A novel electronic data collection system for large-scale surveys of neglected tropical diseases

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BACKGROUND: Large cross-sectional household surveys are common for measuring indicators of neglected tropical disease control programs. As an alternative to standard paper-based data collection, we utilized novel paperless technology to collect data electronically from over 12,000 households in Ethiopia. METHODOLOGY: We conducted a needs assessment to design an Android-based electronic data collection and management system. We then evaluated the system by reporting results of a pilot trial and from comparisons of two, large-scale surveys; one with traditional paper questionnaires and the other with tablet computers, including accuracy, person-time days, and costs incurred. PRINCIPLE FINDINGS: The electronic data collection system met core functions in household surveys and overcame constraints identified in the needs assessment. Pilot data recorders took 264 (standard deviation (SD) 152 sec) and 260 sec (SD 122 sec) per person registered to complete household surveys using paper and tablets, respectively (P = 0.77). Data recorders felt a lack of connection with the interviewee during the first days using electronic devices, but preferred to collect data electronically in future surveys. Electronic data collection saved time by giving results immediately, obviating the need for double data entry and cross-correcting. The proportion of identified data entry errors in disease classification did not differ between the two data collection methods. Geographic coordinates collected using the tablets were more accurate than coordinates transcribed on a paper form. Costs of the equipment required for electronic data collection was approximately the same cost incurred for data entry of questionnaires, whereas repeated use of the electronic equipment may increase cost savings. CONCLUSIONS/SIGNIFICANCE: Conducting a needs assessment and pilot testing allowed the design to specifically match the functionality required for surveys. Electronic data collection using an Android-based technology was suitable for a large-scale health survey, saved time, provided more accurate geo-coordinates, and was preferred by recorders over standard paper-based questionnaires.
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