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# mHEALTH COMPENDIUM

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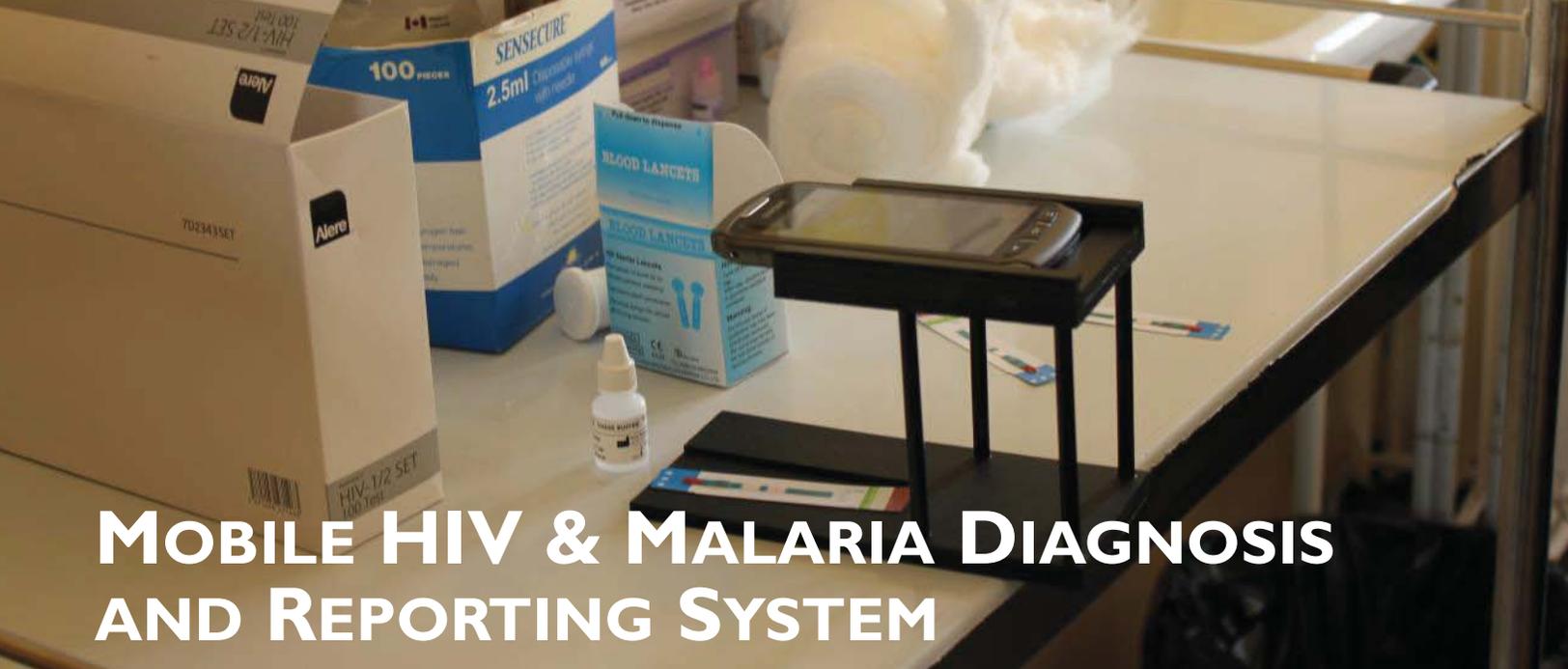
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# MOBILE HIV & MALARIA DIAGNOSIS AND REPORTING SYSTEM

## *Improve disease monitoring in Zimbabwe* DATA COLLECTION

**Implementation date: October to December 2013**

*In 2012 and 2013, 15 percent of Zimbabwe's population was HIV positive and half the population was at risk of contracting malaria. Accurate diagnosis of disease is needed to guide patient treatment and timely reporting of results is needed to guide disease control programs. The challenge is that most disease reporting still relies on paper-based systems. These systems often have gaps such as errors in data or delays in reporting. In 2013, Global Solutions for Infectious Diseases (GSID), the University of Washington and Dimagi created a mobile application to analyze and capture RDT results at the point of care and report them to a secure web-server for remote monitoring by public health officials.*

### **About Mobile HIV & Malaria Diagnosis and Reporting System**

The Android-based software utilizes CommCare's case management and reporting features, developed by Dimagi, to digitize case report forms and Open Data Kit (ODK) software (developed by the University of Washington) to process, analyze and return RDT results with computer vision algorithms. The mHealth tool seeks to:

- Analyze and deliver RDT results to health care workers (HCWs) at the point of care
- Provide a universal reader capable of reading multiple RDTs from various manufacturers
- Automate data collection and eliminate key sources of errors
- Reduce HCWs' workload by digitizing reporting
- Enable high-level supervision and quality assurance of health workers' RDT administration
- Provide real-time, accurate disease reporting

This system has the capability to photograph and analyze HIV or malaria RDT results. The application captures the type of test used, time, date, and location, as well as allowing the HCW to enter demographic data. The results are transmitted wirelessly to a central, web-accessible database that aggregates the data and provides customized reports for use by health officers. The data assist in tracking and managing patients' cases and monitoring disease trends and health commodity consumption. All data are secured and made available based on the national regulations and guidelines.

## Evaluation and Results

Table 1 - Zimbabwe Study Summary (Oct - Dec 2013)

	HIV		Malaria	
	Number	Positive	Number	Positive
Male	214	17%	749	24%
Female	648	13%	965	20%
<b>Total</b>	<b>862</b>	<b>14%</b>	<b>1714</b>	<b>22%</b>

Working with the Zimbabwean Ministry of Health and Child Care (MOHCC), a pilot study was conducted across five sites in Manicaland Province: one provincial hospital, two district hospitals, and two rural health centers. The application was calibrated to read six different RDTs distributed by the MOHCC (three for HIV and three for malaria). During the study, over 2,500 test results were collected (summarized in Table 1).

Based on interviews, HCWs said the application was easy to learn and use. Actual data entry required about 90 seconds per result. Moreover, they strongly believed that it would improve their workload, primarily by eliminating paper-based reporting requirements on a daily, weekly and monthly basis.

One of the primary goals was to validate the application by comparing the results from the application to those from visual interpretation by the trained HCWs during actual service provision. The study successfully demonstrated a high concordance between the software and visual interpretations. The results have been submitted for publication.

The GSID project provided one phone per clinic, with 60 nurses sharing 15 phones across five different sites. Each user was given a unique login, allowing multiple users to access CommCare on one phone. Supervisors were able to monitor individual locations and hospital departments' performance through CommCare reports.

During the study, GSID used images uploaded to CommCareHQ to conduct quality assurance, identifying when the nurses were performing RDTs incorrectly (such as using too much solution or applying too much blood to the receptor). Representatives at the Central Lab in Harare were able to follow up directly with specific sites, reviewing proper procedures for performing RDTs.

## Lessons Learned

- HCWs can quickly learn and easily incorporate the mHealth application into their existing workflow without major disruptions.
- Relevant data can be easily collected and rapidly reported for remote monitoring by central public health authorities.
- Future studies will need to assess how real-time data can be incorporated with other data sources and used to improve monitoring and management of disease control programs.

## Conclusion

After a successful pilot, expanded use of the mobile application would improve health care, from the point of care up through the senior level of MOHCC. For patient-level management, the application provides standardized interpretation of diagnostic results to guide the appropriate care provided by even minimally trained health workers, in resource-limited settings. From the public health perspective, the infectious disease reporting cycle can be dramatically shortened using mHealth, allowing health officers to gather, assess and respond to real-time disease occurrence for improved disease control. Results can be monitored to detect outbreaks and trends of specific diseases can be evaluated to support evidence-based decision making. Accurate supply consumption data will better inform supply-chain managers. Data can also be used by program funders to enhance transparency and provide better monitoring and evaluation at all levels.

**Geographic Coverage:** Manicaland Province, Zimbabwe

**Implementation Partners:** Global Solutions for Infectious Diseases (GSID); Dimagi, Inc.; Open Data Kit (ODK), University of Washington; Zimbabwe Ministry of Health and Child Care

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See References on page 89.