

Applying or Integrating Mobile-based EpiSurveyor Technology into Malawi Malaria Supervision

Background

EpiSurveyor is a multiple-award-winning application for international development and global health, developed by DataDyne. It's a free mobile-phone-and-web-based data collection system. It serves as a solution for collecting data in field-based surveys.ⁱ This application has proved to be useful for monitoring and evaluation (M & E) activities particularly in resource constraints settings. Apart from the fact that EpiSurveyor is an open source and can function on a simple cell phone; the team selected EpiSurveyor for the Malawi pilot specifically because the program has already proven that it can lower the barriers to collection of high-quality data by creating inexpensive, easy-to-use forms for data collection with simple cell phones. Also, this program has proved that it can produce more and faster analysis in near real time.

In July 2009, SPS Program and the JSI|DELIVER Project piloted the use of EpiSurveyor Mobile for data collection of the President's Malaria Initiative (PMI) End Use Verification activity in Ghana. The objective of the Ghana pilot was to assess the benefit of using EpiSurveyor Mobile, preferably as a way to improve the process for paper-based data collection and eventually replacing them with electronic based data collection for conducting future End Use Verification (EUV) activities in PMI supported countries. The Ghana pilot was designed to assess:

- *Time:* comparing the time lapsing at a health facility while using the phone to the amount of time it took to gather the data using paper
- *Data Quality:* comparing the data quality between that uploaded to the online database from the mobile phones, and that gathered on paper and entered in an Excel database
- *Ease of Use:* evaluating comments and observations made by data collectors using the mobile phonesⁱⁱ

Objective

After lessons learned from Ghana pilot, it was recommended that PMI countries should consider using EpiSurveyor Mobile for data collection, particularly when doing End Use Verification activity, and where the NMCP supports the idea, and resources are available. In March 2010, the Strengthening Pharmaceutical Systems (SPS) program in Malawi decided to pilot the application of EpiSurveyor Mobile for their malaria quarterly supervision activity, with integration of EUV for both supply chain and malaria case management indicators. Malawi pilot was designed to assess the practical feasibility of integrating EpiSurveyor technology into routine quarterly supervision organized by NMCP and as well as piloting this technology at the national scale up. As opposed to the Ghana pilot, whereby a contract was signed with DataDyne and a fee was paid by the



JSI|DELIVER Project to include access to unlimited number of forms per user; unlimited access of records per form; unlimited number of questions per form; and technical support with priority 24 hour response.

The basic (*free*) version of EpiSurveyor has its own limitations. Some of the limitations include the number of forms that can be created per user, number of records available per form, and number of questions per form that can be created by the basic (*free*) user. In addition, the technical support consists of user forums and email, as opposed to email with priority 24 hour response for pro users. The specific objectives of the Malawi EpiSurveyor pilot were to assess:

- How EpiSurveyor Mobile can help alleviate the burden of data collection, data entry, and data analysis for future malaria quarterly supervision surveys.
- The application of GPS feature in EpiSurveyor Mobile to map out health facilities visited.
- The use of basic EpiSurveyor in a supervision where limited support is provided by DataDyne

Methodology

Fifty-six health facilities were visited during the supervision conducted in March 2010. As usual with the supervision exercise in Malawi, there were supervisors from the NMCP, SPS Program and the district health offices. The facilities visited included 42 government facilities, 12 CHAM facilities and 2 facilities run by non-governmental organizations (NGOs). All these facilities were visited in a period of one and half weeks.

Development of Forms

Although the generic versions of the End Use Verification forms have been developed for data collection when using EpiSurveyor Mobile, for Malawi, the forms had to be updated and changed because the Malawi supervision tool which already integrated EUV indicators has been endorsed by the NMCP. As a result, the Malawi supervision tool had to be updated because the last update was done in early 2008, and it was important for the tool to be modified, for it to be in sync with EpiSurveyor Mobile for data collection. Updating and digitization of the forms took three full working days, and helped prompt improvement to the supervision tool. Also, the majority of the questions had an “answer required” feature to deject data collectors from skipping any questions that required an answer. Following the creation of the Malawi supervision indicators and forms on EpiSurveyor.org, the forms were uploaded to EpiSurveyor Mobile phones, a program that was already installed from www.episurveyor.org/m, into the Nokia E71 mobile phone.

Equipment/Tools Used

The type of mobile phones selected for this pilot was the Nokia E71, and five phones were purchased for the Malawi office. All phones came with a charger, and the battery life lasted for the entire survey while at the facility, and required to be charged in the evening, but the battery proved that it can last at least three days. EpiSurveyor can be used on standard and/or basic mobile phone; thus, making it very economical, particularly

in situations where financial constraints are a major hindrance to the process of effective, fast, and accurate data collection.ⁱⁱⁱ

However, for the Malawi pilot the Nokia E71 phones were selected because of their additional capability or functionality to use the Global Position System (GPS) feature, as well as, the keyboard being large enough to allow for easy and quick typing. The Ghana pilot did not use GPS feature from the phone; instead, a hand held GPS monitor was used. Therefore, a question asking for GPS coordinates for each health facility visited was added to the survey. The GPS coordinates were collected onsite during each visit to the particular health facility. On day five of the data collection, which was the last day for the survey, the data was collected only by phone and no paper was used. The GPS feature was useful in mapping out the health facilities that were visited during the survey. The phone company selected to use in Malawi was Zain Telecommunication Network. Zain was selected because it has wide network coverage in Malawi. The SIM card purchased from Zain had a data plan to allow functions of internet service for connecting to DataDyne to upload forms and send data to the server.

Training

After uploading the forms into EpiSurveyor, a one day training was provided to five in country SPS staffs who served as team leaders, and were primary users of the phones during the data collection. The five SPS staff are responsible for supporting the National Malaria Control Program (NMCP) with the quarterly supervision. In the future, the SPS team would be responsible for training NMCP staff on creating forms, and collecting data for all M & E activities for malaria using EpiSurveyor. Due to time constraints, the team did not field test the phones within Lilongwe for testing the practicality of the questionnaire on the phones. Instead, the team leaders conducted mock interviews amongst themselves. These worked fine because the team leaders were familiar with the survey and know how to ask the questions, and understand how questions have to be structured to avoid confusion when collecting data in the field. All changes to the survey tool and data collection forms were made after several interviews amongst the team leaders. It is important to highlight that the Malawi pilot did not measure time needed to collect data at one facility when using the mobile phone. Experience from the Ghana pilot proved that using EpiSurveyor Mobile for data collection can save time when compared to using paper based data collection tool.

Data Collection

As opposed to using excel, access or any other database for data entry, EpiSurveyor program automatically generates a matching database that is stored online. Therefore, using EpiSurveyor to gather data in the field, the mobile phone can be thought of as a handheld computing device, into which the user is able to directly input data into the database while at the health facility. The data gathered in the field automatically populates the online database when it is uploaded from the phone, thereby removing both the step of creating a database

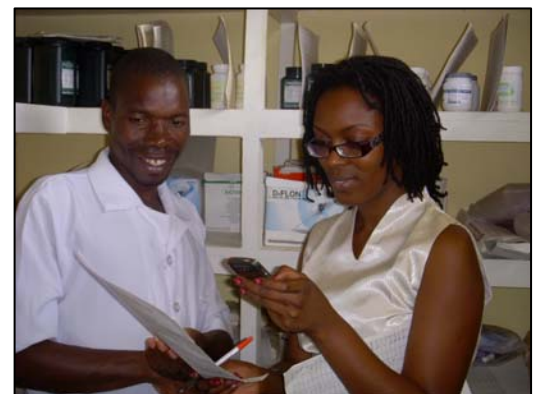


Figure 1 Data collector at the facility

and the need to manually input the data, as well as their corresponding costs, in terms of time, skillset required and financial resources needed.

Results

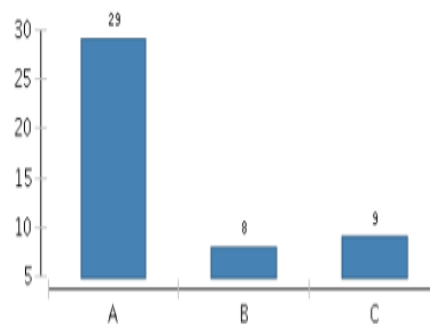
After each data collection exercise, the team leaders finalized the data and used one master hard copy with complete data to enter into the mobile phone for uploading into the DataDyne server. The automated analysis was conducted using EpiSurveyor, which performed basic statistical analysis on the data instantly or in real time.

Because the Malawi pilot was applying a basic (free) version of EpiSurveyor, there was a limit to a number of records per form that could be uploaded to the server, for example up to 500 records per form is the maximum that any basic user can upload to the server. The limitations to the number of records that can be uploaded per user slightly hindered the process of data analysis part, simply because not all analysis that exceed 500 records could be analyzed automatically from EpiSurveyor. As a result, data was exported to excel for further analysis and preparation of the report writing, which is also an advantage to those who prefer to use their own software programs for data analysis. Overall, basic automated analysis was performed on EpiSurveyor.org, just by a click of a button, and a generic analysis of the data with line and bar charts was displayed automatically. The only time exportation of the data to excel was required was for the analysis of the malaria case management data, which had more than 500 records uploaded. See figure 2 for sample of automated analysis performed by EpiSurveyor.

4. What was the diagnosis?

	Option	Number (%)
A	malaria only	29 (63)
B	malaria and another condition	8 (17)
C	a condition other than malaria	9 (20)
	Total	46 (100)

Figure 2 Automated analysis performed by EpiSurveyor



Through the GPS feature, the team was able to capture some of the health facilities that were visited. In the first couple of days of the survey, the data collectors had difficulties obtaining the GPS coordinates for the health facilities. Therefore, not all the health facilities visited were captured on the GPS, however, by the end of the week, all facilities were captured on the GPS. See figure 3 for a sample map of some of the health facilities that were visited during this activity. Mobile data or internet is not required for Nokia GPS operation. It took a little longer to synchronize with the satellites and obtain the coordinates, which is why we had difficulties getting all the coordinates to the health facilities visited. As a result, the team only obtained GPS coordinates to only half of the facilities that were visited during the survey (i.e. 21 out of 56 health facilities were recorded).

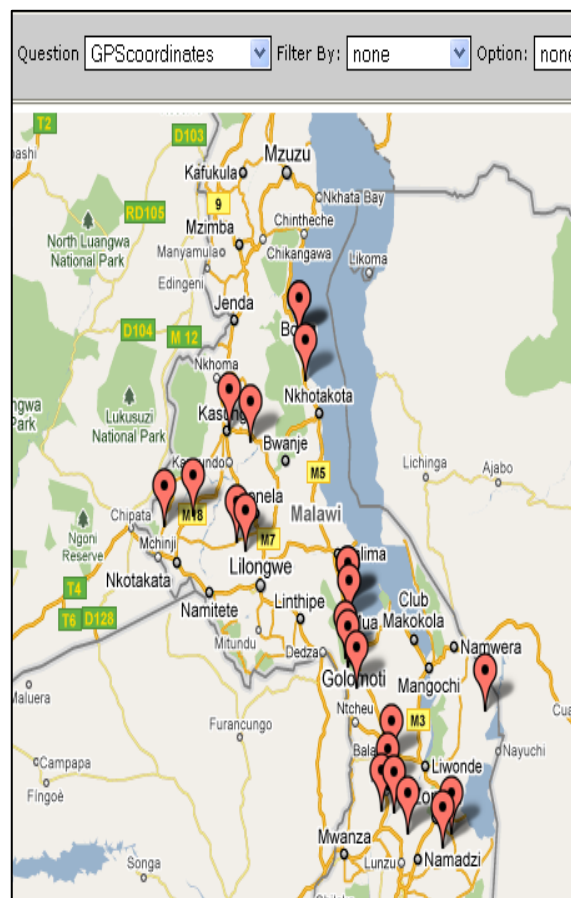


Figure 3 Sample map of health facilities visited

Conclusions and Recommendations

Overall, the use of EpiSurveyor Mobile in Malawi proved to be successful, particularly in the data collection, data analysis and data entry phase. Therefore, the team recommends using the EpiSurveyor Mobile for all future data collection of the malaria supervision activity in Malawi. Data will be collected at the health facility on the phone and uploaded to the DataDyne server immediately depending on the network connectivity at a particular health facility or location. Of the fifty-six health facilities that were visited, data was collected and using paper and later transmitted into the mobile for uploading to EpiSurveyor. This proved that EpiSurveyor Mobile can be applied and adapted in a variety of ways when conducting surveys.

The team recommends two phones per team, with only one phone having the GPS feature. The second phone can be a very basic and/or standard phone, this is due to the fact that once the teams arrive in a facility, they split into two groups: one group collects indicators for supply chain/drug management indicators and the other group collects malaria case management indicators. As a result, one section of the survey was collected using mobile phones while the other section, particularly the malaria case management section was collected using paper in most of the facilities visited. This was because each team only had one mobile. Also, for future supervision activity, the team recommends collecting the GPS coordinates at the end of each health facility survey. This will help save time in case there are issues with satellite signal for collecting GPS coordinates.

Overall, the EpiSurveyor technology proved to be useful in Malawi for implementing the integrated supervision and EUV tools, and cannot easily calculate some of the indicators using other existing databases systems, such as excel, access, etc. Despite these limitations, overall the Malawi EpiSurveyor pilot was carried out successfully.

Very limited support was provided by DataDyne staff to the Malawi pilot. The basic (*free*) service of EpiSurveyor did reduce the overall cost of the pilot. Therefore, the EpiSurveyor delivery model can also prove to be scalable because it does not require ongoing technical support, but instead shifts the responsibility to the end user, and/or organization that is implementing the program. This model is important for settings like Malawi and other countries, whereby the NMCP and other malaria programs can take the lead in implementing EpiSurveyor without dependency to ongoing TA. For more information, see www.episurveyor.org.

ⁱ Courtesy of DataDyne website (www.datadyne.org)

ⁱⁱ Frost, Mike, Meaghan O’Keefe Douglas, Erika Ronnow & M. Thulani Mbatha. 2009. *Harmonization of Routine Monitoring*. Arlington, Va.: USAID | DELIVER PROJECT, Task Order 3.

ⁱⁱⁱ Courtesy of DataDyne website (www.datadyne.org)