



## Executive Summary

Global Health Bridge is a 501(c)(3) non-profit organization focused on improving healthcare in developing countries by creating culturally-relevant, grassroots inspired health technologies.

Global Health Bridge was founded by a group of young, social entrepreneurs with backgrounds in medicine, business, public health, computer science, and engineering. Since receiving 501(c)(3) status in 2010, Global Health Bridge has partnered with MOTECH, a non-profit organization based out of Columbia University's Mailman School of Public Health and the Comprehensive Rural Health Project (CRHP) in Jamkhed, India to develop a cell phone-based technology that would improve maternal healthcare in developing countries.

Our technology would enable community health workers to gather data on pregnant women in rural villages and automatically send/receive timely reminders to community health workers and pregnant women of key antenatal visits as well as aid in monitoring the health of high-risk pregnant women. Our technology would enable NGOs, their staff, and their trained community health workers to monitor the health of pregnant women in urban and rural areas, including remote villages in hard-to-reach areas.

This proposal outlines the details of a pilot project that would be conducted in Jamkhed, India in partnership with MOTECH and CRHP to implement and evaluate the effectiveness of our technology. This proposal also outlines our plans to conduct an academically rigorous research study during the pilot project as well as our future plans for sustainability.

## Mission Statement

To develop and implement simple, grassroots-inspired health technologies to transform and improve healthcare delivery for communities in need.

## The Problem

Community Healthcare Workers (CHW) are often the primary healthcare providers for many communities globally. As populations and incidences of chronic disease grow, CHWs face new complexities in effectively delivering healthcare services.

Often, there is only one CHW responsible for the care of the entire village. On average, a CHW provides care for 1,000 villagers as well as monitoring their health regularly. One key challenge for the CHW is remembering when her patients need to be seen and the degree of urgency of each patient. Some patients can wait a few weeks to be seen, while others cannot wait more than a few hours depending on the situation.

The CHWs rely on their memory and notebooks to log their healthcare visits and patient information, but this can often lead to missed visits, care oversights, and untimely delivery of care. For the CHW and NGOs on the ground, a key challenge is managing large amount of this patient data in an organized and accessible system. This capability would enable accurate diagnosis of medical conditions, prescription of relevant treatments, and most importantly, timely delivery of care and on-going monitoring of pregnancies and diseases.



## CHW Profile



### Who is She?

- Someone with deep roots in the local community
- Understands community's values, practices and beliefs
- Often female and from poor and marginalized groups in community
- Has been trained by NGOs to become healthcare leaders in their community

### What is Her Role as CHW?

- Provide health education for prevention of infectious disease
- Serve as the primary care provider for the entire village/community
- Facilitate social change within community

### Key Impact Areas of CHWs

- **Maternal Health:** Providing pre- and post-natal care of mothers including antenatal check-ups
- **Child Health:** Monitoring the health of children under 5 years
- **Chronic Conditions:** Teaching and encouraging preventative medicine while providing care and treatment
- **Infectious Diseases:** Providing treatment to prevent and control outbreaks



## Maternal Health Platform Pilot

In summer 2010, GHB traveled to India to visit CRHP and their CHWs to propose the idea of using mobile technology to improve healthcare delivery. Through presentations and focus group sessions, we identified the key challenges that CHWs face and brainstormed together to come up with a mobile health solution together. They responded enthusiastically and immediately proposed a pilot project.

## Problem

Timing of antenatal visits is crucial. >50% of women globally do not receive the WHO recommended minimum of four antenatal visits at specific points during pregnancy and risk facing deadly complications before and after birth.

## Need

Each CRHP CHW is responsible for an average of 1,000 patients, each needing unique appointment schedules. As such, they often miss delivering antenatal visits at the required time, thereby putting pregnant women and their babies at risk.

## Our Partners

The Comprehensive Rural Health Project (CRHP) is a nongovernment organization (NGO) in Jamhked, India with over 40 years of experience providing access to healthcare for the rural poor and other marginalized communities through a network of CHWs. They are internationally-recognized and has been featured in publications such as the National Geographic and New York Times. MOTECH (Mobile Technology for Community Health) is an NGO based out of Columbia University's Mailman School of Public Health that has been running an innovative open-source maternal health platform in Ghana for the past two years with the support of the Bill & Melinda Gates Foundation and Grameen Foundation. It has one of the leading mobile health platforms focusing on maternal health.

## Proposed Solution

GHB has partnered with MOTECH and CRHP to deliver a cell phone-based system called the Maternal Health Platform (MHP) to send CHWs antenatal visit reminders so they can deliver visits on-time. CHWs will be able to report basic information about pregnant women to MHP using their cell phones (via SMS text message and voice), and MHP will automatically send them reminders about antenatal visits for specific patients as well as vaccination reminders for children up to the age of six.



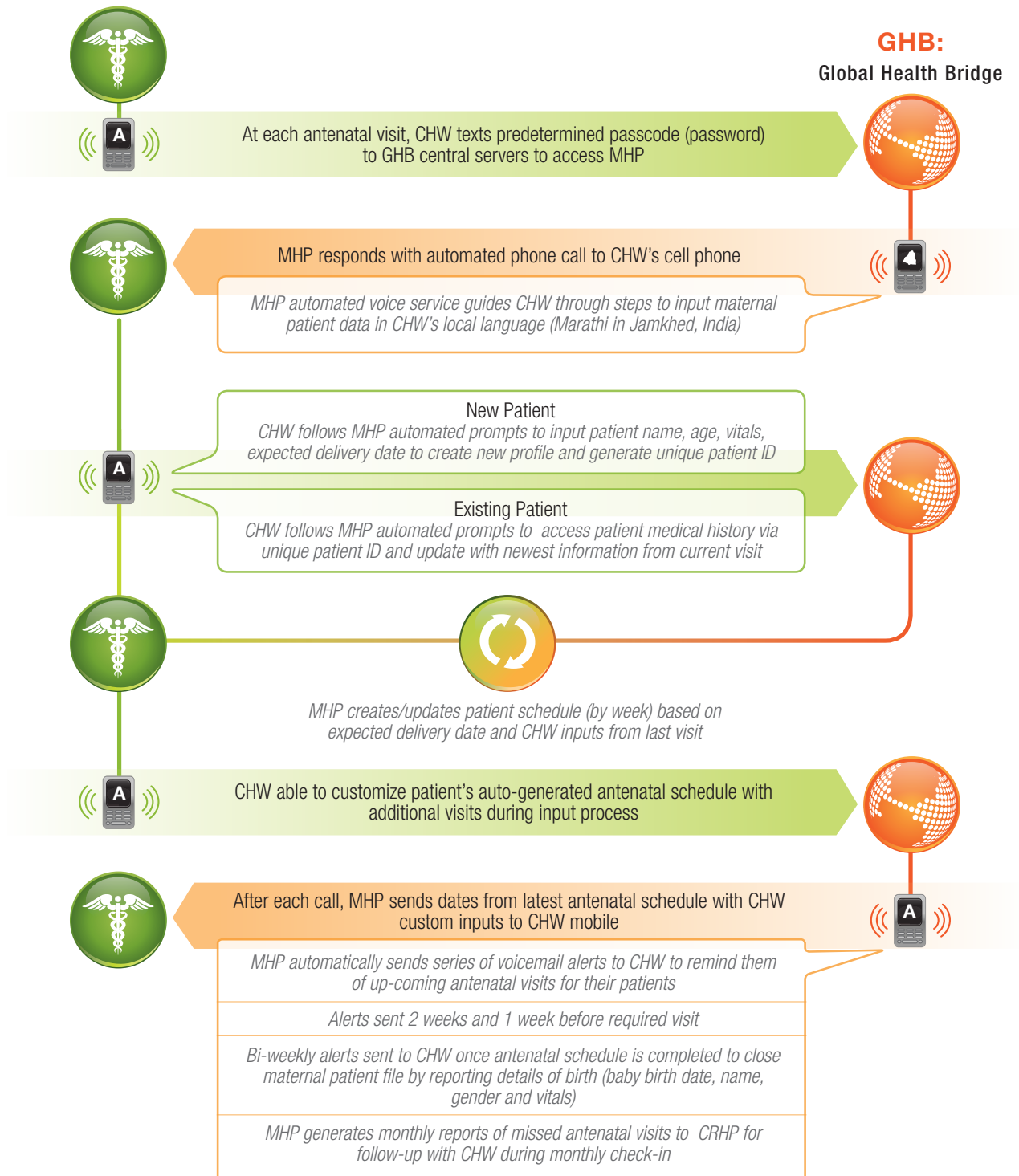
## MHP: The Process:

### CHW:

Community Healthcare Workers

### GHB:

Global Health Bridge





## MHP: The Technology

MHP will be an SMS text message and interactive voice response (IVR) based platform accessible via a basic cell phone. The data will be stored in a secure database, which will run algorithms to automatically send antenatal visit reminders to the appropriate CHWs and pregnant women. The dual option of using text message and voice response increases the potential user base to any CHW since not all CHWs are literate. Illiterate CHWs will use the IVR system, and literate CHWs will choose between the SMS and IVR system depending on their preference. Further details about the technology can be provided upon request.

## Implementation and Research

Adoption of technology to improve operational efficiencies continues to be a great challenge, especially at the grassroots level. GHB realizes this and will take necessary steps to ensure that ground-level implementation challenges are well addressed through extended training and on-field support. Our partnership model with local NGOs enables us to adapt training in use of the GHB platform to the local context. Rigorous evaluation of health worker training and program implementation during the pilot phase will help inform the methods for the next phase.

We will leverage the existing infrastructure, cultural knowledge, and trust that our partner, CRHP, have throughout the communities in Jamkhed, India to pilot our platform and improve upon it. The existing health workers will be trained in the use of the platform once a week for 4 weeks, when they gather at the CRHP campus from their respective villages. After this, a mobile health team will visit them on a weekly basis to guide the process of using the platform in the field. This follow-up process will not only support improved adoption and usage of the platform but also minimize errors in data transmission during the pilot phase.

After 6 months of field implementation, we will be in a position to make necessary changes to the platform as well as the implementation strategy for further expansion into surrounding areas through partnerships with local NGOs.

## Program Aims and Objectives

To attain our mission of transforming and improving healthcare delivery to communities in need by using simple mobile technology, Global Health Bridge seeks to achieve the following aims during the Maternal Health Pilot (MHP)

**Primary Aim:** To evaluate our mobile phone health intervention's impact on the delivery of quality health care to pregnant women in India.

**Secondary Aim:** To identify and measure key indicators within each program objective and determine their statistical significance.



## Program Aims and Objectives (cont'd)

The stated aims will be met by accomplishing the following objectives:

**Objective 1:** To determine if the MHP is meeting the needs of the CHWs and enhancing the timeliness of prenatal visits to pregnant women in Jamkhed, India.

**Objective 2:** To test and evaluate the feasibility of the MHP training program used to educate CHWs on how to employ the MHP in the field.

**Objective 3:** To assess CHW satisfaction with the cell phone technology and gain productive feedback on how to optimize the MHP and make it sustainable for long-term use. This will consider the technical, cultural, and social aspects of cell phone use and our technology.

## Hypotheses

**Hypothesis 1:** Using the MHP SMS text message system to collect pregnancy data and send reminders to CHWs will be more effective in improving timely prenatal visits than the current paper-based system.

**Hypothesis 2:** Using the MHP system to collect pregnancy data from CHWs will result in higher rates of usage and data collection than the current paper-based system.

**Hypothesis 3:** CHWs will report a high satisfaction level for using the MHP SMS system and will express confidence in using cell phones to assist them in the field.

## Participants, Estimated Accrual Rate and Target Sample Size

Based on this historical data and preliminary 2010 focus group data showing increasing interest in using cell phone technology to assist CHWs in providing maternal healthcare, we plan to recruit 35 CHWs from 35 villages monitored by the Comprehensive Rural Health Project in Jamkhed, India. These CHWs will be selected by a Global Health Bridge investigator who will determine eligibility for participation in the MHP.

To avert selection bias toward younger CHWs who may have a higher affinity toward cell phones and thus may use the cell phone with greater ease, an equal number of <50 and >50 year-old women will be recruited. These 35 CHWs will undergo a comprehensive training program (outlined below) and perform SMS-based data collection system using a cell phone.

## Training of CHWs

The existing infrastructure at CRHP provides us with the perfect platform for launching MHP. In order to improve fidelity in the use of the SMS system, a Global Health Bridge investigator will meet with the 35 CHWs to train them to utilize the SMS-based platform. There will be an intensive training program for the initial 2 months of the pilot project when the CHWs will convene at the CRHP campus from their respective villages. CRHP and Global Health Bridge staff will train the CHWs during this period. After training completion, CRHP licensed social workers will visit the CHWs once per month to guide them on using the platform in the field and address any problems or concerns.





## Training of CHWs (cont'd)

Global Health Bridge investigators will develop the support materials required to train the CHWs. Additional support will be available to the CHWs throughout the study duration, but a log will be kept to note the participant, question/comment, and any other key information that would potentially bias the results of the study due to any continuous technical support given.

## Evaluation

A process evaluation will be conducted during and following Global Health Bridge's pilot project in Jamkhed, India that will last approximately 6 months. The purpose of this evaluation is to determine if the MHP achieves the program aims of optimal healthcare delivery through a cell phone-based intervention. The results of the evaluation will serve as an intermediate assessment of the program and provide essential feedback for the design and future implementation of the MHP.

## Data Collection

Members of the Global Health Bridge team will conduct periodic focus groups with the CHWs to assess their feelings and concerns about the MHP. These focus groups will be conducted at 4 time points; a pre-assessment before the beginning of the training program (baseline), immediately following the training program, at 3 months during MHP implementation, and a final exit interview at study completion.

Baseline information will be collected from the initial focus group session (pre-assessment). CHWs will provide information about their standard procedures of providing patient care. We also have historical data that we can use to compare our data against to identify if any Hawthorne Effect occurs. Basic demographic and descriptive information, including age, occupation, self-perceived level of comfort with cell phones, and literacy level will also be collected from the CHWs. Descriptive analyses on these demographic variables will be performed.

Data on the above listed indicators will be collected from the MHP computer database and via CHW focus group assessments that were developed by the Global Health Bridge team at several time points to evaluate training methodology and level of CHW satisfaction. These focus groups will be conducted by GHB research staff who are fluent in the language and they will record all information provided by the CHWs. This information will be entered into a secure database.

## Data Analysis

The Global Health Bridge research team will conduct the statistical analysis of the data using STATA statistical software. First, a descriptive bivariate analysis was presented to examine the relationship between each of the measures and indicators and their outcomes. Second, a multivariate regression analysis will be conducted to examine the "net" effect of the CHWs that use cell phones versus the ones that do not. The first model will look at age, education, marital status and cell phone competency. The second model will include all other factors and measures as well as those mentioned in the first model. Third, interaction models will be conducted to see if the associations differ by different contextual factors.



## MHP Timeline

**Pilot in CRHP** - Begin July 2011 for period of 6 months

**Target publication of study results** - Spring 2012

## Global Health Bridge Plans for Long-Term Sustainability

The GHB team is committed to ensuring long-term sustainability of its operations in both management and funding of its programs. To that end, GHB is exploring the following avenues for generating constant cash flows from its technology and data asset base:

- Sell subscriptions to GHB database for use by government health ministries + university research programs
- Provide services to government health ministries and university research programs in design and execution of in-field health data gathering using GHB technologies + healthcare-worker networks
- Build + maintain a social network for healthcare workers who use GHB technologies across the globe that allow other health organizations to easily share and test new programs or technologies

## The Global Health Bridge Maternal Health Platform Team

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