

## Africa's cellular solution to TB

It only made sense to connect the dots, in a manner of speaking. The number of new cases of tuberculosis (TB) is exploding in sub-Saharan Africa, to 260 per 100 000 population in 2011, according to the World Health Organization ([www.who.int/media/centre/factsheets/fs104/en/](http://www.who.int/media/centre/factsheets/fs104/en/)).

Almost as explosive has been the growth of mobile phone use, which isn't altogether surprising given the continent's lack of access to such amenities as electricity or computers. For example, in Nigeria, the continent's largest telecom market, the Nigerian Communications Commission says roughly 100 million smartphones are now making Nigerians the continent's leaders in the use of wireless technologies.

Given those realities, it's not surprising that many countries and agencies in Africa have launched initiatives to explore whether wireless technologies can actually be used to improve treatment for diseases such as TB, particularly in remote communities.

Typical is a collaborative initiative in Nigeria which the government's National Tuberculosis and Leprosy Training Centre partnered with Maryland-based Abt Associates to develop and pilot an automated checklist that allowed for better supervision of patients with TB. Scaled up in 2011–12 to use smartphones during monthly or quarterly supportive supervision visits at 200 health facilities, it ultimately resulted in substantial improvements in quality of care. For example, in one administrative division, the Lagos Mainland Local Government Area, the percentage of patients co-infected with TB and HIV on cotrimoxazol preventive treatment increased to 100% in March 2012 from 33% in March 2011 ([www.healthsystems2020.org/content/resource/detail/92730/](http://www.healthsystems2020.org/content/resource/detail/92730/)). "There was also an improvement in the new smear positive cure rate, increasing from 62% in March 2011 to 79% in May 2012."

"By using smartphones on these visits to collect data on tuberculosis, the



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Getting therapies into the hands of many patients in Africa can be a challenge.

supervisors have eliminated the need for printed forms, minimized human error in data entry, reduced the lag time for getting data to policymakers and managers, and helped pinpoint ways to improve quality of care," the study noted. "Worldwide, mobile technology is spreading rapidly and barriers to its

utilization are quickly disappearing. The percentage of users accessing the Internet by using mobile phones in sub-Saharan Africa is notable; in Nigeria it is 41%," according to the World Bank's *World Development Indicators 2011*. The report also projected that over 300 million smartphones with a retail price

under US\$100 will be in use by the end of this year.

The increasing use of smartphones has had a remarkable impact on quality of care, particularly by enabling supervisors to improve data collection and impose immediate corrective action for patients, says Kehinde Jimoh, scientific officer and trainer with the national tuberculosis program. “With the smartphone technology, the 50 supervisors in the four states — Abia, Kano, Lagos and Rivers — now have common checklists, can quickly detect if there are problems such as drug shortages and default rates and can immediately take actions based on the rapid results.”

By contrast, in Malawi, where the smartphone technology and checklist are unavailable for use in the treatment of TB, district supervisors continue to flip through paper registers to analyze data on patients, says Isaias Leo Dambe, an officer with the country’s National TB Control Program.

“There are about 25 000 patients on TB medications in Malawi annually and [if smartphones become available] supervisors can use the smartphones to

identify patients who are defaulting from treatments, and prompt them to complete treatments,” says Dambe.

Given the rapid expansion of smartphone use in sub-Saharan Africa, Dambe and others are hoping the technology can be more extensively adopted, for a wider range of purposes, such as sending health reminders to patients.

That may be possible under an initiative that will soon start in Malawi and that will see overall supervision of essential health services (including TB treatment) undertaken through use of smartphones in both health centres and district hospitals, Leah Ekblad, a senior associate at Abt Associates, writes in an email. “Supervisors [will] have a tool that allows for rapid problem identification and prioritization of solutions. When those solutions are implemented, patients benefit from the improvements whether it be more consistent drug stock, referral for HIV testing, etc.”

The possibilities are numerous, Ekblad adds. For example, in Nigeria, the partners are now testing the use of smartphones to send emails and text messages to front-line health workers

and officials to pinpoint multiple drug-resistant TB cases identified by a new rapid diagnostic technology called GeneXpert.

Similarly, in South Africa, the TB/HIV Care Association has undertaken a pilot project to train staff of health facilities to collect data on patients, including the use of Global Positioning System on smartphones to locate patients through their smartphones and direct them for treatment, says Harry Hausler, director of the association and associate professor at the University of the Western Cape, South Africa.

But Hausler cautions that the expanding use of smartphones to deliver and improve health care in sub-Saharan Africa must proceed carefully because there’s a good possibility that many patients will be lost in the wireless shuffle. Mobile telecommunication “network coverage is not universal and technology can be intimidating to older community health workers,” he notes. — Bernard Appiah, College Station, Tex.

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