Improving Completeness, Accuracy & Timeliness of HIV Voluntary Counseling & Testing Client Data in Malawi Using Touchscreen Computers

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Abstract: A real-time data collection system can mitigate problems of data completeness, accuracy and timeliness often experienced using paper-based data collection and subsequent data entry. The Client Management Information System developed for the Malawi AIDS Counseling and Resource Organization employs touchscreen computers to collect client information during voluntary counseling and testing sessions. A user-friendly interface allows counselors with low levels of computer literacy to electronically capture client data in real-time without compromising the quality of counseling.

Background: Complete, accurate and timely data are useful in monitoring and evaluating public health programs. Data collection methods that employ paper-based forms have no mechanism to ensure all fields are completed. Subsequent entry of data into a computer for analysis can introduce errors. Latency between capturing and entering data can result in reporting delays.
The Malawi AIDS Counseling & Resource Organization (MACRO) provides voluntary counseling and testing (VCT) for HIV to more than 50,000 clients each year. A two-page HIV counseling and testing form was used to capture information. Completed forms were entered into Epi-Info in batches. Analysis of 300 previously entered forms showed that: 1) one quarter of the forms had one or more incomplete fields, 2) one third of the forms had one or more errors introduced during subsequent data entry.

Methods: A system to facilitate real-time data collection was introduced at the MACRO Lilongwe branch in 2004 using lessons learned from the touchscreen-based Patient Management Information System (PMIS) developed at Kamuzu Central Hospital. The system consists of an electronic version of the VCT data collection form running on small touchscreen computers located in the reception area, testing lab, clinic, and each of the five counseling rooms. Computers are connected to a central database server using a local area network. Since traditional uninterruptable power supplies (UPS) proved inadequate to keep the system running during prolonged power outages, an alternative system using deep-cycle batteries was introduced to provide up to 10 hours of additional backup time. Service providers enter data directly into the computer immediately after each component of the VCT session, eliminating the need for retrospective data entry. The sequential nature of the data entry as implemented in the user interface provides a mechanism to control for completeness and internal logic testing in the computer program promotes accuracy. The real-time nature of the data entry eliminates delays in analyzing data. Counselor and client exit interviews were conducted to evaluate the impact of the new system on the counseling process.

Results: Initially, several of the touchscreen workstations froze periodically but this stabilized after some reconfiguration was done.
Counselors were surveyed after the system had been in place five months. Of 12 respondents, 11 reported having occasional technical problems, sometimes related to prolonged power outages. However, all 12 respondents reported they preferred to use the touchscreen system versus paper forms and that they felt the touchscreen was faster and easier than paper forms to record information. Feedback from the counselors was used to improve the user interface.
Exit interviews were conducted with 60 clients. Responses indicated that the introduction of the touchscreen computer into the counseling session had no negative impact on the counseling process. Thirty-four clients reported not noticing the touchscreen computer during the VCT session. Feedback received through open-ended questions focused on issues unrelated to the use of the touchscreen during VCT.

Conclusion: Real-time data entry has the potential to increase the completeness, accuracy and timeliness of data over traditional paper-based methods. The touchscreen user interface developed for MACRO appears to provide a sufficiently user-friendly mechanism for real-time data collection to be performed by users with low computer literacy without compromising the quality of the counseling process.