



Feasibility of Implementing a Tablet-Based Decision Support and Integrated Record-Keeping (DESIRE)

Tool in the Nurse Management of Hypertension in Rural Kenya

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Background

- Hypertension, a major risk factor for cardiovascular disease (CVD), contributes significantly to the CVD burden in sub-Saharan Africa (SSA)¹
- Task redistribution of hypertension care from physicians to nurses in low- and middle- income countries (LMICs) has been proposed²
- In order to support nurses in this new role, Academic Partnership Providing Access to Healthcare (AMPATH) has developed a tablet-based Decision Support and Integrated Record-Keeping (DESIRE) tool to record patient data and assist with clinical decision-making
- The DESIRE tool is a data entry system with branching logic featuring decision support, alerts and reminders with the ability to retrieve and display historical data derived from the electronic health record stored on a central data server (Figure 1)

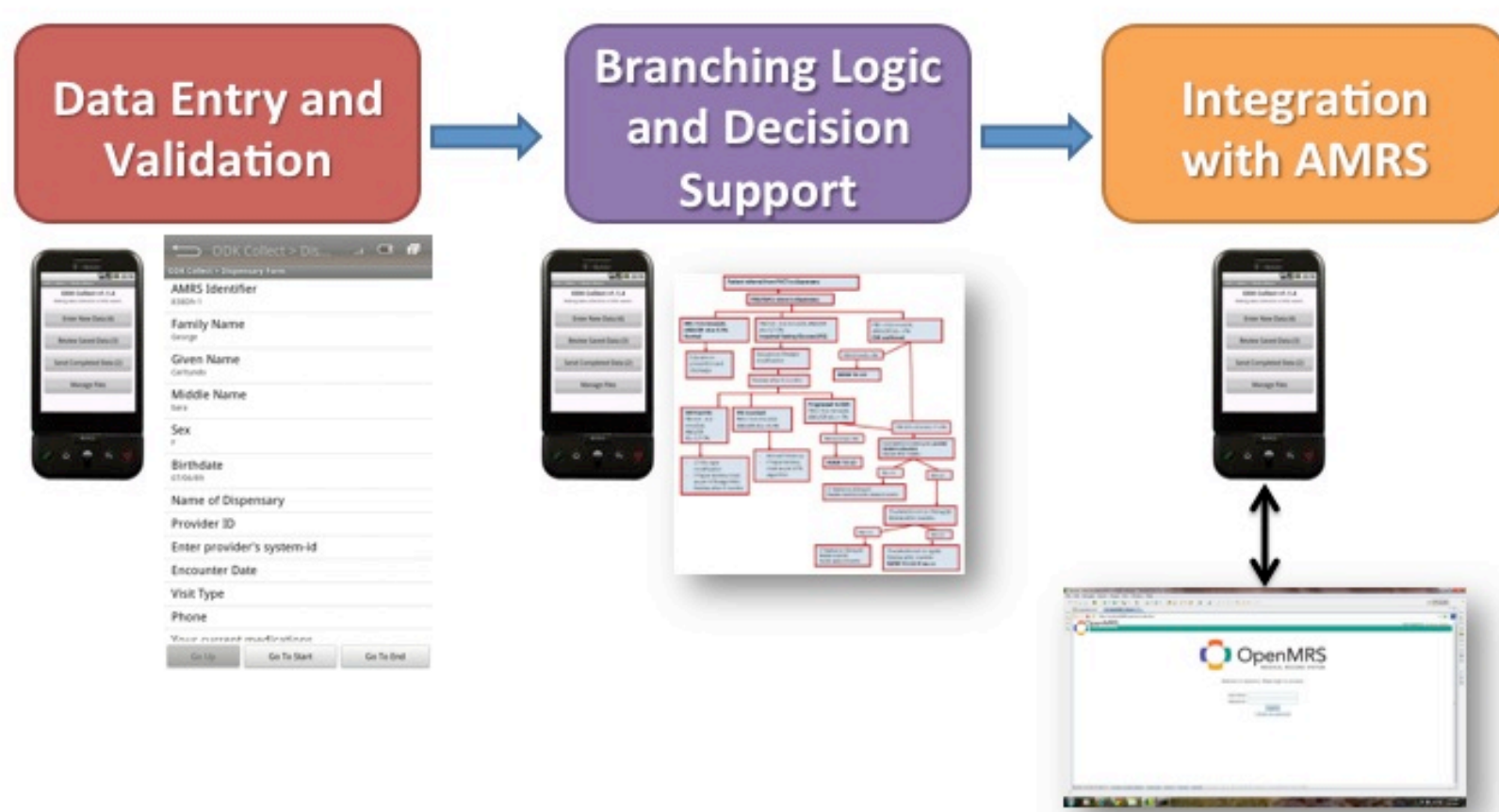


Figure 1: A schematic overview of the DESIRE tool and its integration with the AMPATH Medical Records System (AMRS)

- The feasibility of this type of tool for hypertension care has not previously been assessed in a LMIC setting

Objective

- To assess the feasibility of implementing the DESIRE tool in the Nurse Management of Hypertension in rural Kenya
- To potentially broadly impact treatment of non-communicable diseases in LMICs by optimizing the implementation of mHealth interventions in task redistribution among frontline health workers

Methods

- Data collected:
 - Five semi-structured interviews with nurses
 - Two semi-structured interviews with implementation team members
 - One focus group discussion with five nurses
- Content analysis of the qualitative data was used (Nvivo, QRS International. Version 10.), focusing on:
 - Acceptability
 - Confidence using the DESIRE tool on a day-to-day basis
 - Likelihood of recommending the DESIRE tool
 - Value added by the tool to the workflow
 - Impact on the practitioner-patient relationship
 - Empowerment of the end-users
 - Infrastructure
 - Technical
 - Logistical
 - Human
 - Cultural

Results

- Five themes were found to emerge:
 - Barriers to implementation
 - Facilitators to implementation
 - Provider issues
 - Patient issues
 - Feature requests

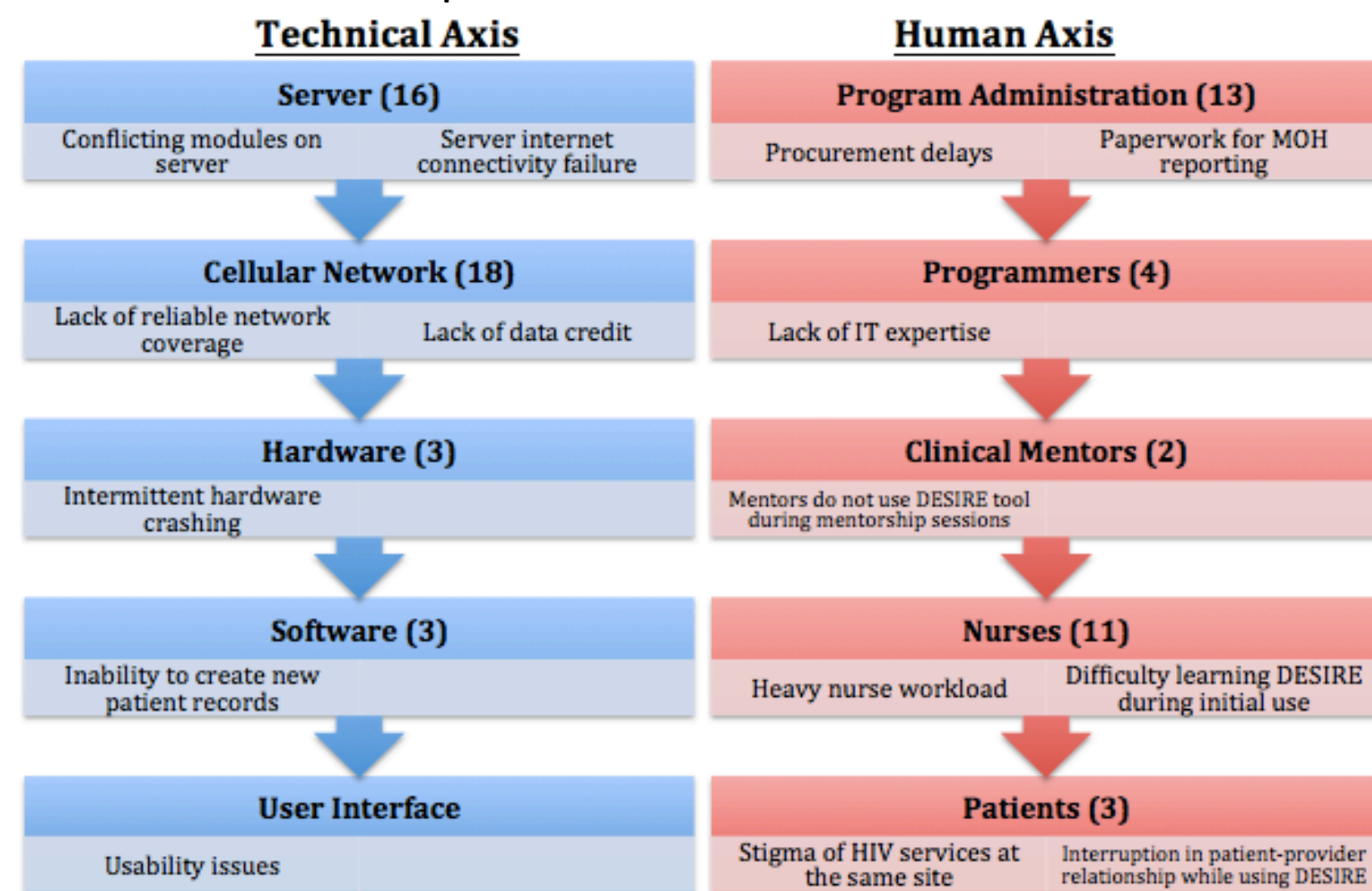


Figure 2: Barriers to implementation categorized into the Technical Axis and Human Axis. Frequency of barriers coded noted in parentheses.

Results (cont.)

- Barriers to implementation were found to exist along both a Technical and Human Axis (Figure 2)
- Solutions were proposed to the barriers to implementation (Table)

	Barrier to Implementation	Proposed Solution
Technical Axis	Conflicting modules on server	• Close collaboration with other teams using server
	Server internet connectivity failure	• Improve server internet connection and uptime
	Lack of reliable network coverage	• Work with network provider to ensure wireless coverage • Allow application to work in both online and offline modes
	Lack of data credit	• Regular schedule for data bundle transfer
	Intermittent hardware crashing	• Replace defective hardware
	Inability to create new patient records	• Possible biometric use to prevent duplication of records
	Usability issues	• (See Usability Design Change Suggestions)
Human Axis	Procurement delays	• Streamline procurement process
	Paperwork for MOH reporting	• Program DESIRE to auto-generate reports
	Lack of IT expertise	• Focus on recruiting, training and retaining IT staff
	Mentors do not use DESIRE tool during mentorship sessions	• Train mentors to use DESIRE and encourage use with mentees
	Heavy nurse workload	• Ensure adequate staffing
	Difficulty learning DESIRE during initial use	• Improve and increase training
	Stigma of HIV services at the same site	• Community outreach and sensitization
Interruption in patient-provider relationship while using DESIRE	• Nurse communication training	

Table. Barriers to implementation, categorized into technical and human axes, with corresponding proposed solutions.

- Facilitators included:
 - Electricity availability
 - Privacy of digital health information
 - Improved health record organization
- Provider Issues included:
 - Steep initial learning curve
 - Delays in implementation decrease user confidence
 - Barriers to implementation decrease user confidence
 - Prior smart phone use correlated with user confidence
 - Decision support perceived as improving quality of care

Results (cont.)

- Patient Issues included:
 - Initial decreased communication during patient-provider encounter
 - Improved communication with continued use
 - Perception that device provides higher quality care
- Ten feature requests were proposed including:
 - Ability to create new records
 - Encounter review screen
 - Free text field
 - Confirmation of data sync

Conclusions

- The use of a participatory feasibility study uncovered many previously unknown feasibility issues in implementing a tablet-based decision support tool for use in hypertension care by nurses in a resource-limited setting.
- The feasibility issues identified resulted in system change suggestions, highlighting the importance of feasibility testing as part of implementing mHealth systems in LMICs.
- In addition to confirming the presence of previously reported technical issues, we highlight the importance of human factors that can impact an mHealth intervention's implementation success.

Limitations

- Delays in implementation of the program resulted in variability of the duration and intensity of nurse use of DESIRE prior to testing.

Future Plans

- Design change suggestions and feature requests have been incorporated into updated versions of the tool that AMPATH has subsequently developed
- Implementation of a revised system/tool based on feedback/feasibility testing
- Evaluation of patient perceptions of the DESIRE system directly through semi-structured interviews and a focus group

References:

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