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Prioritizing ICT Interventions for Health

Information and communication technologies (ICTs)—which include eHealth and mHealth—have begun to change the way healthcare is delivered in resource-limited settings. Examples of these changes are tracking of women throughout pregnancy, maintaining supplies of essential medical commodities, and promoting behaviour change and service uptake via text messages (Mendozo, Okoko, Morgan, & Konopka, 2013). Mobile health (mHealth) technologies have been seen as a driving force behind the "ICT for health" revolution in global development. The South African mHealth Strategy 2015–2019 defines mHealth as the use of mobile computing, medical sensors, or other communication technology in the delivery of health-related services (National Department of Health, 2015).

Though there have been many successful mHealth interventions, there have also been many partial successes or outright failures, leading people to believe that most ICT projects in developing countries fail or are unable to scale up past the pilot stage (Heeks, 2002).

In general, ICT priorities should be determined in the context of achieving local, national, and global health priorities. Data from existing health information systems should be used in decision making and in the design of monitoring and evaluation (M&E) systems. However, this often is not the case. Instead, priorities are often determined through ad hoc decisions, instead of using established guidelines.

This brief examines a method of weighting criteria that can provide guidance for setting priorities for health interventions and ICTs, specifically. It illustrates a way to improve transparency and avoid ad hoc decisions in the allocation of healthcare resources.

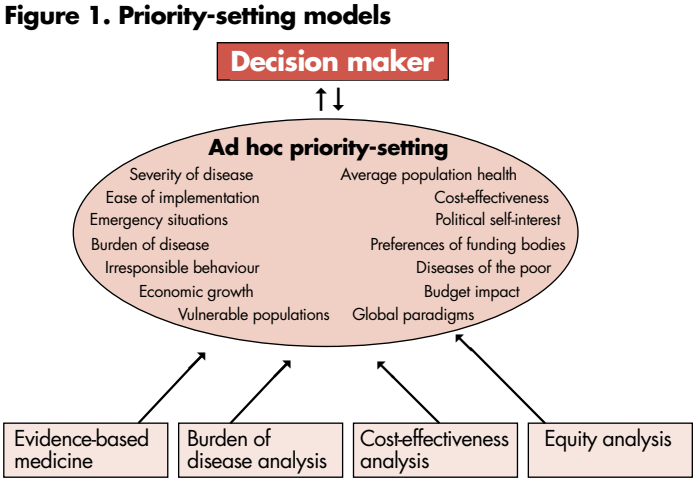
Many donor-funded ICT initiatives have limited resources and limited time frames in which they are expected to prove their worth. To work within these constraints, project managers must be able to quickly assess and determine which interventions and innovations would best meet the project's goals. Evidence of impact on health outcomes, ability to contribute to health systems strengthening, and potential to reach sustainable scale are common criteria for prioritizing health interventions (Baltussen, Stolk, Chisholm, & Aikins, 2006). Other criteria that may be considered in setting priorities for mHealth projects include how well a project addresses health disparities or reaches vulnerable populations.

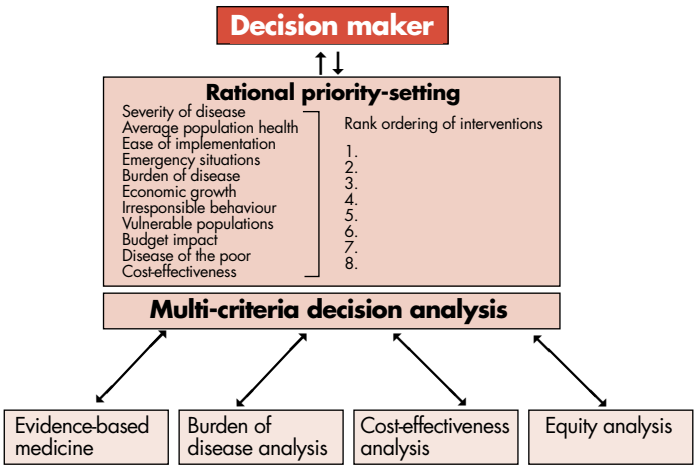
It is unclear if this type of priority-setting alone will work within the context of mHealth and other ICT interventions. This is because evidence is limited regarding the effectiveness of mHealth interventions and because of inherent limitations on achieving scale, such as unreliable mobile network coverage.

But studies have shown that outcomes are poorer when decisions are ad hoc than when they are made according to guidelines (Bazerman & Moore, 2008). Without guidelines, some suggest, interventions are selected on the basis of advocacy from special interest groups and personal biases and perceptions rather than evidence and policy (Glassman & Chalkidou, 2012).

Figure 1 compares the process of ad hoc priority-setting with that of rational priority-setting. The rational model provides multi-criteria guidance for setting priorities for health interventions, including ICTs (Baltussen & Niessen, 2006). It is recommended that an interdisciplinary team well-trained both in health and technology should participate in the priority-setting process described.

Figure 1. Priority-setting models





Source: Baltussen & Niessen, 2006

These two models illustrate how guidelines in decision making can lead to better understanding of why one intervention is prioritised over another. Guidelines such as the rational priority-setting model help decision makers and policymakers prioritise health interventions. However, these criteria may not be directly applicable to ICT-based health interventions, because the guidelines often call for evidence from randomised controlled trials that does not exist for many ICT interventions now being proposed in low-resource settings. Furthermore, additional criteria specific to ICT interventions may be needed, such as technological infrastructure.

Guidelines are also useful to help implementing organizations and ministries of health optimize their investments in ICTs. They may help decision makers understand when scaling up a project may be more worthwhile than piloting a new one, and may help demonstrate whether a health behaviour program has shown measurable success in health outcomes. Also, guidelines can describe what infrastructure and human resources should exist to support a proposed intervention. Without guidelines, an intervention may reach an untold number of subscribers but yield no usable data to support impact.

Developing an ICT Priority Framework

Several techniques can help organizations and governments determine priorities. Absent clear-cut guidelines for prioritising ICT interventions, organizations may be wary of receiving guidance from technology vendors who have a financial stake in the outcome of decisions made. Local experts and useful techniques can help decision makers, and often can be tailored to the local context.

One example is the "criteria weighting method," in which the team responsible for setting priorities establishes criteria and assigns priority rankings relative to them (Roszkowska, 2013).

Guide for Using the Criteria Weighting Method

(U.S. Centers for Disease Control and Prevention, 1991; U.S. Centers for Disease Control and Prevention, 2006)

1. The most important step is determining the group participants. Participants should represent a cross-section of people who understand the health, policy, and technology implications of the interventions being proposed.
2. The first role of the group is to develop criteria. The World Health Organization document *Priority Interventions: HIV/AIDS prevention, treatment, and care in the health sector*—discussed below—can provide guidance on priority criteria for the health component of HIV and AIDS interventions. Examples of such criteria are the following:
    - Anticipated impact: What is the magnitude of an intervention's impact expected on health outcomes or on quality of care?
    - Costs/expenses: Will the intervention require buying expensive equipment, such as servers, that need to be maintained?
    - Usability: Is the software easy to use or will it require intensive training for expected users?
3. Because some criteria may be more important to the group than others, the group then needs to weight the criteria. This can be done by taking the following steps:
    - Step 1: Reach consensus on the meaning of the suggested criteria. This will also provide an opportunity to eliminate inappropriate or invalid criteria.
    - Step 2: For example, using a scale of 1 to 10, with 10 being most important, each group participant should assign a value to each criterion.
    - Step 3: The values are then averaged and that score becomes the weight of a given criterion.
4. Participants score each intervention according to the criteria. Choosing a scale of 1 to 10 may be the simplest method. Some scoring systems incorporate negative numbers, such as a scale of -10 to +10 in order to express perceptions more accurately. For example, if a participant had a criterion of "feasibility" but believed the intervention was not feasible with given resources, a score of -5 could indicate that shortcoming (U.S. Centers for Disease Control and Prevention, 1991).
5. Next, each participant should calculate the significance level. This is done by multiplying a criterion's rating by its weight, as determined in Step 3.
6. Next, the significance levels are summed for each intervention. Ranking by the highest total would make the highest total the highest priority.
7. The rankings themselves may be used as the priority order or may be a starting point for further discussion before priorities are finalized.

Criteria Weighting Example

Step 1. Identify the criteria

For this example, the key criteria for evaluating ICT interventions are:

- Anticipated impact
- Cost of hardware/software
- Usability

Step 2. Weight the criteria

Using the method described earlier, develop a weight for each of the criteria. For this example, we will say "anticipated impact" and "costs" both have a weight of 6 (on a scale of 1–10) and "usability" has a weight of 2. This can be interpreted to mean that we care equally about the "anticipated impact" and "costs" and that we care more about both of those than about "usability."

Step 3. Rate options against criteria and multiply the weightings

It may be good to discuss with your participants the significance of each score. Each intervention can be rated on a scale of 0–10 on its anticipated impact on HIV-related morbidity/mortality. For example, we might see the scale for "anticipated impact" as follows:

Anticipated Impact	Rating/Score
No impact on morbidity/mortality	0
No mortality impact/limited morbidity impact	1 or 2
No mortality impact/some morbidity impact	3 or 4
No mortality impact/significant morbidity impact	5 or 6
Some mortality impact/significant morbidity impact	7 or 8
Significant morbidity and mortality impact	9 or 10

Scales across criteria should be consistent. In this scale for usability, for example, 0 is the least desirable rating and 10 is the most desirable rating.

Usability	Rating/Score
Significant learning curve and ongoing training needed	0 to 3
Some training and continued support needed	4 to 6
Limited training and support needed	6 to 8
Can be used with no formal training and little to no support	9 or 10

Then do the same for the remaining criteria. Finally, calculate the weighted values for each intervention being considered.

ICT Intervention	Anticipated Impact (Score x 6)	Costs (Score x 6)	Usability (Score x 2)	Total Score
Electronic health record	7 (42)	2 (12)	3 (6)	60
Texts to support medication adherence	5 (30)	9 (54)	9 (18)	102
Mobile clinical guidelines for providers	8 (48)	7 (42)	9 (18)	108

Through this process, the following rankings emerge: (1) mobile clinical guidelines for providers; (2) texts to support medication adherence; (3) electronic health records.

This example demonstrates how to conduct criteria weighting. More than three criteria will probably be necessary in a real situation. Some criteria may also be strongly linked. In the example given above, one may conclude that software that is not very usable would need extensive support, thus driving up costs for staffing and technical support.

ICT Criteria Considerations

Prioritizing ICT interventions should be thought of in the larger context of an overall eHealth/mHealth strategy. Is the end goal to eventually have a comprehensive health information system that addresses a variety of health conditions and system functions,

or is the goal to address a specific health challenge that could see immediate improvement from the reliable exchange of data? The context of the strategy will influence the criteria selected and the weights given to specific criteria. Here are some criteria to consider :

- *Existing solution:* Does this ICT tool already exist or will it have to be developed? Custom development may be more expensive but better suited to local needs.
- *Support by existing infrastructure:* Does infrastructure exist to support the technology? For example, is a power source needed for a dedicated server? Is there cellular infrastructure that supports real-time data exchange or do users need to be able to store data locally on their devices and then upload the data when they are in range of a cell phone signal? What kinds of devices are target users most familiar with, and which ones are they likely to own? If target users already have their own devices, can these be leveraged?
- *Need for prerequisite technologies:* If the goal is for a clinical site and a lab to exchange data, do both the clinic and the lab need software to track their orders for the intervention to work?
- *User-friendliness:* Will the software require a lot of training? Sending trainers to sites and having staff attend trainings can be expensive, and training clients or members of the community can be challenging. A well-designed app that can be downloaded to a mobile device may not require any training.
- *Staffing support:* What staff is necessary to support implementation? Would staff need to be hired to maintain servers or manage data?
- *Ongoing maintenance costs/licensing fees:* Even if software doesn't require licensing fees, there may be ongoing costs to use and maintain the application. Custom software may also have cost implications for maintenance and support.
- *Software maturity*: Is this application new or one that has been used and supported in multiple settings? Is the company that developed the software well-established and available to maintain it and keep it up to date?
- *Is a similar/competing technology being used locally?* For example, if several behaviour-change text-messaging programs are targeting the same or similar populations, duplicating that effort would probably not make sense. Are health workers already using a specific platform (a smartphone or tablet, for example) whose use could be expanded?
- *Adherence to regulations and standards:* For example, in South Africa, ICT interventions must adhere to the Protection of Personal Information (POPI) Act and to the Health Normative Standards Framework for Interoperability in eHealth (HNSF).

Additional Considerations

If the goal is to implement ICT tools for an organization or part of a health system, conducting an ICT readiness assessment to identify challenges is essential. Many tools have been developed to assess ICT readiness, but most are more appropriate for an industrialised nation and may not consider issues often found in low-resource settings, such as lack of computer infrastructure. Be sure to use an assessment tool that is appropriate to the context. One example is the "NGO ICT and e-Readiness Self-Assessment Tool," available here: https://improveit.org/sites/default/files/NGO-ICT-and-eReadiness-Self-Assessment-Tool.pdf.

Developing a Priority Framework for HIV and AIDS

The following three documents can serve as resources for developing a framework for South Africa to prioritise its HIV and AIDS ICT interventions.

The World Health Organization developed *Priority Interventions: HIV/AIDS prevention, treatment and care in the health sector* (http://www.who.int/hiv/pub/priority_interventions_web.pdf) as a guideline to help organizations and governments prioritise HIV interventions that are tailored to the communities being served.

In "Partnership Framework in Support of South Africa's National HIV & AIDS and TB Response," the U.S. President's Emergency Plan for AIDS Relief outlines a number of long-term goals: reducing the incidence of HIV and tuberculosis; increasing the life expectancy and quality of life of people living with HIV and AIDS; and strengthening South Africa's local and national response to the HIV epidemic (U.S. President's Emergency Plan for AIDS Relief, 2010).

The Joint United Nations Programme on HIV/AIDS (UNAIDS) has set ambitious treatment targets known as "90-90-90" (UNAIDS, 2014). These stipulate that by 2020, 90 percent of all people living with HIV will know their status, 90 percent of all those diagnosed will be receiving antiretroviral treatment, and 90 percent of those receiving antiretroviral treatment will achieve viral suppression.

Conclusions

Developing guidelines for prioritising ICT interventions will help program managers and policymakers quickly and effectively make decisions regarding allocation of resources. A prioritisation framework will be an important tool for reducing bias in the decision-making process and ensuring that the ICT interventions selected are those most likely to have impact on health outcomes and health systems strengthening. Such a framework can also ensure that these interventions align with country and donor priorities and organisational strengths, and that they provide the data needed for decision making and resource planning.

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