Grant application for Tele-woundcare

SECTION 1: The problem we are tackling.

In many developing countries a large fraction of the population lives outside the cities, and all are pressured by a scarcity of skilled medical workers. Debilitating wounds are involved in health issues such as burns, HIV, malnourishment, post surgery, accidents, leprosy, skin ulcers, pressure sores, and more. This initiative makes the valuable knowledge of a skilled nurse available to less skilled visiting carers, to hasten their cure. This project is aimed at **improving the care of wounds using photos to get expert help to the point of care. Visiting health workers use cell phone cameras to take photos of patients' wounds and send them to an experienced wound care nurse at the hospital for advice.** The wound care nurse uses the clinic computer to look at the patients' picture and notes along with the previous ones from the same patient. The encouragement and advice that the nurse shares with the visiting health worker is expected to improve healing rates.

Product. The software system.

There are two parts to the system; sending in the photos, and viewing them. The wound care nurse runs a "clinic". Patients and health workers "belong" to a clinic.

Sending in the photos.

The visiting health worker uses a cell phone camera to take pictures of wounds they care for on their rounds. They have several possibilities for sending them in. Email is convenient, and many phones can attach photos to emails. The system can identify the patient from the "to" email address. If the health worker comes across a computer at some time in their rounds, maybe a cyber-café, she can use the webpage to upload the patients' pictures along with comment. Or if they visit the hospital clinic, they can upload the pictures directly to the Wound Image Program, and discuss them with the wound care nurse face to face.

Visualizing the pictures.

The wound care nurse uses the Wound Image Program to save all the pictures for her clinic, and then views them patient by patient. She sees the latest picture in the context of previous ones along with the notes and comments. The Wound Image Program is optimized on her convenience; there is no delay between patients and it's easy to enlarge photos, or to send an email to the visiting health worker. There are convenient facilities for emailing the visiting health workers

Innovation. Anybody can look at pictures.

It seems obvious that a nurse can improve the reach of her skills and knowledge by looking at pictures rather than actual patients, especially in wound care. There have been other approaches to this use of pictures, often with the goal of immediate consultation in real time. Our model is store-and-forward. It is a global mesh. A visiting health worker still "belongs" to a clinic, but the server has many clinics and they have many visiting health workers and patients. This separation of the server from the clinic makes it particularly easy to install a new clinic.

Technology. Servers and services

The system is designed to be low-cost, it is store-and-forward, and any source of photos is acceptable. The server part of the system is hosted in US. It accepts all the emails and other uploads, stores them (encrypted) for download by the clinic's wound care nurse. The server can be replicated locally.
The visiting health workers send emails to this system, the patient id and clinic is part of the email address. The wound care nurse at the clinic calls for the downloads of all photos for her clinic. The system aims to simplify all human interfaces to the system, to hide the complexity, and accept the widest range of sources of images.

Section 2: Project. What we propose to do with the funds.

We will install this system in a hospital in Tabora, Tanzania, and measure its effect on the suffering from wounds in its catchment area. The people involved are Ruth Hulser, MD who is in charge of the hospital, some skilled nurses and the Home Based Carers (HBC) who are the visiting health workers here. Dr. Hulser has expressed enthusiasm for this project, and will likely be able to get the others to support it. She sees applications beyond wounds.

The first step is for one of the researchers to check out the capabilities of locally available low cost cell phones and whether or not they can take pictures and send picture emails to the email server. It's quite unusual to send emails with attached photos, and every phone implements it differently. We may need to buy phones and bandwidth plans for 5 or 6 HBCs. These carers can go about their normal duties and send in photos whenever appropriate, this is not expected to increase their workload, and may improve their status.

We will need to decide on a patient identifying method which can be used by a nurse without contacting the hospital. Some time will be spent training the HBCs on basic photography and emailing the pictures. The wound care nurse will practice receiving their pictures and calling back or sending emails back to the HBC. Once the local personnel are confident in their skills and equipment, probably in a day or so, the system can be started in earnest. The HBCs will do what they have previously done, with the addition of the photos. The wound care nurse will download and view the patients who have new photos and phone or email the HBCs with her opinions, plans and encouraging words.

The health workers in this Tabora hospital will eventually settle into a tele-woundcare routine. The format and understanding of this routine may be important for getting other centers to adopt the system. The social organization and attitudes of the people involved is of great relevance. We have friends in the hospital at Kakamega in Kenya. When the Tabora test is under way and autonomous we would like to try again in Kakamega, a quite different social and financial situation. Ideally we would take one of the Tabora HBCs with us to teach in Kenya.

Measurement.

The project is expected to discover if this approach improves wound healing, and if the personnel involved feel that it is worthwhile.

Worthwhile?

If there is success in getting the project to work and its people are confident in it, can it be extended to other hospitals? The funds required for this are likely small and if we can get the local nurses and HBCs to go and show others how to install and run it, then this will be its own testament. The hypothesis in this test is that health workers are generally unwilling to waste their time and if they are interested enough to spend time teaching others, then the wounds program is worthwhile.

Improvement?

The approach we plan for measuring improvement is to take a snapshot of the prevalence and severity of wounds at the start of the project. After, say 4 months, a second snapshot is taken and any change identified. By going through the records on the computer and we can count and classify the wounds at these two points in time. The opinion of the medical staff involved will be sought and recorded.

Data developed.

Primarily the data will be about implementation details of this system and what modifications it needs to operate successfully. The technology works quite well, but the details of how to deal with the problems that arise in practical situations are new.

Next Steps.

If the installations funded here are successful, we would expect to extend the installation of this system to other countries, both in the developing world and the West. The ideal situation would be for the formation of a commercial company to set up the global network that is implied here, and involve the wound care clinics of many hospitals.