

Smartphones for Output-Based Aid

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ABSTRACT

Providing effective health care in poor countries is an essential component to economic development and poverty reduction. Unfortunately donors supporting this endeavor often find that resources given are not matched by desired gains. The output-based aid (OBA) model of financing seeks to address this by paying healthcare providers directly for services rendered instead of paying for the service provision up front. However, the program management is information intensive, necessitating much paperwork to track and reimburse payment claims. Smartphones (mobile phones with advanced features) have the potential to alleviate this burden. Based on recent work in Uganda we have identified some of the constraints and realities of the context in which these devices could improve the quality and speed of payment claims. In collaboration with Marie Stopes International and Microcare, we propose to deploy a number of smartphones for use in the Uganda OBA project, with dual goals of reducing claim processing time and improving communication between the health care providers and the management agency running the OBA project.

Keywords

Mobile phones, smartphones, developing regions, health, forms

1. INTRODUCTION

In low-income countries, STIs constitute a large health and economic burden: 75 to 85 percent of the estimated 340 million annual new cases of curable STIs occur in low-income countries, and STIs account for 17 percent of economic losses due to illness (Mayaud & Mabey, 2004). The importance of treating STIs has been recognized more widely since the advent of the HIV/AIDS epidemic (White, Orroth, Korenromp, Bakker, Wambura, Sewankambo et al., 2004), and there is good evidence that, under certain population conditions, the control of STIs can reduce HIV transmission significantly (Gray, Wawer, Sewankambo, Serwadda, Li, Moulton et al., 1999; Grosskurth, Gray, Hayes, Mabey, & Wawer, 2000).

Sexually transmitted infections (STIs) represent a major burden of disease in western Uganda. In a 2006 household survey, twelve percent of the surveyed adult population had a reactive result on both TPHA and VDRL tests indicating a highly probable case of

syphilis. In the first six months of 2006, 39 percent (945/2,576) of respondents reported possible STI symptoms one or more times but only a third (373/1,019) of these sought any care (Bellows, Bagenda, & Mulogo, 2007).

The Healthy Life STI voucher program was implemented in response to the high burden of sexually transmitted disease in Uganda. The project is managed by Marie Stopes International (MSI) and Microcare Limited, in collaboration with the Ugandan Ministry of Health (MOH) and the Kreditenstadt for Wiederaufbau (KfW, also known as the German Development Bank) and began in July 2006 in four districts of southwestern Uganda: Mbarara, Ibanda, Kiriuhura and Isingiro. The program treats sexually transmitted infections (STI) reimbursing providers for the diagnosis and full course of treatment only after the patient is seen.

Thus far, the project is going well, and is an effective and efficient means of decreasing the numbers of untreated patients. However, the long lag time between the patient visit and reimbursement has been prohibitive for some providers. We believe that smartphones can be used to streamline this process, by reducing data entry and pushing more validation and verification of the claims forms to the provider, before the forms are submitted. In this brief paper we highlight some initial findings from the field and delineate one proposed mechanism for addressing the problems we encountered.

2. BACKGROUND

2.1 The Role Of Technology

Given the rudimentary communication technology infrastructures found in Uganda, it is expected that a variety of mobile connectivity solutions will be needed to improve the communication between contracted clinics and the central management office. Due to their size, portability, low power consumption, and ability to operate with limited infrastructure, mobile phones are a much better computing platform for rural areas than larger laptops or desktops. Their wide availability for communications also ensures that the appropriate maintenance infrastructure will be available, and may better justify the expense of the equipment itself. The use of mobile phones as more than a voice communication device opens up the possibility of revolutionary new applications for health care.

2.2 Vouchers for health care

Patients buy treatment vouchers in pairs, one for the client and a second one for the partner. Each voucher is good for one consultation (generally a lab test to diagnose the STI) and three follow-up visits. During the consultation, the provider completes a claim form recording the client's demographics, the examination and laboratory results, a diagnosis and details of the course of treatment prescribed. Clients are entitled to a total of four visits to ensure that they have been successfully treated. A new claims

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form is completed at each visit. Completed claims forms are sent to the voucher management office in Mbarara. Forms can take two weeks or more to move from the provider's office to the management agency. The current data management system requires all claims to be submitted on paper forms to the management agency. At least another two to four weeks are spent reviewing the claim, cleaning improperly completed forms, and verifying that the service took place among suspect claims. Two months or more can go by before the provider is reimbursed for service provision. In Uganda, private providers traditionally operating on a fee-for-service model receive prompt payment. In many cases, payment is provided prior to service. Encouraging provider involvement in the OBA scheme requires a great deal of confidence on the part of the providers to participate. If a system to shorten claims processing could be devised, more providers could join the scheme and more patients could be provided the life-saving STI treatment voucher subsidy.

3. NEEDS ASSESSMENT

We found that despite frequent training and extensive documentation, one of the major issues is clinic compliance. Not only does it normally take several weeks to process correct claims, but those that are improperly completed, or do not follow one of the required treatments, can take even longer. Claims are approved/paid, partially paid, or rejected entirely. Any claims that are not paid in full are returned to the clinic by the medical officer in charge of reviewing the claims, and each "disputed" claim is explained to the health care provider. However, by the time this feedback occurs the clinic has already prescribed the wrong drug to a number of people for which they will not be reimbursed and provider recall on the specific claim in question may be limited. On-site validation and feedback, as well as faster processing would serve to increase compliance and decrease discrepancies between the services given and the services covered by the program.

Although initially we proposed to eliminate the paper submission of forms, our needs assessment has actually underlined their necessity. Submitted forms include a number of validation mechanisms, including the patient signature, patient fingerprint, and the physical voucher submitted in exchange for the services. For that reason, forms are prepared in front of the patient, providing an additional guard against potential fraud. Forms that contain a lot of "scratches", which have been modified or corrected extensively, are usually rejected, since this generally indicates that the provider has tried to adjust the form content after the fact to meet program compliance requirements. Thus the paper form serves as almost a transaction certificate or receipt. For our solution we will need to determine the best way of integrating paper processes with the digital processes such that the additional work balances out with the improvement in process.

4. PROPOSED IMPLEMENTATION

Given this understanding, we are integrating smartphones into the existing claims process. The modified claims process is outlined here:

1. Patient comes in with a voucher and a set of medical complaints

2. Provider does an initial assessment, determining whether the patient's symptoms indicate a possible STI covered by the program
 - a. If no, provider informs the patient that the voucher does not cover treatment and offers consultation services for a fee.
3. If yes, the patient is registered in a local patient roster, and then name, village, age, gender are collected for the voucher claim form
 - b. The provider checks the patient voucher, verifies whether this is a first consultation or a follow-up visit, and whether this is a client or partner (vouchers are issued in client/partner pairs). This can be easily validated on a smartphone at the outset.
4. Based on syndrome and symptoms, provider performs a lab test and indicates the lab, the result, and the diagnosis on the voucher claim form and in the smartphone.
5. Smartphone lists acceptable treatment options for a given diagnosis, and they select one. Prices are fixed ahead of time (but updatable remotely). If they want to enter something different, they are warned that the treatment probably will not be covered under the OBA program, and the transaction will be flagged for additional review.
6. Paper form is completed with the same information, but also including doctor and client signatures, and the client thumbprint and the voucher. The phone can also be used to photograph the voucher and the fingerprint on the form. To reduce bandwidth consumption and costs the digital fingerprints are sent on removable media (an SD card for instance) with the claim forms and tagged with the appropriate transaction information.
7. Claim forms are submitted electronically, usually at night when the mobile telecom rates are cheaper. A status indicator in the smartform application shows whether a form has been sent. Forms that are not flagged will be processed and paid within a week. The status indicator will also update to indicate whether the paper copy has arrived and whether the claim has been paid. Once the paper forms arrive at the OBA management office (up to a month later) they will be audited against the electronic data, which should have already been synchronized with the server. If paper forms do not arrive within a month, automatic payment of digital claims is suspended until the provider is able to demonstrate timely submission of forms. Forms that are flagged are not paid until the paper forms arrive and the claim has been reviewed manually.

The basic idea is to automate the flow of claims forms and payments while maintaining sufficient flexibility in the system for providers to enter exceptional claims. The self-validating forms and warning flags should also educate the providers as to what is and is not covered under the OBA program, so they learn immediately if they are prescribing the wrong drugs. The system also provides ongoing feedback to the providers, so they feel more involved with the program and can improve service quality.

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