

Moving from ink to bytes - Addressing the challenges in transitioning from paper to Electronic Data Collection (EDC) in sub-Saharan African HIV research centres.

Background

Whilst the use of EDC for field-based research studies can offer many advantages in terms of increased data quality, timeliness and cost savings, transitioning to these systems can be challenging, particularly in resource-limited settings.

Methods

Based on our long-term experience of field-based HIV research in community and facility-based settings in four sub-Saharan African countries, we explore those challenges and using case studies present strategies to address them.

Results

i) Challenges in implementing EDC -

There are significant costs associated with the purchase and maintenance of the data capture devices. Field-workers who have previously only used paper-based data collection forms will need to be specifically trained in the use of EDC. There is a risk of the loss of data and EDC devices through theft or physical damage. Power supply for charging and mobile connectivity for data transfer may be lacking in remote locations. The storage of primary records electronically may be seen to jeopardise an organisation's ability to maintain a long-term data archive. There may be configuration and customisation required for open-source, general purpose EDC systems such as ODK or RedCap creating a significant need for appropriately skilled staff who may be difficult to recruit and retain in such settings. Finally, research participants may be more reluctant to disclose sensitive or confidential data with EDC, particularly when dealing with highly stigmatised diseases such as HIV.

ii) Solutions to address the challenges -

A staged implementation of EDC, in which sites initially gain experience with smaller stand-alone surveys before scaling-up to larger systems, enables confidence in the systems to be gained across an organisation and implementation costs to be spread over time. Device encryption can prevent data-loss if devices are lost or stolen. Robust risk management procedures can ensure that all conceivable scenarios for data-loss with EDC are simulated and addressed. The use of human-centred design approaches to software development can identify and address difficulties that field staff have in transitioning to EDC. Generators with renewable energy backup can provide alternative power sources, although these may require investment in sophisticated maintenance capabilities. In our experience, even in remote areas, daily uploads of data from a location which has network connectivity is feasible. Data managers and ICT staff should be fully integrated into the entire research data life-cycle of each study to gain greater buy-in to the organisation's research mission and so improve staff retention. The storage of data in centralised data repositories can provide long-term security for data archives. Effective community engagement can alleviate the concerns participants have about the security of data captured electronically. The use of a system such as ACASI with which participants listen to an audio soundtrack and enter their responses directly has been shown to reduce bias when capturing sexual behaviour data.

Conclusions

With rigorous strategic planning in order to address the associated challenges, a staged transition to EDC can be achieved in sub-Saharan Africa biomedical research organisations.

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