Trends and challenges for mHealth in developing countries

An information slide pack

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September 2014

Cover photos courtesy www.photoshare.org
eHealth and mHealth - a word about terms

• The WHO define **eHealth** as the cost-effective and secure use of information and communication technologies in support of health and health related fields, including health care services, health surveillance, health literature, health education, knowledge and research

• **mHealth** is a part of eHealth, and concerns the use of mobile phones and related wireless devices by individuals, families, patients, carers and healthcare professionals to obtain or provide health services and information on health and healthcare

• mHealth applications are being used in many areas including education, diagnosis, monitoring, recording, decision support, consultation, planning, management and finance (see e.g. A B Labrique, L Vasudevan, E Kochi, R Fabricant and G Mehl, mHealth innovations as health system strengthening tools: 12 common applications and a visual framework, *Global Health Science and Practice*, August 6, 2013)
There are many books and reports on mHealth in developing countries, covering a wide range of application areas. This overview focuses particularly on applications of mHealth to provide information about health and health care for the public, patients, lay carers and health professionals.
1. General trends in use of mobile information and communication technology in developing countries

Cover photos courtesy www.photoshare.org
Global growth in access to Information and Communication Technology continues apace, especially for mobile phones.

This growth is not limited to developed countries

Mobile phone subscriptions 2001-11 for developed & developing countries

Households with internet access 2002-11 for developed & developing countries

Growth is particularly rapid for mobile broadband (internet) services. **Internet use on mobile phones in Africa is predicted to increase 20-fold over the next five years**, double the rate of growth in the rest of the world (Guardian, 6 June 2014)

There remain problems such as access to and use of information technology by the poorest.

The *internet.org* project is one global initiative tackling this issue.
Mobile phones are helping to overcome some of these problems

Mobile phones are increasingly affordable, can be used by people with low literacy, and can operate in areas without telephone landline or electrical power infrastructures.

“Mozilla has shown off a prototype for a $25 (£15) smartphone that is aimed at the developing world”
BBC News
23 February 2014

For example, over the past decade, mobile phone coverage has grown in Africa at staggering rates.

“*In 10 short years, what was once an object of luxury and privilege, the mobile phone, has become a basic necessity in Africa*”
President Paul Kagame, President of Rwanda (Connect Africa Summit, October 2007).

“*It’s hard to overstate how much mobile phones have changed the shape and form of life in Africa. Every stratum, every fiber of the fabric of life here has changed because of mobile phones*. ” Erik Hersman, Stanford Social Innovation Review, Spring 2013.

- **In 1999**, only 10 percent of the African population had mobile phone coverage, primarily in North and South Africa.

- **By 2008**, 60 percent of the population (477 million people) had mobile phone coverage.

The example of Kenya

About 15 years ago: the first mobile operator license was granted by the Kenyan government; although few outsiders believed that Africans could afford to pay for either phones or phone service.

Thereafter: in a single decade the proportion of Kenyans with a mobile phone subscription rose from virtually zero to around 70%;

Today: over 90% of Kenyans are mobile phone users. 78% of women and 77% of rural residents are mobile phone users. At least once a day, 81% of Kenyan adults make or receive a call, 61% send or receive a text message, and 22% send or receive money or pay a bill using a mobile phone.

The Afrobarometer survey gives key information about mobile phone use in many countries in Africa.

Analyses can be done for various population subsets e.g. urban/rural, educational level......

Source: www.afrobarometer-online-analysis.com
2. Trends in use of mobile phones in health care in developing countries
In developing countries, access to mobile phones is much better than access to basic health services.

Source: Touching lives through mobile health. Report for GMSA by PwC Feb 2012
Patients and lay carers increasingly get health information from new media

Even 10 years ago mobile phones were increasingly being used to obtain health information in Africa

<table>
<thead>
<tr>
<th>ICT</th>
<th>South Africa (%)</th>
<th>Tanzania (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print</td>
<td>75</td>
<td>53</td>
</tr>
<tr>
<td>Radio</td>
<td>88</td>
<td>81</td>
</tr>
<tr>
<td>TV</td>
<td>83</td>
<td>50</td>
</tr>
<tr>
<td>Video</td>
<td>21</td>
<td>20</td>
</tr>
<tr>
<td>Audiotapes</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Telephones</td>
<td>24</td>
<td>4</td>
</tr>
<tr>
<td>Face-to-face meetings</td>
<td>77</td>
<td>82</td>
</tr>
<tr>
<td>Mobile phones and SMS</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>Computer/CDs</td>
<td>23</td>
<td>3</td>
</tr>
<tr>
<td>Email</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>Internet</td>
<td>25</td>
<td>2</td>
</tr>
</tbody>
</table>

Health practitioners are often at the forefront of using mobile phones (1)

m-Health projects range in variety and scope, examples in Africa include:

- monitoring measles outbreaks in the Zambia
- supporting diagnosis and treatment by health workers in Mozambique
- sending health education messages in Benin, Malawi, Uganda, Kenya, and South Africa
- extending the reach of medical workers and medical services
- collecting, measuring and monitoring health data

Source: J C Aker and I M Mbiti, Mobile Phones and Economic Development in Africa , Center for Global Development, June 2010

“Connecting health workers with sources of information via mobile technology is a strong basis for empowerment, as it provides the support they need to perform their functions effectively and self-sufficiently”.

Health practitioners are often at the forefront of using mobile phones (2)

**Selected mobile health deployments in Africa, 2011**

**Medic Mobile, Mali**
*FrontlineSMS*
An SMS platform that is used for patient management. The services include accessing of Electronic Health Records through mobile phones, low cost diagnostics and mapping of health services.

**Welcel, Kenya:**
*Dimagi*
SMS service to support antiretroviral medication adherence. It helps health worker assist HIV patients and provides health information to the public. It also includes support for remote data collection and logistics of moving healthcare related products.

**MDNet, Ghana:**
*Vodafone, Ghana Medical Association*
A free voice and sms service that promotes transfer of knowledge among physicians. This service helps to send bulk SMS during national emergencies and contact doctors with particular speciality.

**AED Satellite, Mozambique**
*Canadian International Development Agency*
CHWs use PDAs and mobile phones for data collection and access to up to date health information.

**WE CARE Solar, Nigeria**
*We Care Solar*
As part of WE CARE Solar’s attempts to promote safe motherhood and reduce maternal mortality in developing regions, they provide health workers with reliable lighting, mobile communication, and blood bank refrigeration using solar electricity. The provision of mobile phones allows labour and delivery nurses to quickly notify on-call physicians of emergencies, and ask for advice.

**Africa Tele-dermatology Project, Botswana**
*American Academy of Dermatology*
Telemedicine for dermatology. Provides dermatology support to local physicians, dermatologists, and health care workers in hospitals and clinics throughout Africa. This support is provided through Teledermatology consultation services, discussion pertaining to diagnosis and management of patients with skin diseases, links to educational resources, and access to a dermatologic curriculum created specifically for African sites.

Source: Touching lives through mobile health. Report for GMSA by PwC Feb 2012
African m-Health projects are spread widely

Source: Touching lives through mobile health. Report for GMSA by PwC Feb 2012
Growth areas in mHealth

- In recent years some applications, like *disaster mapping* using mobiles, have moved from “nice to have” to “must have”
- Some mHealth applications are now *spreading globally* from higher to lower resource settings, e.g. smoking cessation
- One potential growth area is *distance learning* in health care – useful interaction between mLearning and mHealth
- “*Gameification*” has proved useful in getting messages across
- Lots of potential for *offline applications*, especially now storage capacity is cheap
- Some *impressive technical developments* in use of mobile phones for *diagnostics* in low resource settings e.g.
  - Low-cost mobile phone imaging and remote diagnosis for malaria
  - Use of mobile phone touch screen feature for rapid assessment of respiration rate in diagnosis of pneumonia
  - Use of mobile phones as part of a “lab on a chip” package for rapid diagnosis of e.g. TB

Sources:
- Seminar “Apps, Maps and Cyberchats” Royal College of Physicians London June 2014
Annual m-Health spend in Africa is projected to soon exceed $1bn, mostly on diagnostic and monitoring services.

Spend on m-Health will be higher in north Africa than in the sub-Saharan belt e.g. South Africa, Nigeria and Kenya are estimated to attain mobile health spend per active user of approximately US $14, $3 and $1.5 respectively in 2017.

Source: Touching lives through mobile health. Report for GMSA by PwC Feb 2012
Support to healthcare workers
Many healthcare workers in developing countries are enthusiastic about mHealth

Source: GSMA mHealth, Understanding the Needs and Wants of Community Healthcare Workers, South Africa, August 2014
There are many ways in which mobile phones can support healthcare workers in developing countries

FIGURE 1: Definitions of types of mHealth tools used for database research

<table>
<thead>
<tr>
<th>Type of mHealth Tool</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Patient registration</td>
<td>Registering patients into a project specific or centralized database over the mobile phone; this often includes creating or using unique identifier numbers</td>
</tr>
<tr>
<td>Patient assessment</td>
<td>Data collection and/or survey administration for patient identification of a disease using a mobile phone</td>
</tr>
<tr>
<td>Patient monitoring entry of ongoing</td>
<td>Supporting the entry of ongoing patient medical data on a mobile phone for monitoring and data analysis</td>
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<tr>
<td>Work planning</td>
<td>Mobile tool supporting frontline health workers to prioritize daily, weekly and/or monthly patient load, in addition to the messages emphasized during an appointment, based on data from patient registration and assessment</td>
</tr>
<tr>
<td>Counselling</td>
<td>Supporting frontline health workers to deliver messages on health practices using mobile phone features</td>
</tr>
<tr>
<td>Social Networking</td>
<td>Mobile-based platform to facilitate collaboration and/or communication amongst frontline health workers</td>
</tr>
<tr>
<td>Clinical Decision Making</td>
<td>Intelligent step-by-step guide for frontline health workers to assess a patient’s condition and/or inform treatment decisions; this often includes questions for a frontline health worker to ask a patient, data inputs based on the patients answers to the questions and automated recommendations based on the data inputs</td>
</tr>
<tr>
<td>Checklists</td>
<td>Mobile-based lists to guide sub-activities to be performed by frontline health workers to ensure optimal quality (e.g., list for sub-activities during a home visit)</td>
</tr>
<tr>
<td>Mobile Learning</td>
<td>Mobile-based platform to enable frontline health workers to learn health concepts, treatment guidelines, role expectations etc.; this may also include options for assessment and certification</td>
</tr>
<tr>
<td>Care Coordination</td>
<td>Coordination between frontline health workers and patients, frontline health workers and other health professionals, and referrals, using the features of a mobile phone</td>
</tr>
<tr>
<td>Compensation</td>
<td>Mobile-platform to enable faster delivery of frontline health worker salary, performance incentives and/or resources for transportation or supplies</td>
</tr>
<tr>
<td>Performance Tracking</td>
<td>Mobile-based data input of completed activities by frontline health workers to monitor performance and/or calculate salary/incentive pay</td>
</tr>
</tbody>
</table>

Source: H Batavia and N Kaonga, "mHealth Support Tools for Improving the Performance of Frontline Health Workers", mHealth Alliance, March 2014
But existing mHealth features are not fully utilised by healthcare workers

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**Source:** GSMA mHealth, Understanding the Needs and Wants of Community Healthcare Workers, South Africa, August 2014

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### - Communication tool
- Communicate with colleagues and patients
- Call the healthcare facility to deal with emergency cases

### - Data collection tool
- Gather demographic profiles and healthcare conditions of patients

### - Resource/patient care
- Planning and security
  - Appointment reminder/planning which households to visit
  - Identify the exact address/location of patients
  - Referral/booking system for appointment
  - Track progress of CHW targets
  - Track patient progress

### - Continual professional development
- Access to training materials
- Enable objective assessment

### - Diagnostics
- Checklist to assess the condition of patients and refer them to emergency services, if necessary

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About 1 in 7 households had their information noted by phones.
Education of Front Line Health Workers (FLHWs) is one key health application area

“The education and awareness category includes mHealth tools that support FLHWs to refresh their knowledge on health practices (“mLearning”), and/or support FLHWs ..... during counseling sessions with patients and their families. This was the second most common category of mHealth tools in our database research... suggesting a strong inclination by organizations to focus on using mHealth tools for FLHW capacity building.”

“The literature found that mobile phones were being used by FLHWs as a tool to disseminate and gain knowledge through peer-to-peer networks, and that mobile job aids not only reduced workload, but also improved adherence to national treatment guidelines, leading to decreased error rates”

Source: H Batavia and N Kaonga,, mHealth Support Tools for Improving the Performance of Frontline Health Workers , mHealth Alliance, March 2014
Clinical support is another key health application

“A suite of mHealth tools are used to support FLHWs delivery of quality patient care, including those that utilize algorithms to assist in clinical decision making, provide checklists to support standardized and recommended care and provide directories to coordinate with other health professionals for referrals and advice.”

“The literature found examples of mHealth clinical decision support tools for FLHWs in Columbia, Kenya and Papua New Guinea, two of which focused on malaria and helped reduce clinical errors and improve compliance to standard protocols.”

“Adapting checklists for the mobile platform, to support FLHWs in improving the standard of care in LMICs, was the second most common type of tool in this category ....... The majority of the checklist tools identified focused specifically on post-partum hemorrhage and severe pre-eclampsia and eclampsia, diseases both related to maternal health “

Source: H Batavia and N Kaonga,, mHealth Support Tools for Improving the Performance of Frontline Health Workers , mHealth Alliance, March 2014
There are emerging patterns of use of mHealth by frontline health workers

“Most mHealth tools for frontline health workers are focussed on supporting patient monitoring, reinforcing learning and strengthening counselling during home visits, through pre-loaded java-based applications”

“Research found a notable shift from “single-function” and “single-disease” mHealth tools, to more integrated solutions that cut across the roles and responsibilities of a frontline health worker, and content related to multiple diseases and commodities.”

“The Malaria Consortium and its partners have used CommCare to create an integrated solution for frontline health workers to support malaria diagnosis, treatment and care with a decision support tool, an interactive counselling guide, a patient registry and a mechanism for monitoring FLHW performance in Uganda and Mozambique.”

“Preloaded applications on mobile phones most commonly supported FLHWs to deliver counseling messages to pregnant mothers and their families or access refresher learning modules for their own education.”

“In cases where a single-disease mHealth tool was identified: “it was typically concerned with HIV/AIDS, reproductive health, pregnancy complications, malaria or child survival.”

Source: H Batavia and N Kaonga,, *mHealth Support Tools for Improving the Performance of Frontline Health Workers*, mHealth Alliance, March 2014
Increase in application of mHealth by frontline health workers is driven by various factors

“This trend towards integrated solutions is largely driven by the scale-up of cloud-based mobile platforms that provide the infrastructure to easily develop, manage and monitor unique mobile tools for frontline health workers (FLHWs).”

“This trend is combined with increased mobile phone ownership, and improved technical literacy of FLHWs in low and middle income countries, providing the infrastructure required to deploy an mHealth solution.”

“Development of mHealth tools has become increasingly cost-effective and accessible, even amongst organizations with minimal technical expertise”.

Source: H Batavia and N Kaonga, ‘mHealth Support Tools for Improving the Performance of Frontline Health Workers’, mHealth Alliance, March 2014
Support to citizens
Mobile “apps” for health information for the citizens of the developing world have begun to take off

**Medafrika App**

**Medafrika App**

MÉDAFRICA APP

Your medical content and information library that enables you to get certified information that enhances your well being from validating a doctor to locating a hospital to monitoring of symptoms to getting diet and drugs information amongst others.

**Mobilium Smart Health App**

**Mobilium Smart Health App**

**Hesperian Safe Pregnancy and Birth App**

**Hesperian Safe Pregnancy and Birth App**

Staying Healthy During Pregnancy

Danger Signs During Pregnancy

Danger Signs During Birth

Danger Signs After Birth

How To...
Most current mobile phone health information applications use SMS text messaging.

MAMA SOUTH AFRICA

BRIEF OVERVIEW
MAMA South Africa provides information to mothers that promotes earlier antenatal care, supports HIV-positive mothers and helps them understand how to prevent transmission to their babies, and encourages exclusive breastfeeding for all mothers.

Through the use of mobile phones, the program is able to inform and empower mothers to adopt healthy behaviors and to access maternal and child health services. It currently consists of a free SMS program offered through two inner-city clinics in Hillbrow, Johannesburg, a dynamic community portal at www.askmama.mobi, and a USSD-based interactive quiz service. MAMA South Africa aims to expand to include voice services for mothers with low literacy and a portal on MXit, a popular mobile social network.

MAMA South Africa was officially launched in May 2013.

Text messaging can be a low cost and effective form of mHealth but has several limitations:

(i) Users need to be literate

(ii) Mobile network connections are required

(iii) Message content and timing tends to be “pushed” by the sender rather than “pulled” by the user; messaging does not provide a constantly available underpinning health information resource
There are solutions to these problems such as use of audio, pictures and video and pre-loading information onto phones or cheap memory cards.

Examples include the **Hesperian Pregnancy App** and the **HealthPhone** video library.

- HealthPhone™'s health and nutrition content is scripted on knowledge prepared jointly by UNICEF, WHO, UNESCO, UNFPA, UNDP, UNAIDS, WFP and The World Bank.
- This knowledge, in 77 languages, is pre-loaded on microSD memory cards for popular low-cost mobile phones – no signal is required and there is no download cost.
However, so far, only a few mHealth applications empower citizens with off-line health information.

A HIFA review of 1700 mHealth programmes found less than 10 that empowered citizens in low-income countries with off-line information on their phones for them to consult as and when they needed it.

Source: C Hagar School of Library and Information Science, San Jose State University see www.hifa2015.org/the-first-hifa-smart-goal-mobile-healthcare-information-for-all/
3. Some challenges for use of mobile phones in health care in developing countries

Cover photos courtesy www.photoshare.org
There are many challenges in developing mHealth

- For **financial sustainability** in the developing world mHealth applications will probably need to be “at cost” - similar to essential drugs
- Importance of **tailoring the technology to the situation** e.g. a maternal health application had originally intended to use text messaging but switched to voice messaging when participant literacy levels were checked
- Difficulties in **scaling up pilots** are sometimes owing to technical issues such as lack of access to smartphones but often because funding is available only for short pilots or insufficient attention is paid to getting key people on side
- Concerns about **security of private health-related information**, although many users, e.g. younger people, were less concerned about this than is often assumed
- Concerns about personal security - **risk of theft** of phones
- Need to guard against **risk of widening health inequalities**– technology is not always the answer – keep things simple!
- Some development is being slowed by **fears of legal action** if an application leads to a wrong diagnosis
- The **corporate ownership of software** is a problem in developing countries – although open source software is becoming more used
- Potential problem with indiscriminate use of **unevaluated information or software applications** – but hard to get funding for evaluative work.

Source: Seminar “Apps, Maps and Cyberchats” Royal College of Physicians, London June 2014
Various factors have been perceived to impede the use of ICTs in communicating health information.

Table 7.3 Factors impeding the use of ICTs for the fight against HIV/AIDS.\(^{10}\) Values shown are percentages of sample \((n = 990)\)

<table>
<thead>
<tr>
<th>Factor</th>
<th>South Africa (%)</th>
<th>Tanzania (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inappropriate language</td>
<td>81</td>
<td>58</td>
</tr>
<tr>
<td>Inappropriate and embarrassing messages</td>
<td>73</td>
<td>49</td>
</tr>
<tr>
<td>Lack of information, education and communication materials</td>
<td>80</td>
<td>81</td>
</tr>
<tr>
<td>Lack of feedback mechanism</td>
<td>82</td>
<td>67</td>
</tr>
<tr>
<td>Lack of enabling ICT policies</td>
<td>82</td>
<td>63</td>
</tr>
<tr>
<td>Poor infrastructure/physical access</td>
<td>86</td>
<td>80</td>
</tr>
<tr>
<td>People's attitudes</td>
<td>85</td>
<td>75</td>
</tr>
<tr>
<td>Traditional/cultural beliefs</td>
<td>87</td>
<td>80</td>
</tr>
<tr>
<td>Cost</td>
<td>85</td>
<td>68</td>
</tr>
<tr>
<td>Illiteracy</td>
<td>90</td>
<td>81</td>
</tr>
</tbody>
</table>

Proximate and Contextual factors are both important

<table>
<thead>
<tr>
<th>Some key success factors</th>
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</thead>
<tbody>
<tr>
<td>• User engagement in project e.g. on user interface design</td>
</tr>
<tr>
<td>• Buy-in from key local and national stakeholders</td>
</tr>
<tr>
<td>• Training e.g. on use of mobile devices</td>
</tr>
<tr>
<td>• User literacy</td>
</tr>
<tr>
<td>• Meeting security concerns e.g. about theft of mobile devices</td>
</tr>
<tr>
<td>• Attention to social factors e.g. possible impact on work-life balance</td>
</tr>
<tr>
<td>• Sustainable funding arrangements</td>
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</tbody>
</table>

A cascade of criteria need to be met for a mHealth application to be successful in low resource settings

- **Significance of the health problem(s):** Is the application focused on a significant health or healthcare problem - a widespread serious condition, or an emergency or urgent need?
- **Appropriateness of the targeting:** Is the application aimed at use in low resource settings or by low income or other priority groups e.g. mother and child, health educators?
- **Value of the information:** Is the information relevant to users’ needs for addressing the health problem; is it reliable; can it be easily related to practical action?
- **Ease of assimilation of the information:** Is the information presented in an appealing and easy to understand way such as a video; is it available in local language(s)?
- **Availability of the application:** Is the application available across several regions or countries; is it available free to the user?
- **Technological accessibility of the application:** Does it have a simple and intuitive user interface, is it accessible on a basic or featurephone; will it work “offline”; will it work on multiple operating systems; is it pre-loaded?

Ref: www.hifa2015.org/the-first-hifa-smart-goal-mobile-healthcare-information-for-all/
Three concluding questions about mHealth in low resource settings
Many issues need clarification if mHealth is to develop appropriately in low resource settings

For example, in low resource settings:

• How far can the phone replace paper?
• How fast will be the switch to feature or smartphones?
• How extensive is the evidence of process and outcome improvements through mHealth applications?

Some points on these issues are made in the following three slides...........
How far can - or should - the phone replace paper in low resource settings?

- Paper-based information often still the medium of choice in low-resource settings but there are examples of organizations testing the feasibility and cost-effectiveness of replacing paper-based case management tools with mHealth tools and achieving favorable results. E.g.
  - Thailand’s malaria program scaled-up the use of mHealth tools for patient case registration and follow-up, following a pilot project testing the feasibility with Front Line Health Workers (FLHWs).
  - A study in Kenya illustrated the feasibility of using mobile video to support FLHWs in remote monitoring of TB patients. This worked by partnering with a patient’s treatment partner (as part of the Directly Observed Therapy (DOT) model) to take and send videos to FLHWs of patients taking their medication.

The recent report by the mHealth Alliance sets out a three-step process for adapting paper-based content into mobile-friendly content (pages 32-34)

A note of caution?:
“A recent randomised trial found that teenagers who read material on a printed page understood the text significantly better than those who read the same material on a screen”
M Tobin. Put down your smartphone and pick up a book. BMJ 2014; 349

Source: H Batavia and N Kaonga,, mHealth Support Tools for Improving the Performance of Frontline Health Workers, mHealth Alliance, March 2014 – see refs 17,18 and 19.
How fast will be the switch to feature or smartphones in low resource settings?

- Pre-loaded applications on smartphones and java-based phones are the most common format for mHealth tools for frontline health workers (FLHWs)
- However, applications that have scaled up have mostly used low-cost basic technology such as interactive voice response (IVR)
- Obstacles to achieving scale of pre-loaded applications on smartphones and java-based phones include the costs of hardware and data transmission, availability of power for charging, and managing the logistics of training and support.

Source: H Batavia and N Kaonga, mHealth Support Tools for Improving the Performance of Frontline Health Workers, mHealth Alliance, March 2014

However, costs are dropping rapidly – Mozilla is releasing a smartphone that costs about £20; memory cards that can hold an entire library of videos can be obtained for not much more than £1

A note of caution?:
“While most community health workers would like bigger touch screens, they are wary that these may make them targets for robbery”

From GSMA mHealth, Understanding the Needs and Wants of Community Healthcare Workers, South Africa, August 2014
How extensive is the evidence of process and outcome improvements through mHealth applications in low resource settings?

There is some encouraging evidence, particularly on process improvement - mobile phones have been shown to improve access to health services for remote populations, improve training of healthcare workers and disseminate information to the community.

Notes of caution?
- Most evaluation of mHealth projects in low-income countries has focused on technological inputs or job performance rather than health outputs.
- There has been very little evaluative attention to contextual factors (e.g. device sharing) which promote or inhibit adoption of mHealth at the margins of healthcare systems.
- There has been very little evaluation of cost-effectiveness aspects of mHealth in low resource settings.

Source: A Chib The promise and peril of mHealth in developing countries, Mobile Media and Communications, 1 (1), 69-75, 2013
To illuminate these and other issues we need more information about experiences in applying mHealth in low resource settings!