

"mHealth involves using wireless technologies such as Bluetooth, GSM/GPRS/3G, WiFi, WiMAX, and so on to transmit and enable various eHealth data contents and services. Usually these are accessed by the health worker through devices such as mobile phones, smart phones, PDAs, laptops and tablet PCs."

**—Dr. Adesina Iluyemi,
PhD Candidate,
University of Portsmouth, UK**

Mounting interest in the field of mHealth—the provision of health-related services via mobile communications—can be traced to the evolution of several interrelated trends. In many parts of the world, epidemics and a shortage of healthcare workers continue to present grave challenges for governments and health providers. Yet in these same places, the explosive growth of mobile communications over the past decade offers a new hope for the promotion of quality healthcare. Among those who had previously been left behind by the ‘digital divide,’ billions now have access to reliable technology. There is a growing body of evidence that demonstrates the potential of mobile communications to radically improve healthcare services—even in some of the most remote and resource-poor environments. This report examines issues at the heart of the rapidly evolving intersection of mobile phones and healthcare. It helps the reader to understand mHealth’s scope and implementation across developing regions, the health needs to which mHealth can be applied, and the mHealth applications that promise the greatest impact on health care initiatives. It also examines building blocks required to make mHealth more widely available through sustainable implementations. Finally, it calls for concerted action to help realize mHealth’s full potential.

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The Promise of Mobile Technologies for Health

Mobile communication offers an effective means of bringing healthcare services to developing-country citizens. With low-cost handsets and the penetration of mobile phone networks globally, tens of millions of citizens that never had regular access to a fixed-line telephone or computer now use mobile devices as daily tools for communication and data transfer. A full 64% of all mobile phone users can now be found in the developing world.³ Furthermore, estimates show that by 2012, half of all individuals in remote areas of the world will have mobile phones. This growing ubiquity of mobile phones is a central element in the promise of mobile technologies for health. Figure 1 illustrates that developing world citizens have plentiful access to mobile phones, even while other technologies and health infrastructure are scarce. This explosion of mobile phone usage has the potential to improve health service delivery on a massive scale. For example, mobile technology can support increasingly inclusive health systems by enabling health workers to provide real-time health information and diagnoses in rural and marginalized areas where health services are often scarce or absent altogether.

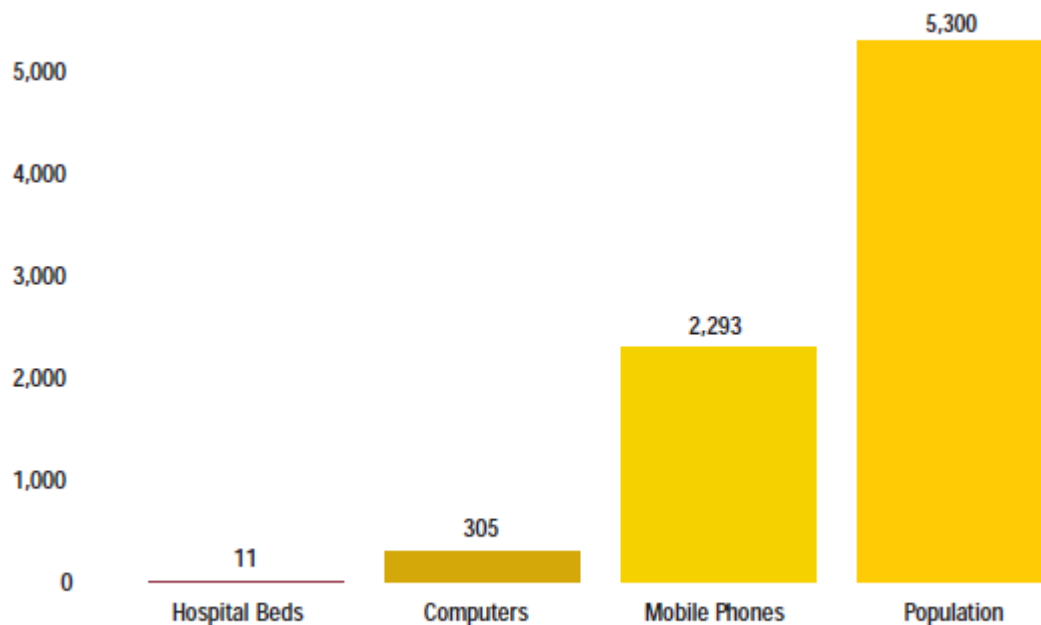
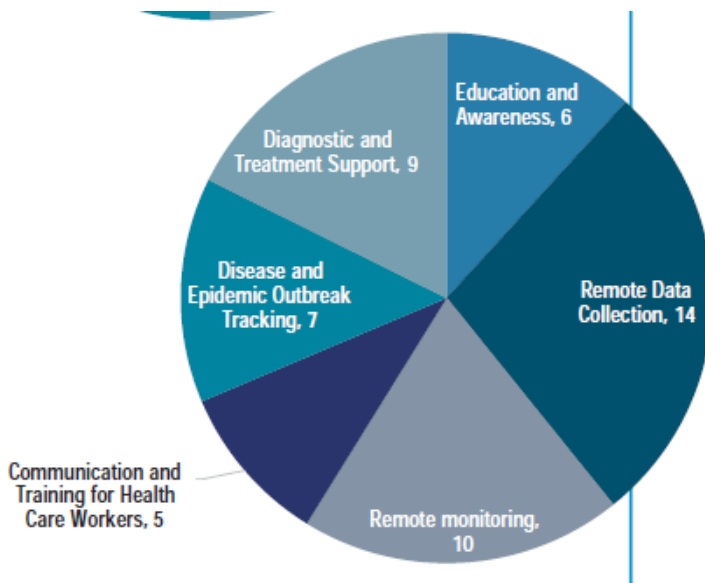


Figure 1. Technology and health-related statistics for developing countries (millions).⁴

Meeting Health Needs Through a Broad Array of Applications

A growing number of developing countries are using mobile technology to address health needs. The mHealth field is remarkably dynamic, and the range of applications being designed is constantly expanding. The key applications for mHealth in developing countries are:

- Education and awareness
- Remote data collection
- Remote monitoring
- Communication and training for healthcare workers
- Disease and epidemic outbreak tracking
- Diagnostic and treatment support



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Evolution of Mobile Technologies

Addressing future health needs will be facilitated by the development of mobile technologies and network expansion. The key technology trends in mobile technology continue to be the same trends that have characterized technological progress for the past 40 years: miniaturization, greater speed, and cost reduction. These advances are reflected in mobile telephony by some of the advancement issues shown in Table 2. A greater range of services becomes possible with more uniform, faster, and more affordable broadband access; greater access and coverage expands the ‘subscriber’ base, building volume, creating incentives for players, and helping push sustainable mHealth applications beyond simple one-way data services.

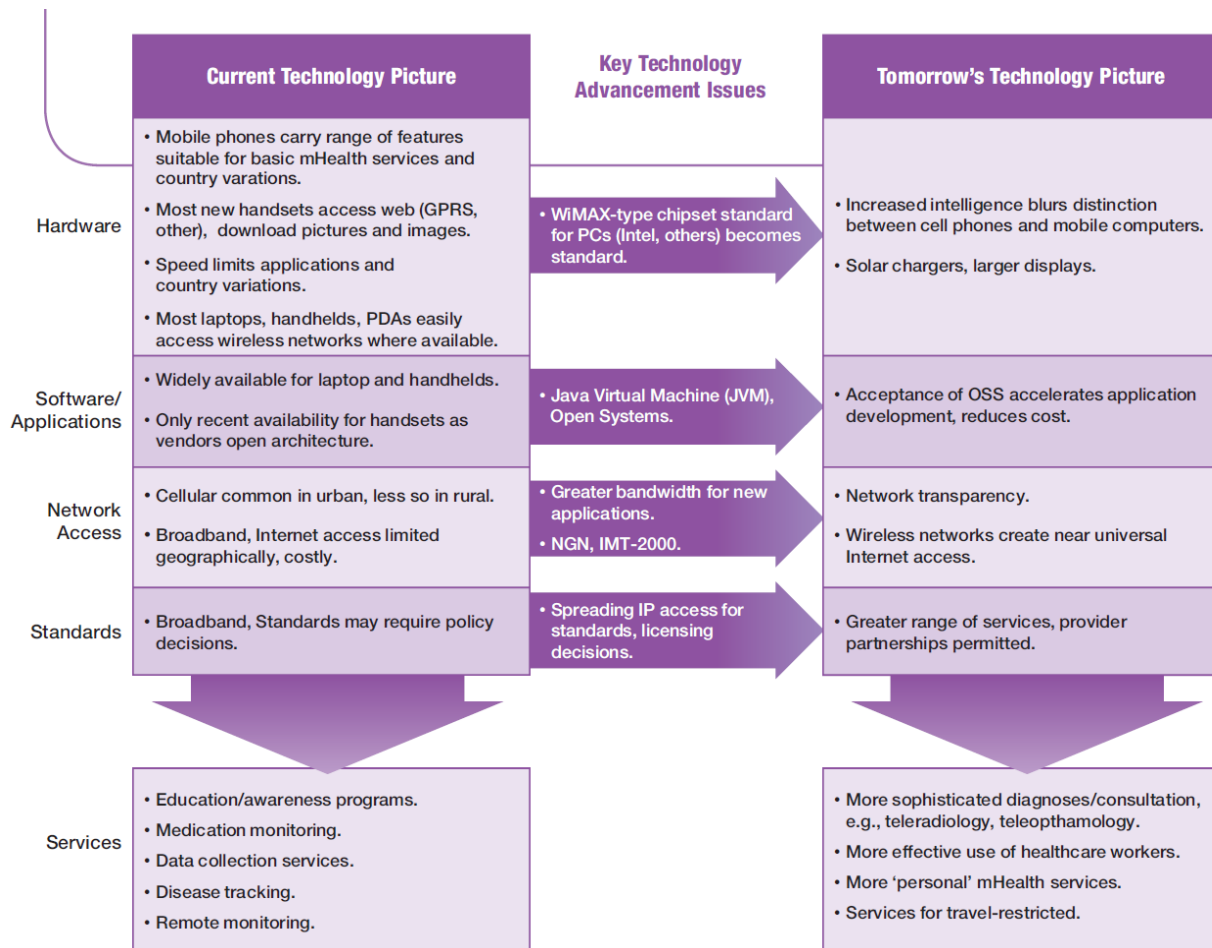


Table 2. Evolving mobile technology capabilities.

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mHealth Brainstorming Tool

Example: Community Case Management of Pneumonia

	FIRST	SECOND	THIRD
	List the <u>Critical Steps</u> in the health activity	Identify the <u>Major Constraints</u> for each step	Brainstorm <u>Mobile Solutions</u> to address each constraint
1.	Caretaker correctly recognizes pneumonia danger signs	Can be difficult to teach subtle signs of pneumonia	Train caretaker using a mobile device showing a video of a child with pneumonia
2.	Caretaker promptly seeks care from a trained CHW	Caretaker may not be able to find CHW or child may be too sick to travel	Have caretaker call the CHW to find their location or request that they come to the home
3.	CHW provides appropriate assessment and diagnosis	CHW may not follow diagnostic algorithm	Have CHW follow a phone-based checklist

mHealth Checklist

7 questions to ask at the start

1. **Does your mobile phone solution directly help you achieve your key health objectives?** Does it directly improve the availability, quality or utilization of health care services? Does it address the critical events (e.g., labor and delivery) that directly influence mortality?

2. **Does your solution address key health program constraints?** List the programmatic steps involved in one of your health activities and identify the major bottlenecks. Then identify the causes of these bottlenecks and brainstorm ways to overcome them through the use of mobile phones. See mHealth Brainstorming Tool, attached.

3. **Was your solution developed with the help of your target users, and will it make their lives better?** The most successful solutions will be the ones that users spontaneously adopt and continue using. And those are likely to be applications that help them do whatever they're already doing, but more easily, quickly and accurately.

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4. Before designing your solution, did you first look for solutions that are already working well elsewhere? What are the costs and benefits of implementing a new solution versus improving an existing one?

5. Does your solution focus on functions that the mobile phone can perform better than existing tools? For example, real-time communications, simultaneous communication with multiple individuals, data transfer? Or does it try to replace something that's already pretty good (e.g., flipcharts, checklists, flowcharts)?

6. Is your solution replicable and scalable? It's important to design for scale from the start. How long does it take to train each user? How will you handle illiteracy? How will you manage issues of privacy and data sharing? How will the MOH benefit? How much will it cost at scale?

7. Do you have an M&E plan in place? Especially at this early stage, we need to share experiences and learn from each other's successes and failures. The plan should include indicators related to traditional health outcomes as well as intermediate outputs indicative of feasibility at scale (e.g., usability, cost).

"With eHealth and mHealth, an ecosystem approach is recommended. Many of the basic applications and devices exist and are in use, but now we need to make them talk to each other in a way that yields strategic benefits."

**—Dr. Patricia Mechael,
mHealth and Telemedicine Advisor to
the Millennium Villages Project at the
Earth Institute at Columbia University**