

# IMPROVING THE COMPLETENESS AND ACCURACY OF HEALTH INFORMATION THROUGH THE USE OF REAL-TIME DATA COLLECTION AT THE POINT OF CARE

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**Background:** In Malawi, morbidity and mortality data has traditionally been derived from copies of inpatient discharge slips, outpatient tally sheets and registers. Auditing has demonstrated that this system results in incomplete and inaccurate data in many cases. Incompleteness has resulted from a lack of printed forms, unwillingness of some staff to complete forms, and in some cases the loss of completed forms prior to data entry. Inaccuracies result from errors introduced at the time of data entry, in the coding process and in the formulation of incorrect diagnoses. Unfortunately, the HIV pandemic has further complicated the collection of health data. Clinicians have even less time to devote to documentation as a result of the increase in the number of patients seeking healthcare. Additionally, limited diagnostic testing means that many diagnoses are clinical, placing greater emphasis on the value of recording signs and symptoms to document patterns of morbidity and mortality.

**Objectives:** Develop a low-cost IT-based system that can 1) accommodate low computer literacy users and function in a resource-poor setting, 2) collect signs and symptoms in addition to diagnoses, 3) improve the completeness and accuracy of routinely collected health data over that currently collected in Malawi, 4) be perceived by clinicians as an integral part of healthcare delivery rather than a clerical duty.

**Method:** A pilot system incorporating 8 clinical workstations into the existing workflow was introduced into the 216-bed paediatric department in Lilongwe Central Hospital, Malawi. Workstations use a touchscreen interface in place of the traditional mouse and keyboard to accommodate for low computer literacy among the target users. Each workstation communicates with a centralized computer where all data is stored. Communication is achieved using a combination of wired and wireless networking technology.

Software modules were developed on-site and modeled on existing processes so as to minimize the learning curve for staff. The patient registration module was brought on-line in May 2001. More than 55,000 patients were registered in the first 21 months of use. In July 2001 an outpatient module was brought on-line followed by an inpatient module in February 2002. Both inpatient and outpatient modules facilitated the recording of signs, symptoms and diagnoses through the use of pick lists. Clinicians and nurses were encouraged to use the system but its use was never mandated. Surveys and interviews were conducted to access users' attitudes toward the system.

**Results:** Both clinicians and nurses reported that the system was intuitive and easy to use. Clinicians have been eager to learn the system. Most clinicians reached proficiency with only 20-30 minutes of training. Clinicians reported that having access to signs and symptoms collected during previous visits provided a better clinical picture than diagnoses alone. The Health Information Management Unit (HIMU) of the Ministry of Health & Population of Malawi noted that the quarterly reports coming from the paediatric department appeared to be the most accurate out of all departments within the hospital. Clinicians reported that they did not perceive the use of the system to be a data collection process. Rather, they use system because it provides them access to past medical history, generates complete and legible documents and simplifies the ordering of diagnostic tests and prescribing of medications.

**Conclusions:** An appropriately designed system can simplify patient management for the clinician. Under these circumstances clinicians will be highly likely to adopt the system resulting in the transparent collection of health data through its use. The addition of signs and symptoms to the routinely collected data has the potential to improve disease monitoring. The real-time nature of the data collection provides a suitable infrastructure for real-time outbreak detection and surveillance.