Building an SMS Network into a Rural Healthcare System

Frequently Asked Questions
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This guide provides an inexpensive way to create an SMS communications network to enable healthcare field workers as they serve communities and their patients. The steps are purposefully simple – the system is easy to set up, use and maintain.

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FAQ #1: Who might benefit from a text-based communications network?

In the summer of 2008, an SMS network was implemented at St. Gabriel's Hospital in rural Malawi. The hospital serves ¼ million people, spread throughout a catchment area 100 miles in radius. St. Gabriel's recruited 600 community health workers (CHWs) to serve as volunteer healthcare representatives in their villages. Disconnected from hospital services and resources, the CHWs' ability to help patients was limited.

Hospitals, clinics, and organizations faced with the defining challenges of rural healthcare – namely, distance and the isolation it breeds – are set to benefit from a low-cost SMS network. Given specific steps and tools to connect individuals, SMS ("short message service") can provide the missing link – between a hospital and its field worker, patients, support group members, or CHWs in their respective villages.

Ultimately, the aim is for benefits to fall upon those served by the health network. See FAQ #2 for an outline of the benefits derived from a newly implemented SMS program that is providing connectivity for a rural healthcare network.

FAQ #2: What are the benefits for my hospital, clinic or organization and the people it serves?

Implemented at a hospital in rural Malawi in the summer of 2008, a text-based communications network is making a significant impact on hospital operations and patient care. Here is a list of the current functions of the SMS network:

- Requests for remote patient care
    - CHWs text the hospital staff when immediate care is needed, and the Home-Based Care mobile unit subsequently visits the patient. Patient location and health status are communicated, allowing the mobile team to bring needed drug supplies. According to Dickson Mtanga, a CHW in the pilot program, "When I have a problem with my patient, I just send a message to the hospital, at once. If they are helped and assisted, I feel so much better."
- Patient tracking
    - The hospital is now able to track patients in their distant communities. According to Mr. Ngalande, "Each and every department is free to use FrontlineSMS. We have ART, Home-Based Care, TB, PMTCT (Prevention of Mother to Child Transmission). For example, TB patients who are not coming for their appointments, we use FrontlineSMS to text volunteers close to the patient's village. It's easy to get feedback from the community."
- Checking drug dosages
    - CHWs in the field have been given basic drug supplies (e.g. Panadol, Ferrous Sulfate, eye ointments) for primary care. The CHWs now check drug dosages and uses within seconds. When FrontlineSMS receives an SMS with a drug name, it automatically responds to the health worker with that drug's information.
- Patient updates
    - CHWs regularly update the hospital staff with regards to patient status, including reporting patient deaths. These messages have created a post-discharge connection to patients' well being.
- Coordinating Home-Based Care visits
    - In addition to responding to medical emergencies in the communities, the Home-Based Care (HBC) unit also follows a schedule of home visits – sometimes checking on patients have been discharged recently. Other patients are enrolled in the hospital's palliative care program. Before traveling to the patients' villages, the mobile unit text messages CHWs in close proximity to the clients they plan to visit. Any response by the CHW (e.g. "Patient is not at home.") is forwarded to the mobile team's phone, allowing medical staff to maximize their productivity by visiting available patients.
- CHW-to-CHW communication and group mobilization
    - CHWs are now communicating and collaborating. All texts are shuttled through the hospital, and FrontlineSMS commonly relays messages and requests between CHWs. This has been an important function in setting meeting dates for Village AIDS Committees and linking HIV/AIDS support groups. Hospital activities throughout the catchment area (including microfinance and Positive Living programming) are

organized using the SMS network. Baxter Lupiya, a CHW in TA Kalolo, notes, "We used to travel a long distance. Now, we have easy communication with others. The program must be continued, because it is so good!"

- Integrating connectivity into HIV counseling
    - HIV Counseling and Testing (HCT) at the hospital has been augmented because of the SMS network. If a client tests positive, he or she is paired with to an HIV-positive CHW with a phone – these volunteers act as models for Positive Living and provide comfortable, relatable links to the hospital.

Other benefits:

- CHW status
    - The connection to hospital services has solidified the CHWs' role as legitimate healthcare representatives in their villages. The patients and their communities, according to the program's participants, have noticed the phones, each one clearly marked with the hospital's logo.
- Incentives and accountability
    - The phones provided very concrete incentives for the volunteer work done by the CHWs. The SMS network created, for the first time, a way to track the CHWs' activities, paving the way for more informed decisions regarding allocation of resources (e.g. which CHWs should receive bicycle ambulances).

The listed benefits developed organically from a particular hospital's needs. Undoubtedly, future demands will uncover new functionalities. For example, the hospital in Malawi is exploring the use of FrontlineSMS's 'Forms' function to collect structured data regarding the status of palliative care patients – information that can quickly be exported to donors and organizations supporting those patients.

FAQ #3: What technology do I need?

Here is a quick list of the equipment used in Malawi:

- 75 Motorola V195 cell phones, purchased at $15/phone from a recycling company
- 15 Nokia 6210 cell phones, $40/phone
- 10 Nokia 6100 cell phones, $50/phone
- 1 Falcom SAMBA75 GSM modem, $200
- 1 donated Compaq Presario laptop
- 100 cell phone chargers + Malawian adapters

Software:

- FrontlineSMS version 1.4.7, free software downloaded at **www.frontlinesms.com/download**
- FrontlineSMS is running on a Windows Vista operating system

A few notes on hardware and software:

- As long as the cell phones get service and function on your local network – they can send/receive text messages – they will work with FrontlineSMS. Motorola V195 phones were chosen for the program in Malawi because of their low cost and ease of use. The Nokia phones were chosen for similar reasons – teaching texting using the Nokia models (6100 and 6210) was straightforward. The steps for sending an SMS with the Motorola V195 were slightly more complex.

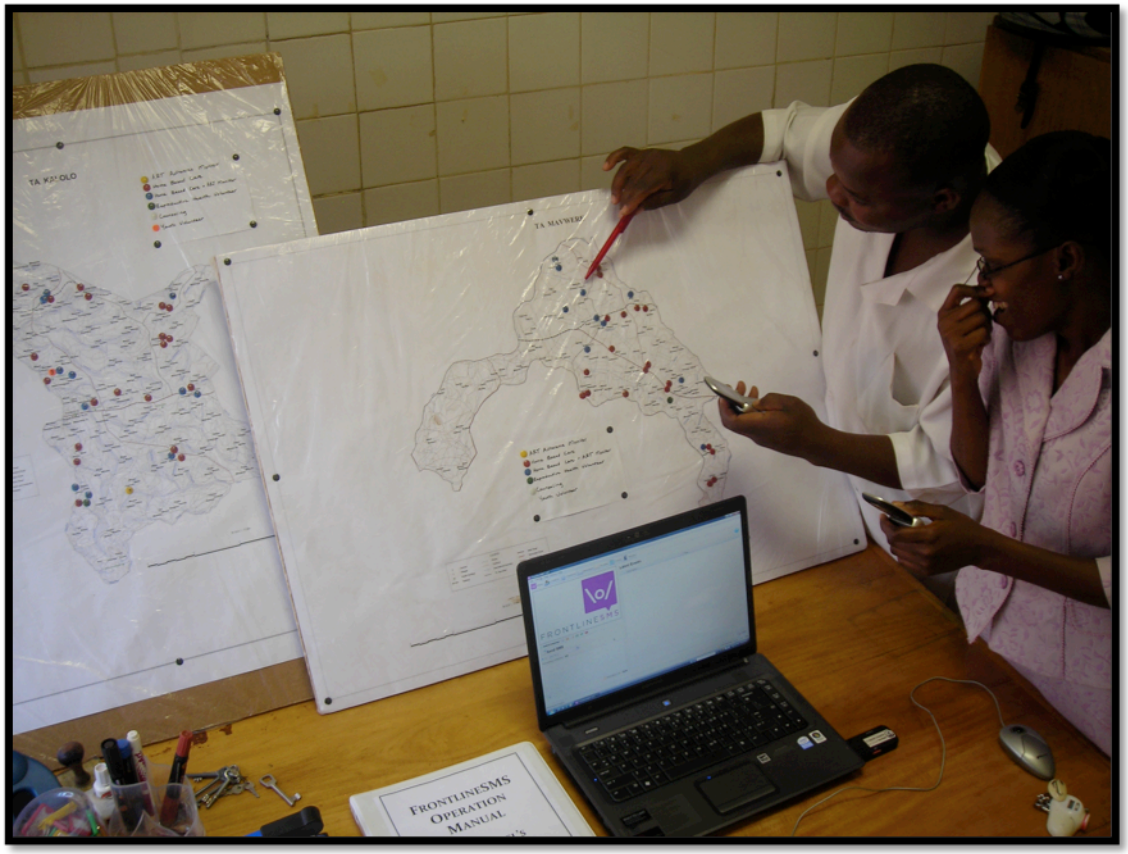
- Each distributed phone was labeled with the hospital logo. This was important for ownership and accountability, along with community transparency and health worker status.

- I had the Malawian Department of Surveys print a map of the hospital's catchment area. On this map, color-coded pins were placed, showing where distributed phones are located (along with each CHW's program type, e.g. Home-Based Care or ART Monitoring).

- When selecting phones for your network (if you are purchasing new or used phones), keep a few things in mind:
    1. Consider the experience of the user. In most situations, simpler is better – sending and receiving an SMS is meant to be easy.
    2. Check to see which bands (e.g. GSM 900 band) work with your local network, and make sure the phone supports that band. Here is a site with GSM coverage maps for a number of countries: **http://www.gsmworld.com/roaming/gsminfo/index.shtml**

- The new versions of FrontlineSMS are configured to run on a number of operating systems. You can find comprehensive information on Windows, Mac and Linux compatibilities here: **http://www.frontlinesms.com/download/requirements.php**

- Although the SAMBA75 GSM modem is being used in Malawi, a number of modems and cell phones may be connected to the computer running FrontlineSMS. For a list of phones and modems that work well, see the following link: **http://www.frontlinesms.com/download/requirements.php**



FAQ #4: Do I need an internet connection?

All that is necessary is a cellular network signal on your modem or phone – no internet connection is needed. If you can send and receive text messages in your area, FrontlineSMS will work. Check the GSM coverage map link for more information on your local network: **http://www.gsmworld.com/roaming/gsminfo/index.shtml**

FAQ #5: How expensive is an SMS network?

The cost of your network will largely depend on the scale (e.g. the number of phones and the volume of text messages processed per day). Here are the numbers in Malawi:

- The pilot network includes 75 community health workers (CHWs) and 10 members of the hospital staff.
- During the final weeks of the implementation period (weeks 7 and 8), an average of 10 messages were received from the hospital per day. The number of responses by the hospital (along with new patient tracking requests) varied.
- Once the phones are distributed, the only running cost is the rate per SMS. Given that one SMS costs 10 cents, and they are free to receive, the program is running on just over $1/day. So, $4,000 will fund the SMS network for a little over 10 years.

FAQ #6: How do I distribute communication credit?

There are a few options here. Your distribution method will depend on the structure of your healthcare delivery teams and/or volunteer organization. This is how we tackled this logistical issue in Malawi:

- Celtel, the local network provider, has a 'Me2U' service that allows a user to send communication credit ("units") from one phone to another via text message.
- Every phone that we distributed had a 2-digit identification number engraved on its case, specific to that phone and SIM card.
- Using the keyword and auto-forward functions in FrontlineSMS, we automated the entire top-up process, allowing the CHWs to request automatic unit refills.
- For example, the owner of phone #11 sends a message to the hospital, "11 units" which is recognized by FrontlineSMS. FrontlineSMS then sends a message to Celtel's Me2U service, requesting that phone #11 receive another dollar of credit.

Other options include passing large quantities of units to trusted individuals, such as CHW leaders, coordinators, or other staff who have regular contact with those receiving phones. The key to maintaining accountability is making it clear that FrontlineSMS documents every message received by the hospital. Be sure it is understood that the communication credit given to your contacts should be used to communicate with your hospital, clinic, or organization.

FAQ #7: How much staff training is required?

No technical experience is required for implementing or sustaining an SMS network. The nurse in Malawi managing day-to-day communication, using FrontlineSMS on the hospital laptop, had never used a computer before the SMS program was introduced.

Within the first week, the hospital staff understood the functionalities of FrontlineSMS – for this reason, the uses of the SMS network developed organically, shaped by the needs of the hospital, the CHWs, and the patients they serve.

After a 1-hour training session on operating FrontlineSMS, the nurse and ART coordinator were left with a simple, step-by-step operation guide. The guide, available to anyone who requests it, uses images of FrontlineSMS, showing how to:

1. Send a message
2. Check for new messages
3. Add/delete a contact or group
4. Copy and paste text (a useful explanation, for first-time computer users)
5. Ensure that FrontlineSMS is communicating with the attached modem (or phone)
6. View a specific contact's message history

FrontlineSMS also has a built-in Help guide, which explains in detail each function, including forms, e-mail, and keywords. The keywords and their respective automated action (e.g. auto-forward, auto-reply) were all created on the ground, and I have absolutely no technical background.

The program, along with the SMS data collected, is purposefully uncomplicated. According to Alex Ngalande, the nurse running FrontlineSMS for the pilot program, "[Setting up FrontlineSMS] was very quick. And, people didn't know that this thing could work here – because, it's our first time to have this kind of system whereby people can directly communicate with the hospital… It's simple and straightforward."

FAQ #8: How much time does it take, per day, to manage the SMS network?

Towards the end of the pilot period (weeks 7 and 8) in Malawi, two members of the hospital staff were spending 15 minutes every morning and 15 minutes at the end of the workday managing incoming and outgoing SMS data.

This management time (an average of 30 minutes per day) included reading new messages, responding to urgent requests, forwarding CHW-to-CHW messages, passing on patient updates to relevant hospital staff, sending out patient tracking requests, and processing other outgoing texts.

FAQ #9: How do I conduct SMS training?

The success of the SMS program relies on the users being able to operate their phones. For this reason, patient training and a slow rollout are recommended. In Malawi, we trained 10-15 community health workers (CHWs) per week for 6 weeks (75 CHWs in all) – each session lasted about three hours. A few tips, especially applicable if your contacts are first time cell phone users:

1. Start with the basics. The first step displayed on our training posters? *Open the phone.*
2. Keep the training groups small.
3. Take simple steps to make your instructions outstandingly clear – we made posters showing which buttons to press.

4. After each 'lesson,' have a member of the group lead the others through what they learned (e.g. after teaching the group how to check for new text messages in the phone's inbox, have a participant repeat the steps).
5. Poll the group to find out how many have used a cell phone before. Have the experienced participants guide others through the SMS steps.
6. Have the group practice texting something simple (e.g. "Malawi"), then something more difficult (e.g. their full name and birth date).
7. Have expectations for the group prepared (e.g. what will be communicated, and when they are expected to communicate).
8. The most committed volunteers received the first phones. This distribution method contributed to the success of the pilot program.

The training in Malawi was conducted in Chichewa by hospital staff. The staff running the training sessions knew the CHWs, and were used to speaking to groups.

FAQ #10: What is the best power source for the cell phones?

Depending on your area of operation, electricity may or may not be widely available or affordable. The pilot in Malawi looked at a few options:

- When asked, "Who has access to electricity?" every CHW said they could charge the phones on their own. This turned out to be a half-truth – they had to pay a small fee to charge the phones at a local barbershop, as an example of a local solution.
- We created a local charging station, next to the hospital, where the CHWs could charge their phones free of charge.
- I brought hand-powered chargers, which simply did not work.

- As a short-term solution, CHWs in the most remote locations were given battery-powered phone chargers (which provide 2-3 full charges per AA battery).
- For sustainable, remote, off-the-grid charging, individualized solar panels may be the best option. Solar panels will power the SMS network for the pilot program in Malawi.

FAQ #11: Do the CHWs communicate with each other?

Absolutely. This was one of the first questions raised by the CHWs in the pilot group in Malawi. CHW-to-CHW communication is vital for group mobilization, and has a large impact on day-to-day CHW activities. It's important to realize, however, that FrontlineSMS will not track messages between phones in the field. If one CHW wants to contact his colleague many miles away, they are asked to send a message to the hospital – along with directions to forward the message: e.g. "Send to John: The support group will meet this Saturday, at 10 o'clock in the morning. From Dickson." This system ensures that all messages are accounted for.

FAQ #12: Where can I find more information on FrontlineSMS?

Visit **www.frontlinesms.com** for more information on the free, open-source program. The site includes a detailed description of the software, demo, map of current users, and download request form.

The following is an interview with Alex Ngalande, the Home-Based Care nurse in Malawi who is currently running FrontlineSMS on setting up and using the program:

http://www.youtube.com/watch?v=Go09UxPEW7k

Here is an interview with a community health workers involved in the pilot program. She speaks on volunteer activities, as well as the impact the SMS-based network has on patient care:

Verona Kapagawani:
http://www.youtube.com/watch?v=kHXP5S0HkIQ&feature=related