

Mobilizing cell phones to improve antiretroviral adherence and follow-up in Kenya: a randomized controlled trial in progress

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The heart of the HIV/AIDS pandemic lies in regions traditionally lacking in modern infrastructures. Mobile/cellular telephone networks are breaking that pattern. Cell phone access and use is increasing in sub-Saharan Africa faster than anywhere else in the world. The United Nations has recognized that placing more cell phones in people's hands leads to economic empowerment and can even increase gross domestic product (GDP).¹ Access to health care should also benefit from this trend. We have previously shown, however, that although access to mobile telephone services was very high among patients attending two comprehensive care clinics (CCC)

in Nairobi, Kenya, the phones were rarely used for health-care services.² Meanwhile, the global effort to improve access to life-saving antiretroviral (ARV) drugs for the treatment of HIV/AIDS is progressing as human resource and infrastructural challenges remain daunting. We believe that strategic use of mobile telephony can enhance the efficiency, effectiveness and durability of ARV programmes, particularly in resource-limited settings.

Perhaps one of the greatest challenges of ARV scale up will be the maintenance of drug adherence. Life-long adherence to the medications is required at near-perfect levels (>95%), to ensure durable responses and to prevent drug-resistance from developing. Indeed, several studies have shown that adherence is as good as, or better in Africa than in western countries, yet optimal adherence still remains a challenge, especially in long term follow-up. We believe that frequent and open communication between patients and their health-care providers is crucial to optimal adherence and reporting of side-



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effects. We therefore strategized a way to integrate mobile telephony into the health management of subjects receiving ARV medications. We designed the study as a randomized controlled trial to assess health, social, and economic outcomes.

SMS-based protocol

The protocol was designed by the investigators and clinic staff in consultation with patients. It was intended to be a low-cost, clinic-based intervention providing support through regular clinic-initiated communications. We strived to achieve a balance between the intensive support of frequent 'reminders' to take medications on time, and an acceptable frequency of communications in terms of privacy and logistical issues, such as maintaining phone battery charge

IN THIS ISSUE:

Using cell phones to improve adherence to antiretrovirals in Kenya - promising results

How Ghana monitors the management of medicines

A study in Mali looks at factors influencing the use of research findings when updating the Essential Medicines List

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and network credit. Shared phones could be used belonging to spouses or other willing treatment assistants. A pilot study helped identify a 'best protocol' for the initial study as follows:

- ▶ A weekly SMS (text message) is sent by clinic nurse to each enrolled patient "Mambo?" (Kiswahili for "how are you?") using the send-to-many phone function
- ▶ Each patient has two days to respond how they are doing: "Sawa" (OK) or "Shida" (Problem)
- ▶ Patients who respond "Shida" and non-responders are followed up with a call from the clinic nurse to identify and triage any problems.

As part of support, the intent is to identify potential medicine intolerances, adverse events, or any breeches in adherence earlier than through conventional means. The active communication protocol should also enhance follow-up. Medical emergencies are to be handled as per usual community resources. A written log is kept by the nurse of all communications and advice given in the protocol. An automated low-bandwidth-requiring computer platform is currently being developed in conjunction with the "Phones for Health" initiative to help manage larger patient numbers.

Setting and study design

The study involves two sub-studies in Nairobi, Kenya, and two surrounding districts. The first sub-study evaluates subjects newly starting ARV medications and is a randomized controlled trial. The second sub-study is a 6-month 'before and after' trial to assess the effect of the SMS protocol in

subjects who have already been taking ARVs for at least a year and who may therefore be experiencing chronic medication-taking fatigue. The study sites include a broad range of socio-economic urban and rural communities. Two study sites are within Nairobi, including a high density lower socio-economic market area of the city, and two are in vast rural districts. The Kajiado district CCC, for instance, serves a region which encompasses largely pastoral Maasai communities that must travel large distances on limited road networks, while the other district is largely agricultural.

Table 1. Travel investment by participants to attend the clinic (each way)

	N	Minimum	Maximum	Mean
Distance (km)	118	0.5	300	27.64
Time (minutes)	118	5	360	65.13
Cost (USD)	118	\$0	\$9.23	\$1.50

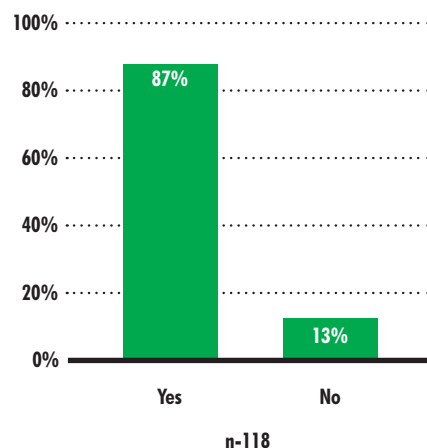
An estimated 1000 consecutive patients will be screened for eligibility including adults who are HIV infected, taking ARVs, and have adequate access to a cell phone to complete the protocol. The primary outcome is self-reported adherence in 6-month follow-up. Hard outcomes include suppression of viral load at 6 months, clinical outcomes, as well as social and economic indicators.

Baseline demographic data, attitudinal data and logistical benefits and challenges are being assessed in all participants throughout the study. In-depth, semi-structured interviews are being held to provide insight into development of new best protocols.

Early findings and lessons learnt

Baseline data from the first 118 subjects screened for the combined study were analysed. Significant time and cost are often incurred for patients to personally attend the clinics (Table 1); however, the majority of subjects screened reported being comfortable with using cell phones for communicating their health issues (Figure 1). Note that the average travel cost to attend the clinic was US\$3.00 (return). The current cost of an SMS is US\$0.08 and a one

Figure 1. Percentage of patients taking ARV medication screened for the study who report that they would be comfortable using SMS (text messaging) regarding their HIV treatment



minute voice call is US\$0.23. The most positive feedback from early enrollees in the SMS-protocol is that the participants feel "like someone cares". Many participants suggested that they would prefer more frequent SMS reminders; however the most common barrier to responding to the clinic SMS on time is lack of network credit at the time they are intended to respond. Overall, the once weekly protocol appears agreeable to most. Several instances of health problems have already been identified by the protocol and hence triaged by the nurse.

Discussion and way forward

The SMS protocol appears to be working and appears acceptable to participants receiving ARV medications. The major subjective

benefit is that participants who receive the weekly SMS reminders from the clinic feel like someone is actively caring for them. It is too early to clearly report differences in study outcomes but a formal report will be compiled at the study completion. In addition to improvements in study outcomes, we intend to use the data and lessons learnt from this study to optimize mobile telephony protocols to best suit patients' and health-care workers' needs to improve access and quality of care in the scale up towards universal access to ARVs. ■

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Monitoring and supervision of medicines management and related pharmaceutical activities in Ghana

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Monitoring and supervision of medicines management and other related pharmaceutical services in the public sector in Ghana are usually carried out by the Chief Pharmacist's Office, which is based at the Ghana Health Service/Ministry of Health Headquarters in Accra, the capital. Other monitoring and supervisory activities in the pharmaceutical sub-sector also take place at regional and district levels. At regional and district levels the offices of the Regional Deputy

Director of Pharmaceutical Services and the District Pharmacist respectively, exercise over-sight responsibility for pharmaceutical services.

A monitoring checklist based on WHO guidelines has been carefully developed to suit our needs. This checklist, which is the main instrument for monitoring and supervision, is periodically (usually annually) updated to ensure that it covers current medicines management issues.

There are 10 administrative regions in Ghana and these have been re-grouped into four zones for effective and efficient monitoring purposes. The Monitoring Team from the Chief Pharmacist's Office tries to visit each zone during one quarter of the year to carry out monitoring and supervision. The team is usually made up of three technical officers and a driver. The total cost per visit to a zone is usually



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about US\$2300 or less depending on the length of stay, which is a maximum of 14 days.

During each visit between 14-18 health facilities are usually sampled and assessed, based on the following criteria:-

- ▶ procurement and distribution of essential medicines
- ▶ storage facilities for essential medicines and other related health supplies
- ▶ stock control
- ▶ quality assurance measures in place
- ▶ medicines availability and accessibility (including vital vaccines and sera)
- ▶ rational use of medicines
- ▶ record-keeping and reports submission
- ▶ medicines pricing
- ▶ in-house manufacture of medicines.

During subsequent visits to the same zone, different health facilities are usually sampled to ensure that the monitoring and supervision

exercises eventually cover all service delivery points in the country.

To make the exercise more relevant, the team focuses on the medicines that are usually used for the management of the 10 top causes of out-patient attendances. Fifty-nine and 41 tracer medicines were carefully selected for the regional/district and the health centre levels respectively. Specialized and teaching hospitals are handled separately from these zonal visits.

After data collection, a draft report is generated by the Monitoring Team and the Regional Health Authorities are briefed on the findings so that immediate interventions can be made to address very urgent issues. A detailed report is prepared later, on return to headquarters and disseminated to all the appropriate authorities - the Director-General, Ghana Health Service, Director, Policy, Planning, Monitoring and Evaluation, Director, Procurement and Supplies (Ministry of Health), Director, Institutional Care Division, Ghana Health Service etc.

Issues arising from the report which might require headquarters' intervention are discussed at the weekly Directors Meeting and the necessary remedial actions are taken as quickly as possible.

Apart from the monitoring and technical support visits to the designated zones by the Monitoring Team from the Chief Pharmacist's Office, the Regional Deputy Directors of Pharmaceutical Services submit monthly returns on all 59 tracer medicines for regional/district hospitals and the 41 tracer medicines for health centres. The report is generally based on availability, shelf-life and prices. In addition, quarterly returns on the status all medicines being held at each of the Regional Medical Stores are submitted to the Chief Pharmacist's Office for assessment and feedback if necessary.

This combination of technical support visits and the periodic submission of returns on the use of essential medicines means that we are able to keep track of medicines availability and accessibility at the user points throughout the country all year round. ■

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Using evidence to select essential medicines

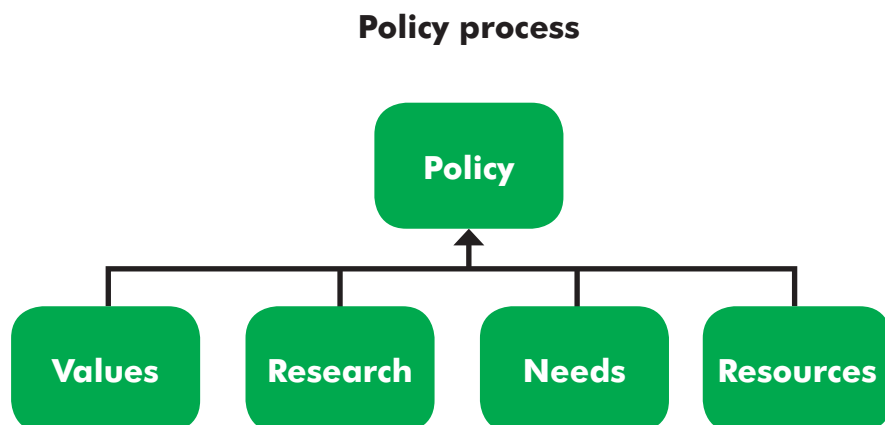
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Research findings are increasingly recognized as critical inputs in policy-formulation and health planning. Probably the single most common recommendation in published research articles is for more research. Health research funding agencies distribute massive amounts of financial resources every year to support researchers and research institutions. The body of knowledge being gathered and consolidated by the research community is enormous. Despite being such an important resource, it is becoming apparent that this body of knowledge is not being used to improve health policies as much as it could be. Research findings are only one of many types of information required for good policy-making. Other concerns such as local resources, values and needs also come into the policy process.

Recognition of the importance of bridging the “know-do” gap is increasing around the world and has resulted in an emergence of various

institutions involved in analysing this problem and promoting the transfer of knowledge to practice and policy.¹ Within the field of evidence-based medicine, there have been several discussions on what constitutes the best type of evidence. Hierarchies of evidence have ranked systematic reviews at the top.² Such discussions have also been applied to health policy-making. Some research has investigated the factors influencing the use of systematic reviews by public health decision-makers: and more recently how to improve the usefulness of these reviews for health managers and policy-makers.^{3,4}

Most of the findings from this field are based on studies from developed countries, and relatively little is known about these factors in developing countries.⁵ There is therefore a great need for a better understanding of this situation in economically strained settings. With their limited resources, developing countries have much to gain from well-informed health policies.⁶



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Essential medicines lists

Introducing an essential medicines list (EML) along with a national medicines policy is widely accepted as an effective way of improving access to, and the supply of medicines, lowering their costs and improving rational use. The WHO Model List of Essential Medicines is the reference document usually used as a starting point for a country's national list. The selection decisions for each list then require additional information in order to take into account the country's specific health situation. Key textbooks, such as *Managing Drug Supply* describe the various criteria (see Box 1) used for selecting medicines for the list.⁷ Since research findings potentially have much to contribute to these criteria, examining their use in selecting the medicines for an EML is of great interest.

Study setting: Mali

This study was conducted in the landlocked West African country

Box 1: Criteria for selecting medicines for an essential medicines list

1. Relevance to the pattern of prevalent diseases
2. Proven efficacy and safety
3. Adequate scientific data and evidence of performance in a variety of settings
4. Adequate quality
5. Favourable cost-benefit ratio
6. Desirable pharmacokinetic properties
7. Possibilities for local manufacture
8. Availability as single compounds

of Mali. Several of the medicines on Mali's EML are not on the WHO Model List. The country's EML also includes an extra section for "improved traditional medicines." The various additional medicines on the EML provided an excellent opportunity for discussing specific decisions that might have been influenced by research findings.

Mali's EML is updated approximately every two years by a national commission. The commission is composed of various civil servants within the Ministry of Health, including pharmacists, managers and directors of various health programmes and institutes, such as those fighting malaria, tuberculosis and HIV/AIDS. The commission also includes local medical practitioners and health workers considered experts in their field, and technical advisers from WHO and the European Union participate in this process. At the time of the study, the country's official criteria for the selection of medicines specifically highlighted: harmlessness, efficacy, relevance to the disease pattern, availability on the international market, and cost-effectiveness.⁸

Study design and data collection

The majority of the data were collected from 19 in-depth, semi-structured interviews. Key informants were chosen from the national commission that selects and updates Mali's EML, as well as one health manager who was mentioned as having played a significant role in the decision-making process for this policy. Questions such as "how often" or "how many times" policy-makers used research findings were not specifically asked in the interviews. The research did

not attempt to explicitly measure in which situations policy-makers used research findings and in which situations they did not. Instead, it aimed to explore policy-makers' perceptions of their lived experience in selecting medicines for the EML.

A group discussion was also conducted with available interviewees. This provided an opportunity to observe interactions between policy-makers and present preliminary results to the group members for feedback. A document analysis was performed to validate comments made by the participants and to analyse actual sources of information accessed by the policy-makers. Documents analysed included technical notes used by the commission, minutes from meetings, a synthesis of the decisions made, and other relevant documents.

What factors influence the extent to which research is used?

After analysing the text from the interviews and natural group discussion, and reviewing the various documents supplied by the commission, several key factors emerged that policy-makers perceived as influencing their use of research findings (see Box 2).

Access to information was believed to be an important factor. The means to access both international and national resources in developing countries is often limited. The World Wide Web can facilitate the use of research findings when it is available, however policy-makers may not have reliable access to the Internet. And even if they do, many online resources require paid access. Language barriers can

Box 2: Factors influencing the use of research findings

1. Policy-makers' access to information
2. Relevance of research findings
3. Perception that utilizing research findings is time-consuming
4. Policy-makers' competency in research methods
5. Trust policy-makers place on research
6. Authority of those who present their view
7. Relative importance or priority of research findings compared with other sources of information in the policy-process
8. Uncertainty of who is responsible or accountable for accessing, locating, and providing research findings to address the policy-decisions

inhibit access as well, since almost all research findings are available in English, but difficult to access in other languages such as French, the working language in Mali.

The **relevance of research findings** was also felt to affect its use. Research findings that are not relevant to policy-makers' questions are not likely to be used. Policy-makers also believed that using research findings was a **time-consuming process**. Also, if a policy-maker's **competency** in understanding the full meaning of the research is limited, it further inhibits its use. At the same time, if a policy-maker is knowledgeable in research methods and is skilled in effectively acquiring high quality, relevant and already synthesized data - such as those found in systematic reviews - research findings are much more likely to be used.

Policy-makers' level of **trust in the research** also influenced the extent to which they believed it would be used. Research findings provided by trusted sources such as WHO or well-known international peer-reviewed journals such as the *Lancet* or the *New England Journal of Medicine* were perceived as more likely to be used. Similarly, the

authority of those who present their view to policy-makers could influence the extent to which the information provided was used in forming the policy. A researcher with a high level of authority might be effective at getting research findings into the policy process. The **priority that policy-makers themselves place on research findings in the policy process** also affects the use of such findings. If a policy is believed to be extremely technical - such as the analysis of effective medications for a particular illness - research findings are likely to be prioritized and will therefore influence the policy decision.

Finally, **accountability** emerged as a unique factor in this study. Policy-makers felt that if someone on a committee is specifically delegated to accessing, locating and providing research findings to the rest of the group, the findings were more likely to be used. If such a task was not delegated, the likelihood of research getting into the policy process would be reduced.

What can be done to improve policy-makers' use of research findings?

Several solutions can be found to bridging the know-do gap by looking at the factors inhibiting and facilitating the use of research findings that emerged in the study (see Box 3). Collaborative projects between policy-makers and researchers have been discussed in great depth. Such efforts address several of the factors outlined above. They improve access to findings by setting up direct links between the researcher and the policy-maker. They improve the relevance of the research by allowing policy-makers to contribute to the research process.

They can improve the trust that the policy-makers place on the research, as the policy-maker has been able to witness first hand the processes involved. Collaborative projects can also improve policy-makers' competencies in understanding, identifying and locating high quality, relevant research as it can serve as an opportunity for effective training for policy-makers. It can also increase the relative importance that policy-makers place on research findings.

Involvement of third parties to act as knowledge brokers, including international government and nongovernmental organizations and UN bodies, such as WHO, can

Box 3: Strategies for improving the utilization of research findings

1. Collaborative projects between researchers and policy-makers
2. Involvement of multi-national organizations in the evidence to policy process
3. Increased production, dissemination and focus on relevant, useful and appropriate research findings, including systematic reviews

also address several of the factors emerging in this study. Their involvement can facilitate access and reduce the time required to utilize research findings. Such involvement improves the trust that policy-makers place in the research findings and can even point policy-makers towards more relevant, high quality and synthesized findings. These organizations can also engage in capacity building and increase policy-makers competencies in accessing and understanding research findings.

Researchers and those who fund research also have an enormous role to play in facilitating the use of the research findings they produce and fund. Better orienting

their research to policy-relevant issues would increase its uptake. Participatory research strategies that involve stakeholders throughout the research project (similarly to collaborations between researchers and policy-makers) increase the links between policy-makers and researchers and facilitate the transfer and uptake of the findings at the end of the research project. Similarly, the research community could help bridge the know-do gap by dedicating significantly more time, effort and financial resources to the dissemination of the research findings that it produces. The research community is also well placed to support and engage in the synthesis and summarization of entire bodies of research findings for easier access and use, such as the preparation of systematic reviews.

Conclusion

Research findings are an important and critical input for the formation of health policy, yet they are not being used to the extent that they could be. With a limited number of studies focusing on developing countries, there is a need for further investigation into how to improve the uptake of research findings by health policy-makers in such a setting. This study revealed several factors influencing the use of research findings in selecting essential medicines as perceived by policy-makers in Mali. Increased efforts on the part of all relevant players in the research to policy process can ensure that strategies to improve the current situation are both implemented and evaluated. In this way, policy-makers in countries such as Mali will be better equipped and informed to address the many complicated and difficult health-care problems afflicting their citizens. ■

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