SURE Rapid Response

Are e-Health Programs Effective in Developing Countries?

July 2012

This Rapid Response was prepared by the Cameroon team of the Evidence-Informed Policy Network **(EVIPNet)** in Africa.

Key messages

➔ Some reviews reported successes of e-health programs in Low- and Middle Income Countries (LMIC), with benefits for practitioner performance and patient outcomes.

➔ Poor data quality limits the impact of Information and Communication Technology (ICT) projects in developing countries, and cases of failure most often stemmed from generic differences between the designers and the users.

➔ A basic conceptual framework for the e-health infrastructure in any country has been developed by the International Society for Telemedicine and e-Health (ISfTeH).

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Background

This Rapid Response was prepared upon request by the Directorate of Health Care Organisation and Health Technology to inform deliberations on the need of a National e-health program in Cameroon. It intends to review the evidence on the effectiveness of e-health in developing countries, and to consider the infrastructure needed for its implementation in these settings.

To date, the literature on e-health in LMIC is limited, and largely consists of articles describing single uses of technology in health care delivery, as well as theoretical discussions and recommendations surrounding the implementation of e-health-based programs and policies. Available studies assess the impact of ICT programs on indicators such as access to service, quality, cost and efficiency.

E-health can be characterized as "a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using ICT".

E-health programs are emerging in all LMIC, which are facing challenges such as lack of financial resources, critical shortage of health workers and inequitable distribution of service providers. Sub-Saharan African countries have common characteristics: the public sector being the principal healthcare provider, a system consisting of many user interfaces with multiple functionalities and a concurrent increase in the use of telecommunication devices among the poor.

E-health programs aim at extending geographic access to health services, as well as improving their quality and affordability for the poor.

These technology-enabled programs rise in all areas of health, mainly in emergency, HIV/AIDS, general primary care, and maternal and child health.

For this document, e-health programs include all ICT-enabled programs or interventions to support the health sector, or the adoption and implementation of technology for health-related purposes.

What we found

The effects of e-health in developing countries are yet difficult to measure, but there is some evidence of effectiveness. This effectiveness seems to need some conditions for successful implementation.

The effects of e-health in developing countries

Some reviews reported successes of e-health programs in terms of improving the quality of care, increasing user satisfaction, enhancing practitioner performance and decreasing costs of care. They also showed the diversity of tools used, and of areas of implementation. Some cases are reported in Table 1

→ E-health aims to improve communication between institutions, assist in ordering and managing medications, and help monitor and detect patients who might abandon care.

→ Evaluations of Personal Digital Assistants (PDA) and mobile devices convincingly demonstrate that such devices can be very effective in improving data collection timeliness and quality.

→ Benefits of Electronic Medical Record (EMR) systems include:

  → Increasing by a mean of 13% the number of guideline-recommended preventive care services by prompting clinicians,

  → Reducing medical errors by well designed and implemented computerized physician order entry systems,

  → Reducing in errors in laboratory and medication data,

  → Improving labelling or registering of samples and patients, as well as collection of clinical or research data using PDA applications,

  → Electronically monitoring and reminding patients of health care needs or treatment, detecting and tracking those at risk for loss to follow-up,

  → Decreasing communication times of information within and between institutions.

Cost-effectiveness of e-health in developing countries

Considering the challenges of the developing world, e-health programs are cost-effective, since simple, inexpensive and effective tools are available. Data revealed that technology programmes in developing countries rely mainly on phones (71%; 63% exclusively on cell phones) and computers (39% of programmes, through video chat, or health hotlines).

  → With similar effectiveness, the text messaging system was half the cost of the mobile phone reminders.

  → Electronic picture-archiving and communication systems could also be particularly cost-effective in LMIC, where access to film and chemicals is often difficult.

  → While improving clinical outcomes, its implementation in a large academic hospital allowed a decrease of clinical visits rates of by 5–9 %, a five-year benefit of US$86,400 per provider and an efficiency increase by 6 percent per year in a large hospital network.

Failure factors of e-health in developing countries

Some cases of failure of ICT projects in developing countries occurred, such as increase in error rates. They most often stemmed from:
  → generic differences between the designers and the users,
  → digital divide, logistical and cultural problems,
  → settings where data quality is poor, because of general paucity of effective data-collection tools and training for data collectors in health facilities.

Infrastructures for successful implementation of e-health in LMIC

While designing and implementing an e-health intervention, one should give attention to institutional, technical, application and data infrastructures.

To organize, coordinate and enable broad-based consultative engagement in e-health collaboration at various levels, the International Society for Telemedicine and e-Health (ISfTeH) has developed and recommend to any country:

→ A basic conceptual framework for the e-health infrastructure (Fig. 1)

→ A fourth dimension-collaboration model for organized e-health professions in a country, involving : academia, government, industry and civil society, in addition to those of the Commonwealth, the Rockefeller Foundation and international federations;

→ A high degree of organizational and administrative systems for the ongoing training and supervision of health-care professionals ;

→ integrated administration and clinical application modules or fail-safe strategies for handling downtime events;

The Fifty-eighth World Health Assembly also recommended the creation of national centres or networks of excellence for e-health with the aim of encouraging best practices in, and providing policy coordination and technical support for, health-care delivery, health service improvement and capacity building, and health education and surveillance.

Lack of the necessary technical infrastructure such as reliable electricity, internet access and other equipment is also to be considered. To address this, one could move from computers to mobile phones, where available.

Application infrastructure is much less a concern as free and open-source software exist and help reduce the costs associated with IT investment. They can easily be modified and tailored towards the needs of less developed countries, hence helping find solutions to the most pressing problems.

Other impediments to technology implementation include:

→ Costs, both initial and ongoing, and financing issue,
→ Data collection system,
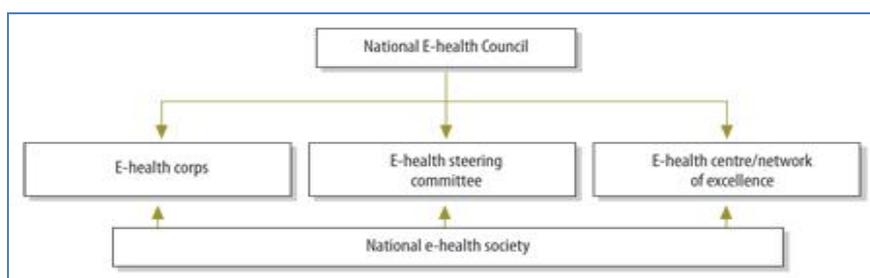→ Support for its adoption,
→ Means for assessing its impact.

Fig. 1. Proposed framework for a national e-health infrastructure[a]
[a] Developed by the International Society for Telemedicine and e-Health (ISfTeH).

Relevance of the research to the question being asked

➜ Findings	▷ Interpretation*
APPLICABILITY	
➜ Public sector being the principal healthcare provider	▷ This is a opportunity to plan and coordinate easily the domain
➜ System consisting of many user interfaces with multiple functionalities	▷ This may limits designing of a e-health system
➜ Concurrent increase in the use of telecommunication devices among the poor	▷ This will ease implementation of patient messaging and reminders
➜ Creation of a national centre for e-health	▷ Since some organisations exist, and expertise is lacking, and considering designers interest, we may face a leadership issue
➜ differences between the designers and the users	
➜ Poor data quality limits the impact of ICT projects	▷ This may be the case of many of settings in Cameroon
EQUITY	
➜ Technology programs aim at improving the the access and affordability, for the poor	▷ This is very useful for phone or computers users, but those in really remote areas may not have the equipment nor the skills for e-health
➜ They rely mainly on phones and computers	
COST CONSIDERATIONS	
➜ Improving their quality and affordability, for the poor	▷ Cheaper alternatives exist
➜ Costs, both initial and ongoing, and financing issue	▷ Savings in travel expenses and time
	▷ Support and advocacy for financing and adoption of e-health may be highly needed to justify the expected impact
MONITORING & EVALUATION	
➜ Baseline data collection system as a weakness Means for assessing its impact	▷ This may limit the effects, and also the monitoring and Evaluation of e-health programs

*Judgements made by the authors of this response based on the findings of the research and consultation with others (see acknowledgements). For additional details about how these judgements were made see: www.evipnet.org/sure

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About the research underlying this Response

Types of	What we searched for	What we found
Interventions	e-health, telemedicine,	e-health technologies, Electronic Medical Report, ICT,
Participants	(Any)	None
Settings	Developing countries	Developing countries, LMIC
Outcomes	Effectiveness	Impacts, findings, role, "promise",
Research	SR, synthesis, RCTs, evaluations	Reviews, synthesis

Date of most recent search: June 2012

Limitations: This is an exhaustive review of the literature, but only few rigorous evaluations were found.

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Related literature
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Conflicts of interest
None known.

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