

# Hacking for Health: Working with Technology to Improve Healthcare in Malawi

BY KEN BANKS

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Bringing medical support to isolated people often means working in difficult environments. A lack of continuous electricity, limited equipment and remote hospitals can mean health projects fall at the first hurdle. In these environments, people often think that cutting edge and complex technology is required, rather than working with what is already available. But in today's 'Digital Diversity', Isaac Holeman explains how Medic Mobile, the NGO he works with, provides health support in the developing world using simple, locally appropriate communication technologies – the ubiquitous first generation mobiles found all over countries like Malawi, where Isaac has been working.

In this way, Medic Mobile works not against the constraints in their environment, but with them, finding smart solutions that are calibrated to the developing world. Medic Mobile uses apps that provide information and the ability to coordinate, so health workers can manage staff, mobilise communities for vaccination drives, set up satellite clinics and manage and map health services, logistics and supply chains. But they don't all need complex technology or even smart phones. Isaac explains how, below.

National Geographic's [Digital Diversity](#) is a series of blog posts from [kiwanja.net](#) about the way mobile phones and other appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives.

## BY ISAAC HOLEMAN

After driving south to the end of the pavement, we continued on gravel and dirt roads for a few hours, long enough for me to fall asleep and wake up several times before arriving at the district hospital. Temperatures can reach 125 degrees Fahrenheit near the Nsanje River in southern Malawi, so I was grateful to arrive in a milder season when midday temperatures hovered just under 100. For more than a year I had been using mobile phone technology to improve health services and I expected this project to follow the typical routine: discuss the plan with leaders at the local district hospital, install software on phones and computers, and train frontline health workers to deliver routine reports using a mobile phone-based data collection app called [FrontlineForms](#).



*Training health workers to use Frontlineforms. (Photo: Isaac Holeman)*

In Malawi, government-employed community health workers (CHWs) treat children in rural villages for malaria, pneumonia and diarrhea. Although highly effective medicines exist, these three ancient afflictions remain leading causes of death among children in developing countries, often because medicines are out of stock or only available at distant locations. My goal in Malawi was to improve the flow of information from CHWs to the district hospital, so that these life saving medicines could be resupplied efficiently to remote communities.

Malawi has two major mobile network operators: Airtel and TNM. I had surveyed all 50 health workers about which mobile network had a stronger signal in each of their communities. When the training began, I was bewildered and frustrated to find that there was almost no signal for the network that 8 out of 10 had requested. I had offered to connect them to either network; why would so many choose the one with much poorer coverage? Reluctantly, they explained that although Airtel had weaker signal locally, they sold airtime in units of 25 Malawi Kwacha, while the smallest increment for TNM was 50 Kwacha. These CHWs typically had 25 Kwacha on hand but may not have 50 in their pocket when they wanted to buy airtime for personal use (work related airtime was to be reimbursed). This experience was eye opening, almost unnerving. I was distributing \$100 phones to people who considered 25 Kwacha (about

15 cents in US dollars) a greater barrier to access than walking or bicycling several kilometers to reach mobile signal.

Money on hand for airtime is one of several important considerations for rural health workers. A few weeks ago I spoke with a volunteer health worker who provides immunization and antenatal care services in coastal Kenya. Mary has a solar panel on the roof of her house and one other volunteer in her community group has grid electricity, but the other 38 volunteers must travel to the market to charge their phones. Charging a phone just once costs 30 to 80 cents. For a volunteer health worker whose cash income may average a few dollars a day, the financial burden of charging a phone this way is similar to filling a car with gasoline in North America or Europe. Walking or paying for public transit to the market are inconvenient, so many volunteers wait a day or two after their phone runs out of battery.

Working in these circumstances for the last three years, I've learned that the key to understanding how mobile health services can proliferate is in understanding what technologies these communities are already using. There is wisdom embedded in the observed preferences of ordinary villagers. The technologies that are driving change in society today are, as a rule, already being used at a massive scale. For the urgent change-maker, *cutting-edge* technologies are hardly relevant, *ubiquitous* technologies should be captivating.

One such captivating technology is the mobile phone that costs \$15 and can last a week or even two on one charge. Clunky nine-button keypads and black and white screens the size of a half-dollar coin can make these phones look second-rate, but they fill an enormous gap in households surrounded by neglected rural roads, with ineffectual postal service, no car and no land-line telephones or internet. The first-generation phone is a quaint memory in developed markets but in Africa, everyman's phones are referred to with familiar terms such as [Kabambe in Kenya](#) and [Mosewalelu in Malawi](#). They have become cultural icons of progress not unlike the early model T Ford, a cultural icon as the first everyman's car in America. The low cost, long battery life, familiarity and ease of use, being less prone to theft, better supply chains, sales



*Medic Mobile apps can be used to share information about when medicines are in or out of stock, saving long journeys and helping to fix the supply chain. (Photo: Isaac Holeman)*



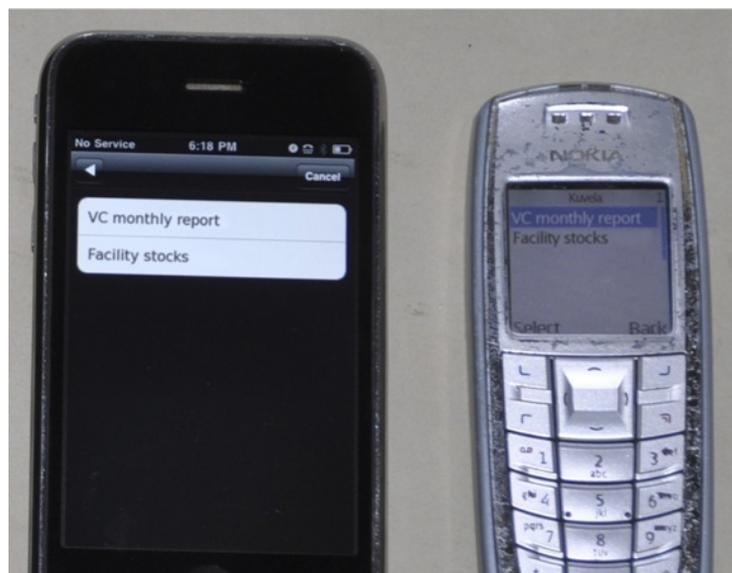
*A cultural icon of progress - the new Model T Ford. (Photo: Isaac Holeman)*

and repair outlets and the promotions put on by mobile network operators all contribute to the statistic that in 2011 there were **32 non-smart phones for every smart phone on the African continent.**

During my first design research trip to Kenya in early 2010 I learned something about \$15 phones that most Kenyans already knew: every phone can have apps – you don't need a smartphone. I was talking with ordinary consumers about using

mPesa, the wildly successful mobile banking service that lets users send money to and from any phone. I learned that mPesa is available and familiar on any kind of phone, from Android smart phones to ordinary \$15 phones. This is possible because mPesa actually sits on the SIM card, not the phone itself. Many North Americans do not even realize that inside of their phone is a small chip called a SIM card that handles the phone's connections to the mobile network. Throughout Africa, however, people frequently change their phone's SIM card from one mobile network to another, to take advantage of evening calling rates or other sales promotions.

SIM apps are viewed through the phone's native menu which means that if you know how to check your contacts list or text message inbox on a particular phone, a SIM app on that same phone will look familiar. The challenge with deploying health related SIM apps is that mobile network operators strictly control which apps are installed on their SIM cards. But I kept tinkering with SIM cards and after several months I discovered that some groups in the financial and security sectors, as well as hackers trying to jailbreak iPhones, use paper-thin



*Different phones, same apps - with a little creativity. (Photo: Isaac Holeman)*



*The ingenious parallel SIM card, which sits under an ordinary SIM. (Photo: Dave Brown)*

parallel SIM cards that slide underneath the mobile network operator's SIM. Using any standard GSM phone, we're able to put our SIM apps on the parallel SIM and still use an ordinary SIM card to connect to any GSM mobile network in the world. About a year ago I announced that Medic Mobile would be the first mobile health organization to develop and deploy SIM apps, and since then the Medic Mobile team has started SIM app projects in several African countries.

As we take on larger SIM card projects, our goal is to work closely with mobile network operators so that the apps sit directly on the native SIM card and don't require parallel SIMs. This will be cheaper and it's true to the strategy that has served Medic Mobile well: no one understands the communities where we work better than the people who live in them every day. Our best chance of deploying mobile health services that are locally appropriate and manageable at a

large scale, is to leverage the phones and other technologies that are already in their hands.

**Isaac Holeman** hails from [a great big outdoorsy Oregon family](#). He's a co-founder and the Chief Strategist at [Medic Mobile](#), where he's focused on building a team that uses communication technologies to improve health services, human centered design and the organization's strategy for products and services. He was named one of the [top 11 mHealth innovators of 2011](#) for his work with SIM apps. He studied Liberal Arts, Biochemistry & Molecular Biology at Lewis & Clark and will begin graduate study in sociology at the University of Cambridge this fall. You can [follow him on Twitter](#).

[Digital Diversity](#) is produced by **Ken Banks**, innovator, mentor, anthropologist, [National Geographic Emerging Explorer](#) and Founder of [kiwanja.net](#) / [FrontlineSMS](#). He shares exciting stories in "Digital Diversity" about how mobile phones and appropriate technologies are being used throughout the world to improve, enrich, and empower billions of lives.

You can read all the [posts in this series](#), visit his [website](#), or follow him on [Twitter](#).