Use of Open Source Tools to Facilitate Population Surveillance in Western Kenya

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Background

83% of Kenyans living with HIV do not know they're infected. This translates approximately 1 million people.[1]

Previous solutions, such as the Voluntary Counseling and Testing program and the Provider Initiated Testing and Counseling program, were attempted and found unsuccessful.

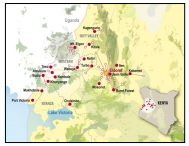


Figure: A map of western Kenya, highlighting locations where the USAID-AMPATH Partnership operates permanent clinics or satellite locations.(Image credit: http://www.iukenya.org)

In response, AMPATH developed a program for home-based counseling and testing (HCT). In the initial iteration, community-based health workers visited people in their homes to conduct basic healthcare and HIV screenings. Data was initially captured on PDAs with tethered GPS devices[2]. Pendragon Forms[3] were used to acquire the data. This system presented several points of technical challenge to our counselors.

- It was necessary to carry several devices and cables.
- Devices had to physically connect for data transfer.

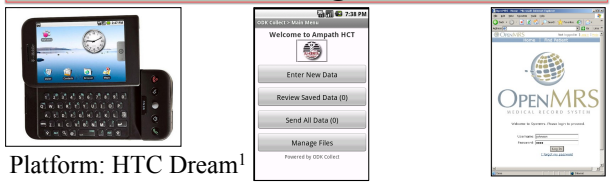
1: Kenyan AIDS Indicatory Survey 2007, accessed 27 Aug 10 from http://www.aidskenya.org/public_site/webroot/cache/article/file/KAIS_Key_Highlights1.pdf.
2: PDA – Palm Inc., Sunnyvale, CA USA. GPS – eTrex from Garmin Intl Inc., Olathe, KS.
3: Pendragon Software Corp., Libertyville, IL USA.

Intervention

In 2009, we began redesigning the system used by USAID-AMPATH for their HCT program. We had several goals for the redesign:

- Reduce the cognitive load on our field counselors,
- Improve the function of the device in the field,
- Integrate obtained data into a medical record system,
- Reduce the per-device cost of the program, and
- Leverage open source systems as much as possible.

Design



Platform: HTC Dream[1]

- Open source operating system (Android OS[2])
- Integrated GPRS, GPS, and WiFi functionality

Data collection: Open Data Kit Collect (ODK)[3]

- Open source, freely available system
- Allows for custom forms designed in XML
- Stores data in XML

Data repository: directly into OpenMRS[4]

- Open source, freely available medical records system
- Has previously developed functionality for XML input

The HCT program also took advantage of the change in devices to implement screening for other healthcare conditions of interest to the USAID-AMPATH Partnership. Some of these include specific screening for:

- Pregnant women without antenatal care,
- Pregnant women infected with HIV, and
- Identification of patients whom the community healthcare worker felt appear 'particularly ill'.

Results

We have currently deployed over 100 devices featuring the new system. We are in the process of preparing 150 more devices.

Preliminary feedback is that the device is easier to use. We will conduct a formal survey of user satisfaction and evaluate device functionality and utilization in September, 2010.

Future directions of this system will include support to screen our population for diabetes, hypertension, and selected other diseases in primary care. We are also considering secondary uses of gathered data to improve presentation rates for at risk populations.

1: HTC America, Inc. Bellvue, WA USA.
2: Google, Inc. Mountain View, CA USA. http://www.android.com/about/
3: http://code.google.com/p/opendatakit/
4: http://openmrs.org/