|--|
| italics. | Displayed in list | Hidden and searchable | |
| Name of beneficiary | x | | |
| Husband's Name | | х | |
| Services due for ANC ANC1 ANC2 ANC3 | x | | |
| Telephone number | | × | |
| Village name | x | | |
| Name of Sahiya | | × | |





The CommCare Definition

| # | question code | question text | question type | options for multiple choice question OR constrainsts for open-ended questions | display condition | audio description- English | audio description- Hindi | image description |
|---|----------------|---|-----------------|--|--------------------------|----------------------------------|--------------------------------|----------------------|
| 1 | client_name | Name | open-ended | | | | | |
| 2 | client_gender | Gender | multiple choice | male, female | | | | |
| 3 | client_age | Age | integer | 10-100 | | | | |
| 4 | phone_number | Phone number | phone number | 10 digits | | | | |
| 5 | is_pregnant | Is the client pregnant? | multiple choice | yes, no | client_gender=fem ale | | | |
| 6 | lmp | When was her last menstrual period? | date | yes, no | is_pregnant=yes | | | |
| 7 | show_edd | EDD: [lmp+274 days] | prompt | | is_pregnant=yes | | | |
| 8 | previous_birth | Have you given birth in the last 2 years? | multiple choice | yes,no | is_pregnant=yes | | | |
| 9 | last_birth | How many months ago? | integer | number must be between 1 and 24 | previous_birth=yes | | | |

Dimagi's Open Source Image Library

http://www.flickr.com/photos/86561884@N02/sets/

























Family Planning 55 photos

Pregnancy General \$2 photos

Pregnancy Care 2 shotes

Postpartum Counsel 25 photos.

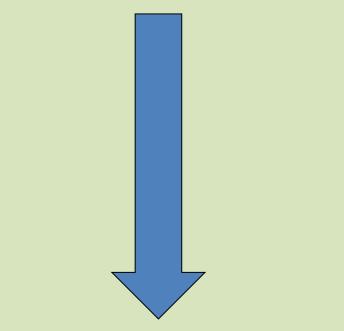
Nutrition 52 photos



The best solutions come from the users themselves. Field testing with CHWs is essential.

- 1.Global HQ
- 2.In-country HQ
- 3. Field Managers
- 4. Talking to CHWs
- 5. Working with CHWs





ACTUAL INTERVENTION





Rapid prototyping of a Pregnancy App

V1 - Scoring

April 2011









V2 - Checklist & Counseling

May 2011







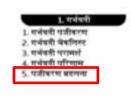
V3 - Separate Counseling

May 2012



V4 - Edit form

June 2012

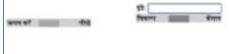


चपर करें विशे

V5 – Infant subcases

July 2012





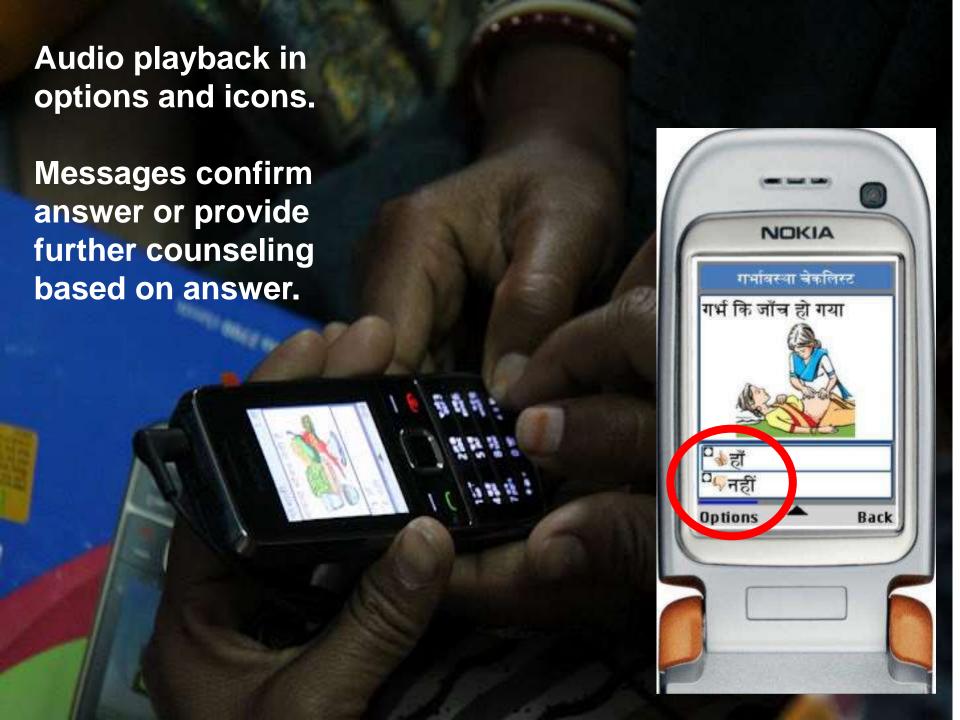












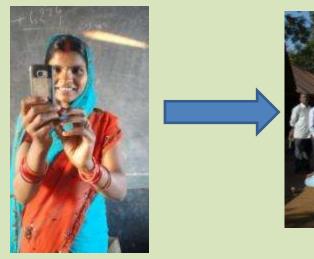


Scale-up strategies should involve building capacity of the entire organization to learn the technology and its components.



Pilot 40-500 CHWs

Scale ???









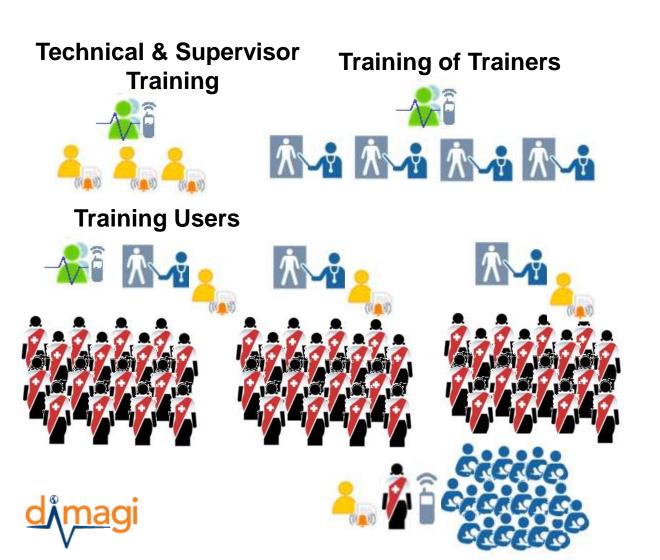
Organizational training needs for CommCare adoption and scale-up

| | Mobile | | Server | | | |
|----------------------|-------------|-----------------|------------|---------------|-------------|--|
| | Application | Troubleshooting | Monitoring | Data Analysis | Maintenance | |
| CHW | ✓ | | | | | |
| Supervisors | ✓ | ✓ | ✓ | | | |
| Trainers | ✓ | Optional | | | | |
| Technical Support | ✓ | ✓ | | | ✓ | |
| Managers | ✓ | | ✓ | ✓ | | |
| Data Staff | ✓ | | | ✓ | | |



Large Scale CommCare Trainings







Supervision & Monitoring of CHWs



Case Activity

Data is submitted to server from mobile to server via mobile internet

9.1588Col-50

18 1866 of 217

43 (80% of 48)

21 191% of 231

23 (90% of 20)



SUPERVISOR













2/256-918

2000 miles

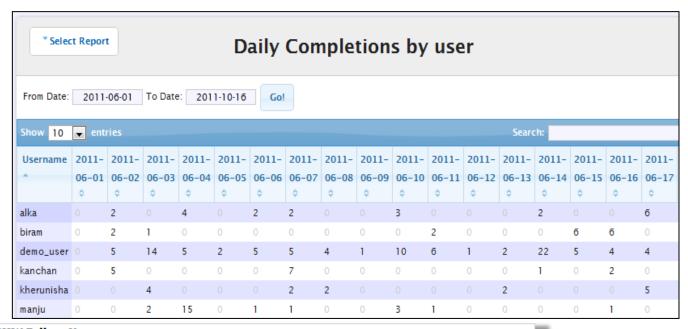
to chies of the

CONSTITUTE.

15 (71% of 21)

14 (70% of 20)

Worker Monitoring Reports



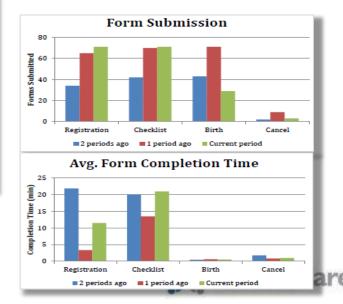
Better CHW performance



Better health outcomes

CHW Follow-Up

| Action Table | Lowest | Highest |
|--|-------------|---------------|
| Follow up with: Lowest/Highest 3 performing | CHW#3-2:57 | CHW#1 - 31:50 |
| CHWs for "Avg. Form Completion Time – "Pregnancy | | CHW#2 - 27:46 |
| Checklist" | | CHW#4 - 26:51 |
| Follow up with: Lowest/Highest 3 performing CHWs for "Form Submissions - All forms" | CHW#6 - 5 | CHW#6 - 30 |
| | CHW#8 - 9 | CHW#8 - 27 |
| | CHW#9 - 10 | CHW#3 - 26 |
| Follow up with: Lowest/Highest 3 performing CHWs for "30-day Client Follow-up Percentage" | CHW#1 - 45% | CHW#5 - 80% |
| | CHW#2 - 50% | CHW#9 - 78% |
| | CHW#3 - 60% | CHW#4 - 75% |







Design processes to support and improve CHW's service delivery based on evidence.

Accountability also extends to supervisors.

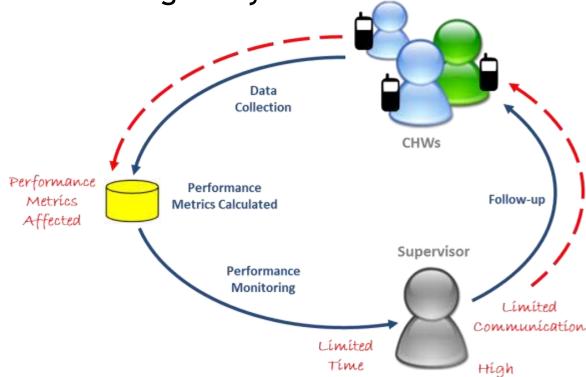




Supervision affects CHW performance

- Limited time dedicated for supervision
- High field staff turnover (challenge in learning tech)

Limited/long delays in communication





Treatman, D., Bhavsar, M., Amland, N., Sharma, A., Swamy, K., Sheel, V. (2012). Performance Metrics Indicative of Supervision: A Study of Community Health Workers. *IAMI Biennial Conference*: New Delhi, India.

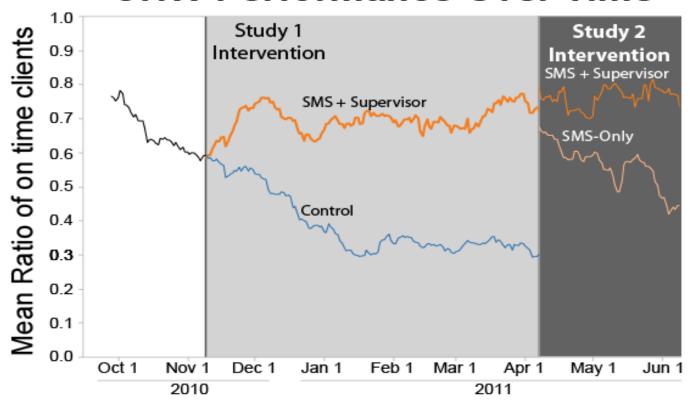
COMMCARE EVIDENCE





Improved Access

CHW Performance Over Time





- 85% More timely Visits
- Randomized Controlled Trial





Improved Quality

| Investigation | Current practice adherence | e-IMCI adherence | p-value |
|------------------------------|----------------------------|------------------|---------|
| Vomiting | 66.7% (n=24) | 86% (n=28) | - |
| Chest indrawing | 75% (n=20) | 94% (n=18) | - |
| Blood in stool | 71% (n=7) | 100% (n=3) | - |
| Measles in the last 3 months | 56% (n=9) | 95% (n=21) | < 0.05 |
| Tender ear | 0% (n=1) | 100% (n=5) | - |
| All | 61% (n=299) | 85% (n=359) | < 0.01 |

- > 20% Improvement to Protocol Adherence in a Randomized Controlled Trial
- Intrahealth Preliminary Result in India: ASHAs had increased their knowledge retention of at least 3-5 key danger signs from 48% at baseline to 70%
- Improvement in IMCI protocol adherence





Improved Experience





Qualitative Assessment

- Phones/CommCare add credibility to CHWs
- Multimedia helps engage clients and their families
- > Audio helps CHWs recall key counseling messages
- Audio facilitates discussion on sensitive topics

Treatman, D., Lesh, N, Strengthening Community Health Systems with Localized Multimedia, M4D'12 to appear.

Chittamuru, D. and Bhavsar, M. (2012). CommCare: Evaluation of a Mobile Application for Maternal Health in Rural India. IAMCR Durban: Communication Policy and Technology: Critical Perspectives on Digital Inclusion and Policy. Durban, South Africa.



Improved Accountability

Detecting Surprising Answers

- Analyze distributions of answers by a CHW.
- Example

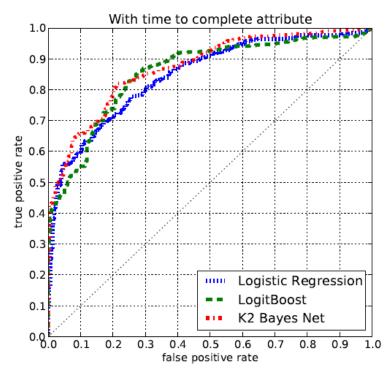
Question: Did you give any referral in this household?

Overall: 93% No, 7% Yes

CHW #3: 62% No, 38% Yes

- Detects systematic errors
- Supports quality control

Detecting Fake Forms



(Work by Ben Birnbaum et. al. '2012)





CHW Performance Feedback

- If ASHAs know their relative performance, does that encourage them to complete more of their visits?
- Background:
 - ➤ There are a number of studies about relative vs absolute performance with variable outcomes
 - We want to understand how we can provide actionable feedback to the CHW

















Active CC Investigations at a Glance

| | Hypothesis | Experiment | |
|----------------|--|---|--|
| ACCESS | CommCare increased number of family members who participate during a home visit/counseling session | · · · | |
| > | CommCare improves motivation of CHWs | Studying motivation levels of CHWs in control site vs. CommCare intervention sites using job satisfaction survey | |
| QUALITY | CommCare improves knowledge of CHWs and reinforces training concepts | Studying pre/post knowledge assessments | |
| | CommCare increases client retention of information | Test knowledge improvement amongst beneficiaries in CommCare intervention and control sites | |
| EXPERIENC E | CommCare allowed CHWs to discuss sensitive or taboo subjects. CommCare allowed CHWs to work around cultural and social barriers (use of multimedia) | Studying patterns of multimedia usage in home visits where CommCare was used | |
| ACCOUN T- | Regular feedback to CHWs improves performance metrics | Studying 2-3 performance indicators over 3 months for 60 CHWs in Madhya Pradesh, who received weekly performance feedback via Call Center | |

- * Two Large Evaluations Planned for 2012:
- + Randomized controlled study in Bihar. Partnering with CARE and Mathematica Policy Research to assess the overall health impact of CommCare as a package intervention in the delivery of maternal and newborn health services in Bihar.
- + **Factorial randomized controlled study**. Also partnering with the government of Kaushambi in Uttar Pradesh, Catholic Relief Services (CRS), Harvard Business School, and University of Washington to more deeply probe how CommCare influences CHW behavior and client outcomes.

WANTED: Research Collaborators

Dimagi is always looking for research partners to help carry out studies that will help lead to optimized mobile tools for Community Health Workers (CHWs) and improve health outcomes for their beneficiaries. We have lots of ideas/questions and are eager to hear yours!

What we do: What we want to learn about:

MULTIMEDIA

Does use of multimedia in CommCare increase retention of health info?





Which types of multimedia are more effective than others?

Can multimedia facilitate discussion about sensitive topics?

CHW PERFORMANCE

Does use of CommCare reduce worker turnover?



Does use of CommCare/mobile tools increase credibility of CHWs?

How can CommCare encourage a high rate of follow-up with clients?

HARDWARE

How is the user and/or beneficiary experience affected by hardware type?







What else do CHWs try to do on their phones?

Are smartphone versions of CommCare more intuitive for low-literate users?





WANTED: Research Collaborators

DATA

| Case Activity | Case | Case

Does CommCare improve accuracy and/or timeliness of data?

How can data be made actionable?

What types of data visualization are most useful/broadly understood?

PROJECT

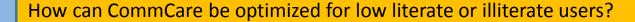


What are major barriers to success for a CommCare project?

Does use of CommCare in a project improve health outcomes?

What elements are required for a successful mHealth project?

USABILITY





What are the best practices for structuring/designing applications?

How does CommCare help CHWs to plan and think about their work?





PARTNERSHIPS





Getting Started with Mobile Health!

Design Your Own App



Field Test Your App w/ 10 free phones



Two Weeks Field Support
(We train your project team
& CHWs)







12 months Remote Support

















FutureGenerations































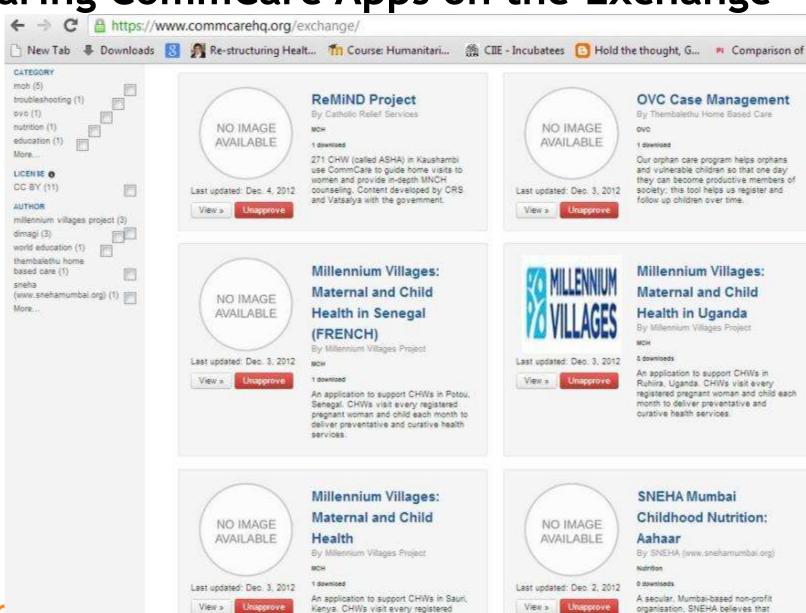






Against Tuberculosis and Lung Disease

Sharing CommCare Apps on the Exchange



pregnant woman and child each month to

deliver preventative and curative health

services



investing in women's health is essential to

building viable urban communities. This

project focuses on child health and

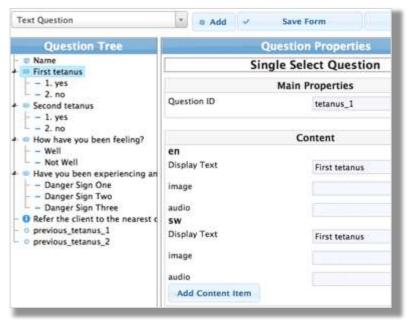
nutrition

EXERCISE





Application Builder



Create Your Own Application

- Online tools to build your own CommCare application
- Collect information including dates, multiple choice, images, video, bar code, and GPS.
- Create simple surveys or complex counseling forms

Download From the App Store

- -Leverage previously built apps to get started quickly
- -Share your own apps with the community







CommCare Tutorial

Step by step guide on how to create your first application!





Step 1: Worksheet

Who are the beneficiaries of the CommCare application?

Example: Pregnant women and newborn infants.

2. Who are the users of the CommCare application?

Example: Government community health workers who visit women during their pregnancies and for the first 30 days after birth.

What data points do you want to collect? Please add one row to the table below for each data element. The table below contains a few example data points.

| Description | Type (Number, Yes/no, Single-select, Multi-Select, Date, Free text) | When data will be collected |
|--------------------------------------|--|--|
| Full name | Free text | Mother registration |
| Age | Number | Mother registration |
| Last menstrual date | Date | Mother registration |
| Have you had a tetanus booster? | Yes/No | Mother follow-up visit |
| Where did you give birth previously? | Multi Select (at home, at clinic, in hospital) | Mother follow-up visit |
| Do you have a birth plan? | Yes/no | Mother follow-up visit (3 rd trimester mothers only) |

 What counseling messages do you want to support? Please add one row to the table below for each counseling message. The table below contains a few example counseling messages.

| Text that should appear on phone | (Optional) Image that will accompany text | (Optional) Audio file that can be played by user | When message will be given |
|----------------------------------|---|--|--|
| Exclusive breastfeeding | Giving only breast milk until 6 months of age with no other fluids or food, including water, is very important for babies. | Picture of a mother breastfeeding. | Mother follow-up visit (3 rd trimester mothers) |



Thank you!

Contact: mbhavsar@dimagi.com

POC: poc-applications@dimagi.com

Additional Videos:

CommCare Overview Video: http://youtu.be/ZpfvISKxylE

CommCare Demo Video with multi-lingual support from India: http://youtu.be/30Ftk6STM3U

Recorded Webex of CommCare Presentation given to NetHope: http://bit.ly/tiLaYy

Additional Resources:

http://groups.google.com/group/ict4chw

http://www.commcarehq.org

http://www.dimagi.com







Dimagi Global Head-office

585 Massachusetts Ave

Cambridge, MA 02139 USA

T: +1.617.649.2214

F: +1.617.274.8393

For more Information

E: information@dimagi.com

W: www.dimagi.com

W: www.commcarehq.org

W: www.dimagi.com/category/blog/



