

Power to the patient: How mobile technology is transforming healthcare



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Preface

Power to the patient: How mobile technology is transforming healthcare studies the changing role of mobile technologies in global health. From Kenya to Thailand to the US, smart phones and tablets are altering how care is delivered and received. The possibilities of these new and emerging technologies are countered by risks, including the potential for privacy issues. This report explores the influence of mobile in health systems globally and how it is likely to evolve in the future.

As a basis for the research, The Economist Intelligence Unit conducted a global survey of 144 healthcare leaders working in public and private healthcare, pharmaceuticals, biotechnology and medical devices, in June 2014. The findings and views expressed in this report do not necessarily reflect the views of the sponsor. The author was John Carey. Frieda Klotz edited the report and Mike Kenny was responsible for layout. We would like to thank all of the executives who participated, whether on record or anonymously, for their valuable insights.

Interviewees

Paul Cummings, senior fellow at ICF International

Robert B. McCray, president and CEO of the Wireless-Life Sciences Alliance

Young Sohn, president and chief strategy officer at Samsung Electronics

Gigi Sorenson, director of telehealth for Northern Arizona Healthcare

Eric J. Topol, director of the Scripps Translational Science Institute

Dr. Martin Were, chief medical information officer at Ampath in Kenya and assistant associate professor of medicine at the Indiana University School of Medicine

Robyn Whittaker, programme leader for health informatics and technology at the National Institute for Health Innovation at the University of Auckland

1

Introduction

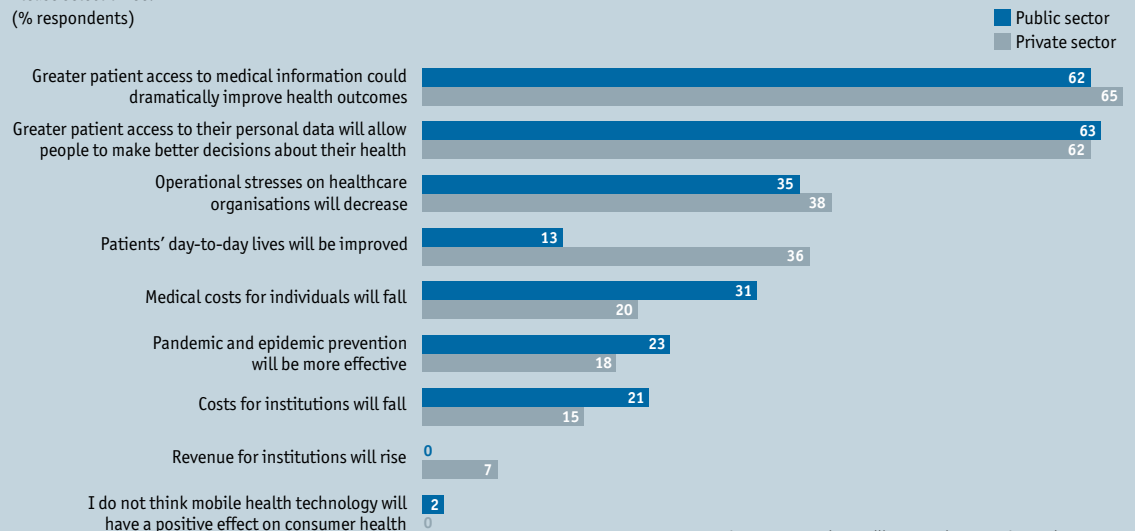
Imagine a future outbreak of the deadly Ebola virus. It starts just like the 2014 epidemic. But suppose that this time, as the virus re-emerges, health agencies use mobile phone records to track the movements of people out of or into disease “hot zones,” and isolate those at risk. Doctors and airport screeners have hand-held devices linked to smartphones capable of detecting the virus in a drop of blood within minutes. By quickly spotting and tracking each new case of infection, the technologies could crush the epidemic before it takes off. Such a future is almost here. Many of these mobile technologies already exist, or are under development.

The impact of mobile health (also known as “m-health” or “connected health”) could go beyond tackling epidemics. With more than 5bn mobile phones already in use around the world, doctors and nurses can send texts, or create automated messages to remind patients to take their medicine or to help them quit smoking. Providers could fit thousands of people with wirelessly connected electrocardiogram (ECG) or glucose monitors, spotting the first signs of illnesses, and nipping heart attacks or other problems in the bud. Most lab tests could be done away from doctors’ offices or clinics using new, connected devices, while hospitals would be needed only in cases of serious

What do you think will be the most positive outcome of mobile health technologies?

Please select three.

(% respondents)



Source: Economist Intelligence Unit survey, September 2014.

Mobile health increases patients' knowledge and power, changing the relationship to a more collaborative one.

illness or for emergency treatment. Mobile health could bring quality care to rural rice farmers in Thailand, cattle herders in Kenya or migrant workers on Arizona farms. "Nearly anything we can do in medicine can be done remotely," says Dr Eric J. Topol, director of the Scripps Translational Science Institute and chief academic officer at Scripps Health. "We're talking about things that are really pretty extraordinary."

In June 2014, the Economist Intelligence Unit conducted a survey about the impact of mobile health; the survey included 144 CEOs, managers, administrators and business development strategists in public and private healthcare, as well as pharmaceuticals, biotechnology and medical device manufacturing, in 23 countries. Most executives surveyed (64%) believe that the ability of new mobile technologies and services to provide greater patient access to medical information "could dramatically improve health outcomes". A similar proportion (63%) also predicts that "greater patient access to their personal data will allow people to make better decisions about their health". Mobile health could reduce medical costs for individuals (cited by 24% of respondents), offer more effective approaches to preventing epidemics and pandemics (20%) and lower costs for institutions (17%).

Equally important will be the ability to collect, process and understand the vast amount of new health data that will be available thanks to an unprecedented wave of innovation at the intersection of information technology and healthcare. "Moore's Law [computing power doubles every 18 months] is coming to medicine," says Dr Topol. "Every company with its lights on is into this—Google, Apple, AT&T, Verizon, Qualcomm, Intel, Facebook, Microsoft"—along with scores of start-ups.

Already, companies have developed more than 40,000 healthcare apps for mobile phones, according to Daryl West, vice president and director of Governance Studies at the Brookings Institution, speaking at a panel on mobile health in March 2014. One app in China, which allows people to ask doctors about their symptoms, has attracted 10m

users. Other companies are developing wearable blood-sugar monitors or hand-held devices capable of monitoring the body's vital signs and detecting more than a dozen medical conditions. "I think this is a revolution in health—and a huge opportunity," says Young Sohn, president and chief strategy officer at Samsung Electronics.

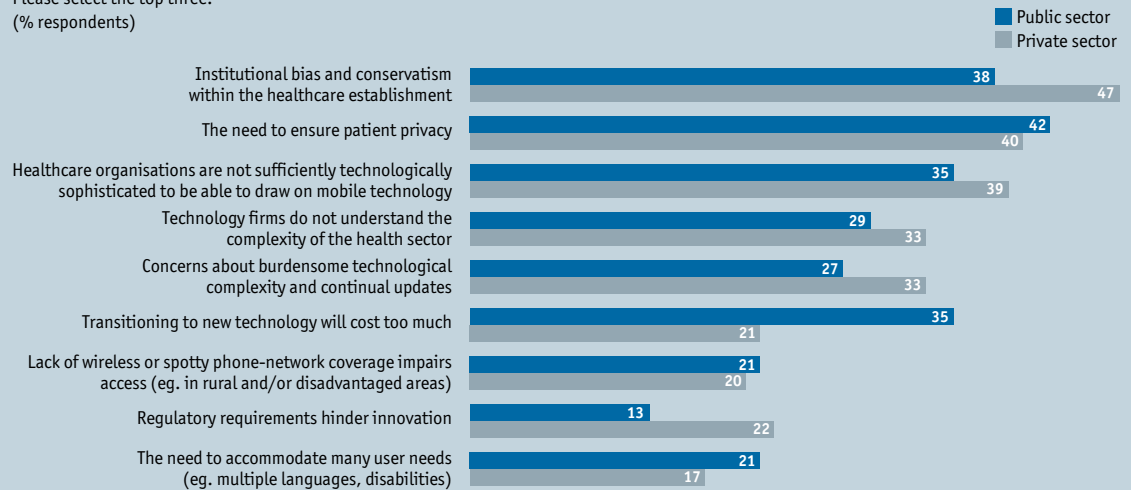
Still, formidable barriers to the adoption of mobile health remain. Respondents in the EIU survey worry that people will find it hard to use the new technology (54%), or be afraid that their personal information won't be kept secure (49% overall; 65% of respondents from North America). "If people won't use the technology because of data breaches, we run the risk of losing the benefits of these technologies," says Robert B. McCray, president and CEO of the Wireless-Life Sciences Alliance. Mr Sohn notes that "privacy is probably the single biggest issue of our time".

For executives in healthcare and information technology, another major challenge is how to make money in mobile health. "The problem is that with many of these systems, there is no business model around them," says Dr Martin Were, who is chief medical information officer at the Academic Model Providing Access to Healthcare (Ampath) in Kenya as well as assistant associate professor of medicine at the Indiana University School of Medicine. Indeed, 10% of respondents (and 19% of those in the US) believe mobile health has no promising revenue model.

In fact, although healthcare savings might be a boon for public sector organisations, connected health threatens to take revenue away from existing private healthcare players, especially in the US, where doctors and hospitals typically are paid for each service they provide. Each time a patient avoids going to a hospital because he or she has received care remotely means thousands of dollars in lost revenue for the hospital. "If we take better care of patients, they don't come back to the hospital—but coming back is now the revenue opportunity," Mr McCray explains. Other barriers include risk-aversion within the healthcare industry (cited by 44% of respondents) and regulatory requirements that hinder innovation (19%).

Which of the following do you think are currently the biggest challenges for health industry adoption (eg. by hospitals, doctors or pharmaceutical firms) of mobile health technologies?

Please select the top three.
(% respondents)



Source: Economist Intelligence Unit survey, September 2014.

Yet experts generally believe these challenges will be met. Ultimately, mobile health could lead to a paradigm shift in healthcare. Instead of a paternalistic system, where doctors tell people what to do, mobile health increases patients' knowledge and power, changing the relationship

to a more collaborative one. Gigi Sorenson, a trained nurse, is director of telehealth for Northern Arizona Healthcare (NAH), serving patients across 84,000 sq km of countryside. "I think this is really a game changer," she says. ■

2

Case studies: “It would not work without the human component”

In the US, reaching rural communities

In 2011, the US National Institutes of Health and Qualcomm invited Northern Arizona Healthcare to participate in a pilot project designed to test whether mobile health services can improve care and cut costs in a rural population. Northern Arizona was ideal because it is so rural, with a population density of just four people per sq km (approx.). Not only do many of these individuals live hours from hospitals or health clinics; many also lack electricity or running water.

The team gave home monitors to 50 people suffering from congestive heart failure (and an average of seven other chronic illnesses, including diabetes). The instruments measured weight, blood pressure, heart rate and oxygen level and automatically channelled data to NAH through a mobile-phone connection. Patients without electricity received solar chargers and batteries as well. Each patient was intensively monitored for at least three months, with doctors and nurses at the centre providing health advice and other care as needed based on the data. The patients’ experiences during the test period were compared with an equivalent number of months of past history.

The results were dramatic. The average number of days each patient spent in the hospital plunged from 14 to just over 5, saving more than \$90,000 per person. The remote monitors enabled nurses

to spot potential health problems before they became serious. They also helped patients understand that many symptoms were not signs of life-threatening conditions. In one case, a patient began to have trouble breathing and, without the remote monitoring technology, might have dialled 911. Instead, nurses were able to look at his oxygen levels and determine that they were normal and then explain to the patient that he was probably having a panic attack, not a health crisis. “That saved a 911 ride and an emergency room visit,” says Ms Sorenson. “With simple tools, simple monitoring and simple interventions, the impact is huge.” Northern Arizona Health is now expanding the programme.

In China, wireless health for the heart

China, one of many countries struggling to deliver quality healthcare to a far-flung rural population, has also had good results from mobile health pilot projects. One example is the Wireless Heart Health programme. Eleven thousand heart patients were given smartphone-enabled heart sensors. The phones sent patient data to 96 community doctors, who reviewed them and contacted the patients by texts or by phone. The programme identified 1,100 people with cardiovascular problems severe enough to require further testing and evaluation in health clinics. “Our research shows that mobile technology can provide a means for China to meet challenges and achieve equal access to medical

The remote monitors enabled nurses to spot potential health problems before they became serious.

care,” the chief engineer at the China Academy of Telecommunications Research of MIIT, Xiaohui Yu, told a conference at the Brookings Institution in March 2014.

In New Zealand, helping smokers stop

Successful connected health efforts do not all require high-tech monitoring devices. Researchers in New Zealand have improved health outcomes using simple text messages. In the early 2000s, researchers at the University of Auckland launched a randomised smoking cessation clinical trial with 1,700 smokers. Those in the experimental group received several text messages a day that offered encouragement, tips on how to deal with cravings and other advice.

Those who received the supportive text messages successfully quit smoking at more than twice the rate (28% compared with 13%) of those in the control group. New Zealand’s health authorities built on that success with a free national smoking cessation service. Now, researchers are following up with a texting programme to help people control their diabetes, and are working with the World Health Organisation and the International Telecommunications Association to bring similar programmes to other countries. “We still have a lot to learn about what works and why and for whom, but the future is very exciting,” explains Robyn Whittaker, programme leader for Health Informatics and Technology at the National Institute for Health Innovation at the University of Auckland. “The messaging aspects of mobile health are really important.”

In Kenya, tracking HIV

Another productive approach combines text messaging with traditional public health outreach and databases of health records. In Kenya, doctors realised that waiting for people to seek treatment on their own was inadequate. “With HIV, by the

time they come to you with symptoms, they are really sick,” says Ampath’s Dr Were. So the organisation sends workers into communities who go door-to-door to test people for HIV and collect information about diabetes, hypertension, children’s nutritional status and other issues. The workers enter the data into mobile devices that transmit the information to a central data network. It then becomes possible to send reminders to people’s mobile phones about taking medications or coming into a clinic. Since the programme began in 2008, it has served more than 1m people. “The most powerful stuff is that we can provide timely reminders based on historical data, for instance to check kidney function if a patient has been on certain medicines for a period of time, or to see a nutritionist if a baby’s weight declines and the baby is malnourished,” says Dr Were.

In the EIU survey, many respondents fear that “consumers and/or patients are not used to the idea of tech-based health services” (54%), and that “the technologies are too complicated,” especially for the ill or elderly (44%). Similar concerns had been voiced at Northern Arizona Healthcare. Doctors initially said they were unprepared for more data. But the worries proved unfounded. “The biggest surprise wasn’t that it could reduce hospital readmission rates—that made sense,” says Ms Sorenson. “The big surprise was that it all worked.” Doctors quickly saw the benefits. And, she adds, “while we thought it might be difficult to get elderly Native Americans to accept the technology, there was always some teenager in the household who wanted their hands on the technology”.

The technology is only responsible for part of the success, however. Healthcare workers also are crucial. The Kenyan programme “would not work without the human component”, says Dr Were. “The technology in this case acts as an intermediary in improving the final outcome.” Or as Ms Sorenson puts it, “the technology is cool, but it is the people who really sell it”. ■

Doctors initially said they were unprepared for more data. But the worries proved unfounded.

3

Opportunities for pharma

“Pharmaceutical companies have a clear opportunity to play a greater role in delivering a better experience for patients.”

Digital health: A way for pharma companies to be more relevant in healthcare, report published by Strategy&.

Pharmaceutical companies are also leaping into mobile health, exploring tools and devices that would enable them to do everything from tracking diseases and outcomes to helping both doctors and patients manage complex conditions like diabetes. Three companies, Bayer, Merck and Novartis, each have created more than 100 healthcare apps. Bayer has developed a tool that multiple sclerosis patients can use to track their medications, for instance, while Novartis has made apps for cystic fibrosis and cancer, among other diseases. One of Merck's apps, My Health Matters, which HIV patients can use to chart symptoms and adherence to their prescribed drug regimens, has won an award from *Medical Marketing & Media*.

With digital health technologies, “pharmaceutical companies have a clear opportunity to play a greater role in delivering a better experience for patients, improving clinical outcomes, and reducing the total cost of care”, says a recent report from Strategy&, the company formed by a merger of Booz & Company and PwC.

But progress in mobile health has so far proved challenging for pharmaceutical companies. Consumers have been reluctant to download and

use the apps. Even the most successful apps, like Merck's, have fewer than 1m users, with much smaller numbers for most individual apps, according to a report entitled published by research2guidance in 2014. The report concludes that “most of the Pharma companies fail to have a significant impact on the mHealth app market.” The industry also faces challenges making apps that users find useful and reliable and showing that the apps can make a difference. A Merck spokesperson, for instance, says that the company doesn't yet have detailed information that shows whether or not patient outcomes have been improved because of its apps.

A problem for the pharmaceutical industry to overcome is that that people have little trust in pharmaceutical companies, ranking them below doctors and academic centres as sources of reliable information on treatment. And even Internet resources like WebMD or search engines like Google are ranked higher in trustworthiness, according to a Deloitte *2012 Survey of US Health Care Consumers*. That trust may increase, however, if pharmaceutical companies can produce services that people perceive as having value. ■

4

Wearables and watches

Today, the main role of mobile health technologies, according to 79% of the respondents in the EIU survey, is to provide education and information. That information can come from text messages, as in New Zealand or Kenya, or it can come when individuals directly ask doctors questions about their specific health concerns using web-based services like HealthTap, an interactive portal allowing patients to ask doctors about their concerns. As long as they have mobile-phone reception, people all over the world can now access basic medical knowledge—in many places before they even have running water, says Ron Gutman, founder and CEO of HealthTap.

But education and information just scratch the surface of what mobile health can achieve. Five years from now, only 11% of respondents in the EIU survey see education as the primary role for mobile technology. Rather, they see the top three benefits as “enabling patients to participate proactively in their care” (50%), “reducing the cost of healthcare delivery” (50%) and “improving personal awareness through self-monitoring” (29%). The shift towards empowering patients is already under way. “Consumers are really driving the process by capturing their own data,” Dr Topol explains.

The first step in giving people more information about their own health has been the development of devices, such as the Fitbit and Apple Watch, and apps like Strava, which track activity level, heart rate, sleep quality and other measures. Such

devices have even made news in Washington, DC, where House Speaker John Boehner and other members of Congress use them to count their daily steps.

The next step is a bigger one: the creation of mobile medical devices that collect data and can take the place of, or complement, equipment now used in hospitals, doctors’ offices and laboratories. The list already includes mobile ultrasound machines from GE Healthcare and, from start-up AliveCor, a \$199 device that attaches to a smartphone to measure heart rhythms. Many more devices, including wearable sensors and monitors, are coming from dozens of other companies. Working with research centres like *imec* in Belgium and 19 other companies, Samsung has launched a major digital health initiative to develop sensors for monitoring blood pressure, glucose levels and other vital signs. The electronics company plans to validate those devices in clinical settings through a partnership with the University of California, San Francisco. “This is a very exciting time,” says Samsung’s Mr Sohn. With continuous monitoring of all the body’s vital signs, he suggests, “we will learn much more about health”.

Moreover, mobile devices may do much more than just chart vital signs—they can also perform lab tests and spot diseases. “We will be able to do blood tests, saliva tests, sweat and breath tests though a smart phone,” says Dr Topol.

Some of the technology on the horizon seems to leap from the pages of science fiction. The

Which of the following are currently the most common functions of mobile health technologies in general?

Please select the top two.

(% respondents)

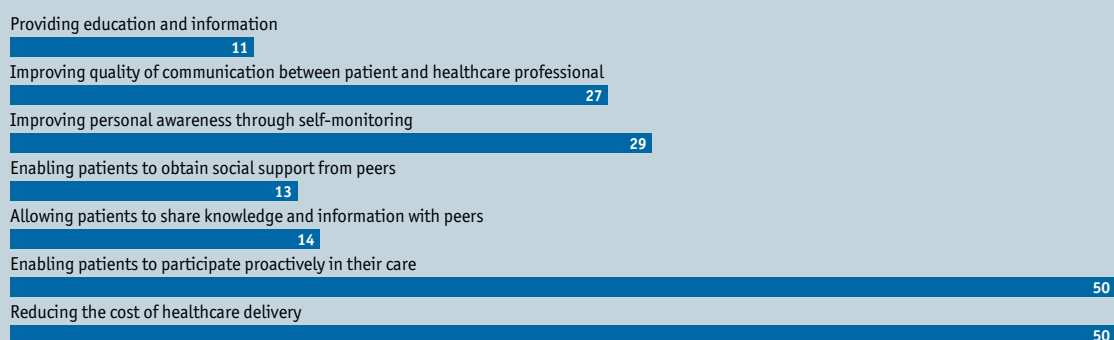


Source: Economist Intelligence Unit survey, September 2014.

Which of the following will be the most common functions five years from now?

Please select the top two.

(% respondents)



Source: Economist Intelligence Unit survey, September 2014.

With continuous monitoring of all the body's vital signs, Mr Sohn suggests, "we will learn much more about health".

Qualcomm Tricorder X Prize, for instance, will give \$10m to a company that can make a hand-held device, similar to the tricorder in *Star Trek*, capable of monitoring vital signs and diagnosing 15 diseases, including tuberculosis, stroke, melanoma and strep throat. Ten promising finalists were selected in August 2014.

In developing countries, these mobile technologies could allow health agencies to leapfrog having to put in place the traditional infrastructure built by the developed world (at great cost), just as nations have avoided having to build a landline phone network because of mobile phones.

Mobile health can also be combined with another growing field, big data. "We want to use the 5bn cell phones to collect the heartbeat of every person in the world," said Dr Leslie Saxon,

chief of the Division of Cardiovascular Medicine and executive director of the Center for Body Computing at the University of Southern California, in a recent TED talk. Researchers and pharmaceutical companies could mine such information for new clues about heart disease and what treatments work best. It could also be used to tailor treatments to individual patients, in what is known as "personalised medicine".

Big data also allows connections to be made between different types of information. In Kenya, for instance, many people use mobile banking. Health authorities could track when people get paid—and then send reminders to buy medicine. Or those travelling to areas with malaria outbreaks might receive text messages to remind them to take prophylactic drugs.

Patients, too, could tap into a growing reserve

Patients, too, could tap into a growing reserve of data.

of data. Apps that provide statistics about a doctor's bypass operation track record or a hospital's rate of hospital-acquired infections could help people make more informed choices about what healthcare providers to use. "You can envision a Yelp for healthcare, with actual data," says Mr McCray.

Finally, mobile health may intersect with another major industry, the game industry. Competitions and other aspects of games can be powerful motivators to change behaviour. One app,

for instance, adds spice—and motivation—to daily runs by suggesting that zombies are chasing the runner. "It is a very clever idea, taking what you like to do, such as walk or run, and adding reinforcement," says Paul Cummings, senior fellow at ICF International and lead author of a new report, *Gaming to Engage the Healthcare Consumer*. Games have been used, with some success, to treat serious conditions like PTSD. In the long term, Mr Cummings believes, "well-designed games can help improve both physical and emotional health." ■

5

Power to the patient

Connected health has the potential to profoundly reshape the healthcare and life sciences industries, creating many new opportunities but also threatening entrenched interests.

If mobile devices enable people to monitor their vital signs, conduct tests, diagnose diseases at home and communicate remotely with their doctors, then much of the current health infrastructure in developed countries becomes potentially unnecessary. At the very least, such a shift would remove pressure from overloaded hospitals and clinics. Meanwhile, the need for routine doctor visits plunges. Hospitals might be needed only for the acutely ill and for operations or emergencies or even, as Scripps's Dr Topol suggests, be "on their way out over time". Better monitoring and care might also eliminate the need for many drug prescriptions, cutting into the bottom line for pharmaceutical companies.

The nature of relationships between patients and physicians, or between patients and the laboratories and hospitals that serve them, could also change. The word used most frequently by mobile health experts is "empowerment". With far more access to data and information, patients will have the ability take greater charge of their own health. For instance, routine lab results, along with information about what those results mean, could go directly to patients instead of being sent first to doctors. Patients would also have ready access to

professional advice when they need it, as in the Arizona telemedicine case study, instead of having to visit the hospital or to wait for a doctor's appointment. And more of healthcare would tilt from reactive—treating diseases when they emerge—to proactive, preventing disease before it occurs. For instance, USC's Dr Saxon envisions drawing on mobile phone users' heartbeats to spot the very first signs of cardiac problems.

Meanwhile, mobile health technologies can boost the efficiency of administering healthcare and help scientists, pharmaceutical and medical device companies and hospitals work better together. The vast amounts of data collected from patients, along with information about the outcomes of various treatments and procedures, will make clearer what works and what doesn't—eliminating unnecessary care and saving many of the dollars currently wasted in the healthcare system.

That's why many experts interviewed for this report, along with 50% of the EIU survey respondents, predict that mobile health can slash spending on healthcare in the US and other developed countries. "Ultimately, the biggest impact is lowering the cost of healthcare overall," says Dr Topol. And in the developing world, he adds, "Wherever there is a mobile signal, there is the capability for delivering better healthcare". ■

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”

Eric J. Topol,
director of the Scripps
Translational Science
Institute.

6

Challenges, problems, pitfalls

The path to a mobile future in healthcare will not be smooth. The biggest challenge is finding viable business models for the new devices, services and connections. The business case is strongest when the agency or organisation that pays for mobile health technology is able to reap potential savings. In New Zealand, with its national healthcare system, “implementing smoking cessation is pretty much a no-brainer,” says Dr Whittaker. “We know it is one of the most cost-effective services in general, and text messaging is even cheaper. It does save money in the long run.”

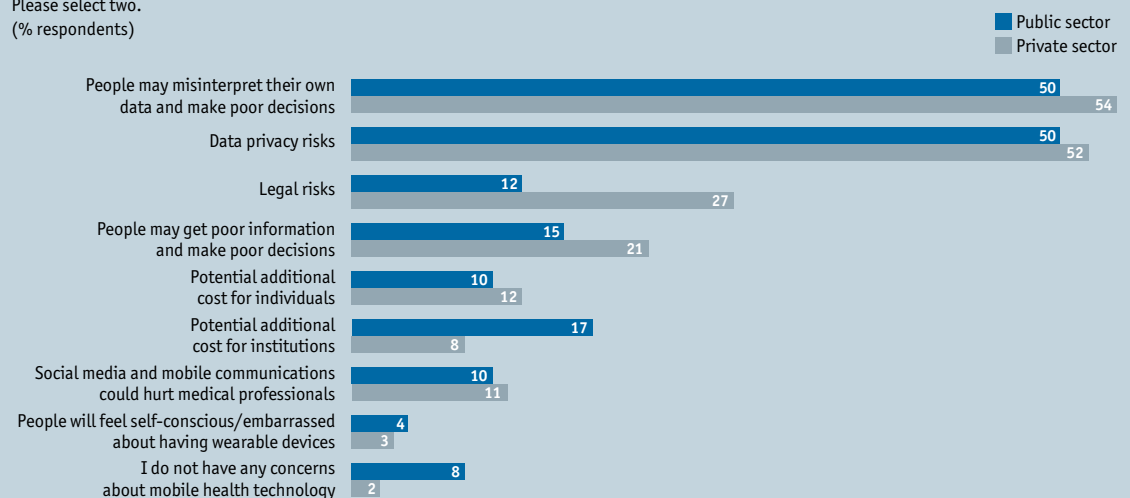
In other situations, however, the savings do not necessarily return directly to those who would foot the bill for mobile health technologies. That’s why

mobile health experiments in Africa and the rest of the developing world often stop when the grants that funded them run out, says Ampath’s Dr Were. This problem is most acute in fee-for-service healthcare systems like that of the US, where mobile health may take money out of the pockets of hospitals, doctors, lab-testing companies and pharmaceutical firms. In fact, 19% of EIU survey respondents in the US saw no viable revenue stream at all.

So what are possible business models? The top two in the EIU survey are selling health services (cited by 41% of respondents) and selling subscriptions to premium content and advice (38%). Another idea is to sell the data collected.

What is your biggest concern regarding mobile health?

Please select two.
(% respondents)



Source: Economist Intelligence Unit survey, September 2014.

Nearly half (49%) of the EIU survey respondents think consumer wariness about privacy violations would be a barrier to the adoption of m-health, and half (51%) say data-privacy risks are their biggest concern.

The pharmaceutical firm AstraZeneca is helping to fund Ampath's HIV control efforts in Kenya, for instance, in exchange for data that it can use in drug development. In addition, many companies developing mobile technologies, such as Samsung, plan to sell them directly to consumers, along with providing services that use the data. When the value of the technology in improving health outcomes is proven, insurers may be willing to pick up the tab, Samsung's Mr Sohn suggests.

The second major challenge is technical. Is it possible to ensure that people's health data are kept secure? Nearly half (49%) of the EIU survey respondents think consumer wariness about privacy violations would be a barrier to the adoption of m-health, and half (51%) say data-privacy risks are their biggest concern. The worries

are real and justified, but solutions can be found. In Ampath's project in Kenya, "it took us five years to get to the point where we feel comfortable and we are continuously improving the security features within our applications", says Dr Were. Key steps include encrypting all data and being able to remotely wipe smartphones clean if lost or stolen.

Beyond these challenges are other, different issues. Fifty-three percent of executives fear that "people may misinterpret their data and make poor decisions". In addition, companies worry that regulators will struggle to keep up with the fast pace of technological innovation, leading to long delays before new devices are approved. In the developing world, people tend to use pre-paid phones and switch numbers frequently, making it harder to reach them reliably by text or email. ■

7

Conclusion: The path forward

The EIU survey indicates that mobile technologies have the capacity to transform healthcare. New devices and services will allow people to be more proactive in taking care of their health and in assuring their well-being, especially in Europe and North America. These technologies promise to improve outcomes and cut costs, while also improving the efficiency of the healthcare industry. They can help bring quality care to people anywhere in the world and make it easier to deny deadly epidemics the chance to get a foothold.

Ironically, though, integrating new mobile devices and services into healthcare may be easiest in parts of the developing world, where people are currently underserved. In the developed world, progress will require changing cultures and entrenched practices. Institutional conservatism is a big problem say 44% of the EIU survey respondents.

Given these challenges, how is this mobile health revolution likely to gain momentum? "I think the drivers will be people like you and me—the consumers," says Samsung's Mr Sohn. Once people see health benefits from devices that keep watch on their blood pressure, heart rhythms,

activity levels and other key measures, they will be willing to pay from them out of their own pocket, Mr Sohn and others suggest.

Another push for mobile health may come from employers hoping to reduce employee healthcare costs. Mobile technologies offer a logical extension of the wellness programmes many companies have already launched. When the benefits emerge, insurance companies may change their reimbursement policies to encourage the use of these technologies. Why should an insurer pay for an expensive ECG or ultrasound in a hospital, or for a visit to a doctor's office, if cheaper mobile devices and remote consultations work just as well?

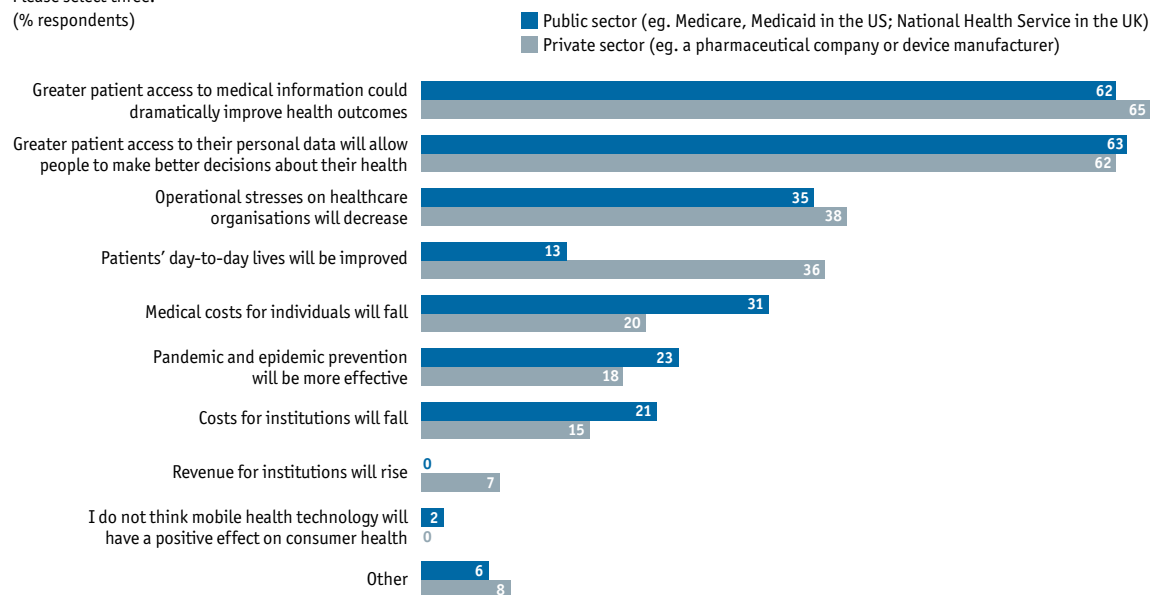
In the future of mobile health, success will go to pioneers with the most innovative ideas, devices, services and business models. So it's no surprise that the opportunities have triggered an explosion of interest and investment in mobile health everywhere from global public health agencies and research universities to telecom giants and Silicon Valley start-ups. For investing in mobile health, "now is the right time", says Mr Sohn. "Five years ago, it was too early. Five years from now, it will be too late." ■

Appendix: survey results

Percentages may not add to 100% owing to rounding or the ability of respondents to choose multiple responses.

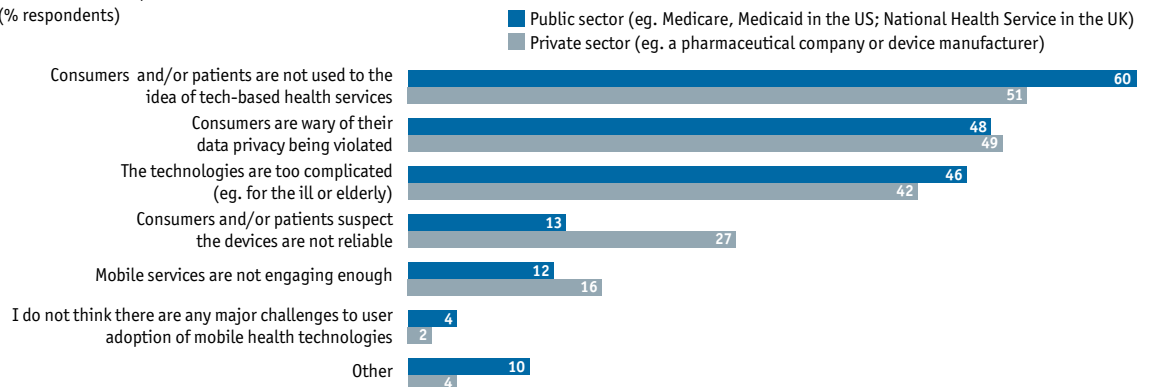
What do you think will be the most positive outcome of mobile health technologies?

Please select three.
(% respondents)



Which of the following do you think are currently the biggest challenges for user adoption of mobile health technologies?

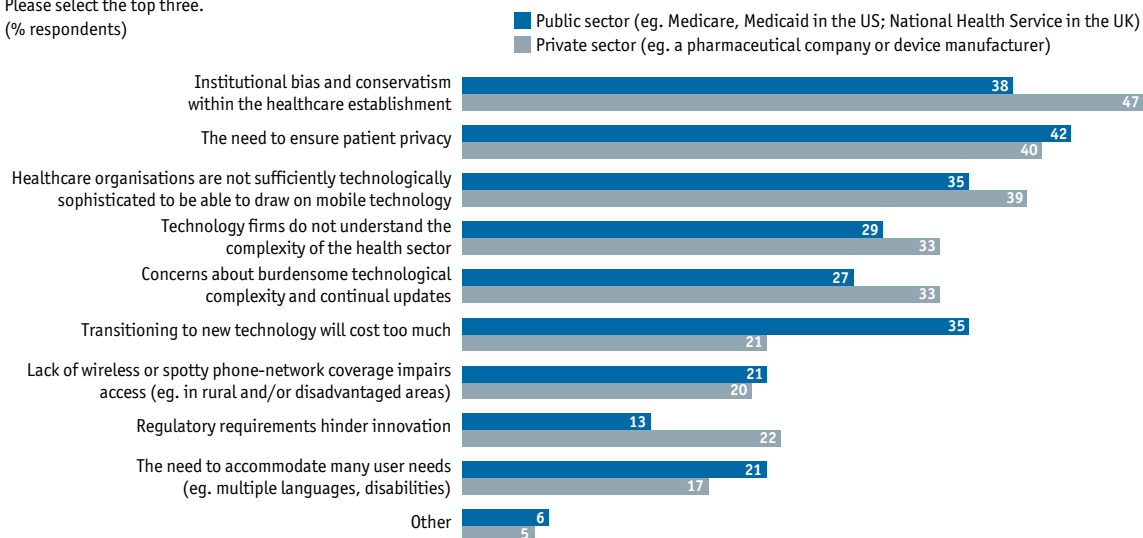
Please select the top two.
(% respondents)



Which of the following do you think are currently the biggest challenges for health industry adoption (eg. by hospitals, doctors or pharmaceutical firms) of mobile health technologies?

Please select the top three.

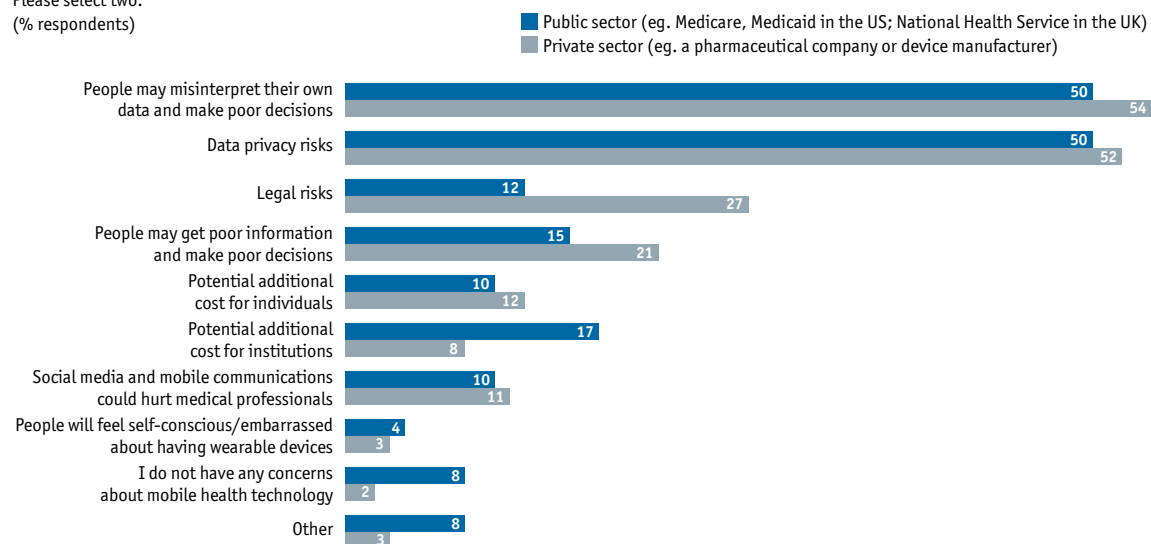
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What is your biggest concern regarding mobile health?

Please select two.

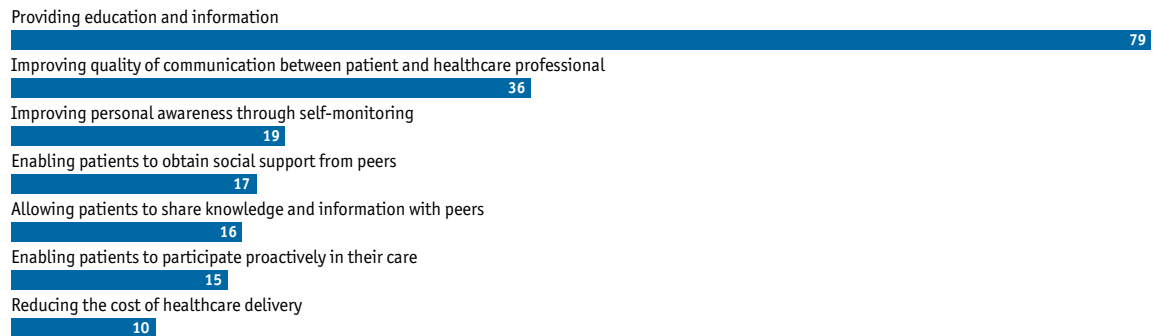
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Which of the following are currently the most common functions of mobile health technologies in general?

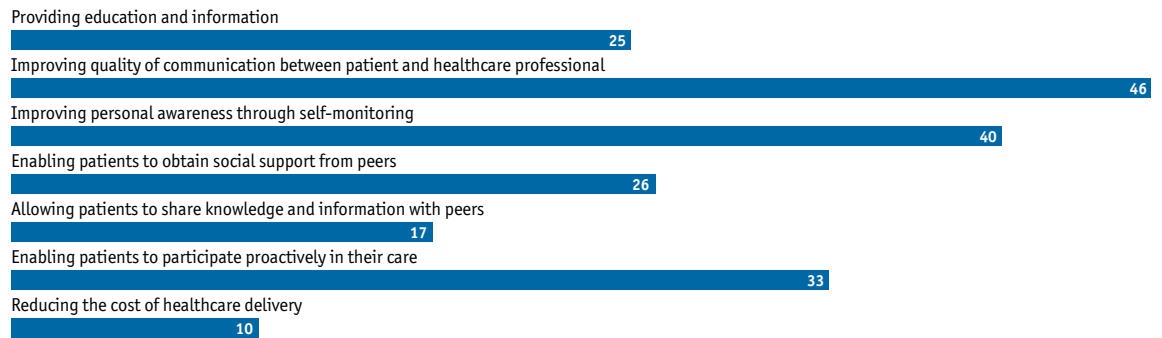
Please select the top two.

(% respondents)

**Which of the following will be the most common functions three years from now?**

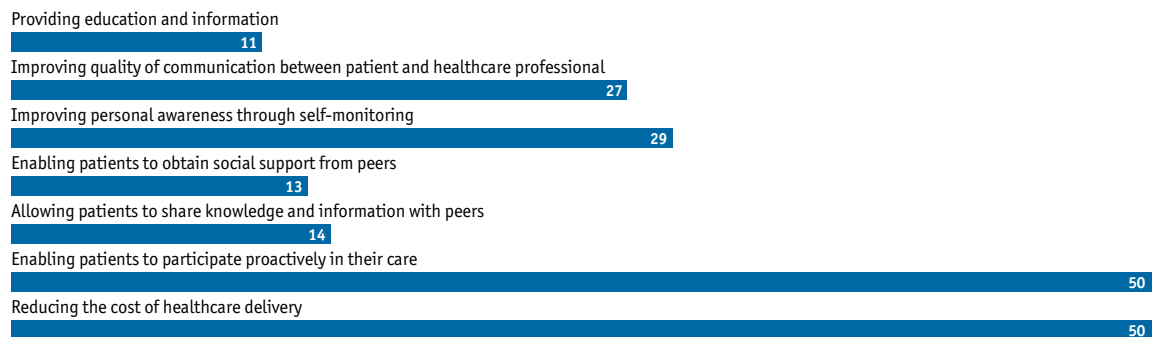
Please select the top two.

(% respondents)

**Which of the following will be the most common functions five years from now?**

Please select the top two.

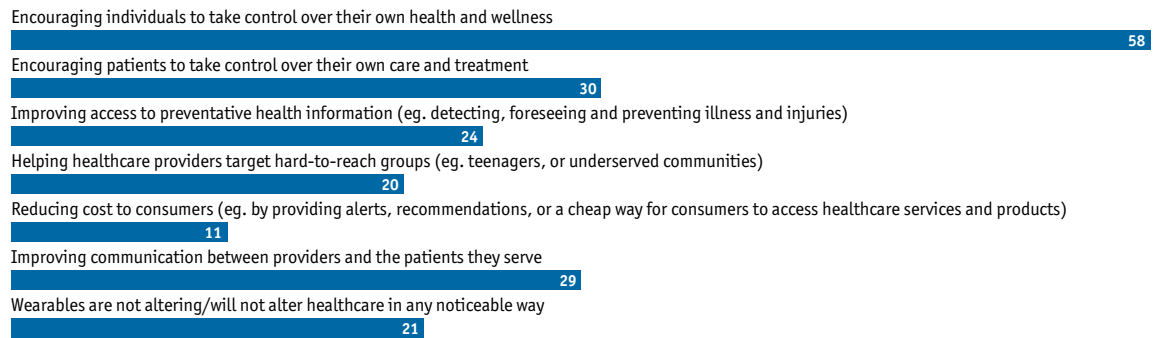
(% respondents)



How are wearable technologies on mobile platforms changing the relationship of individuals to their health now?

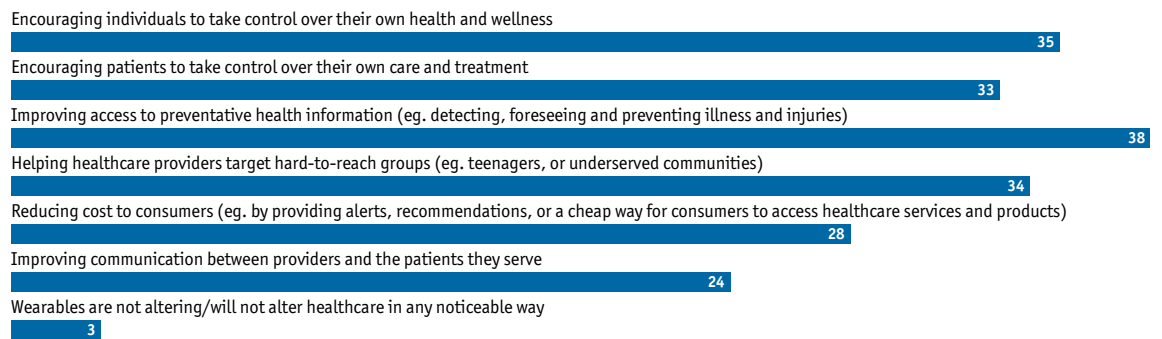
Please select the top two.

(% respondents)

**How will wearable technologies on mobile platforms be changing the relationship of individuals to their health three years from now?**

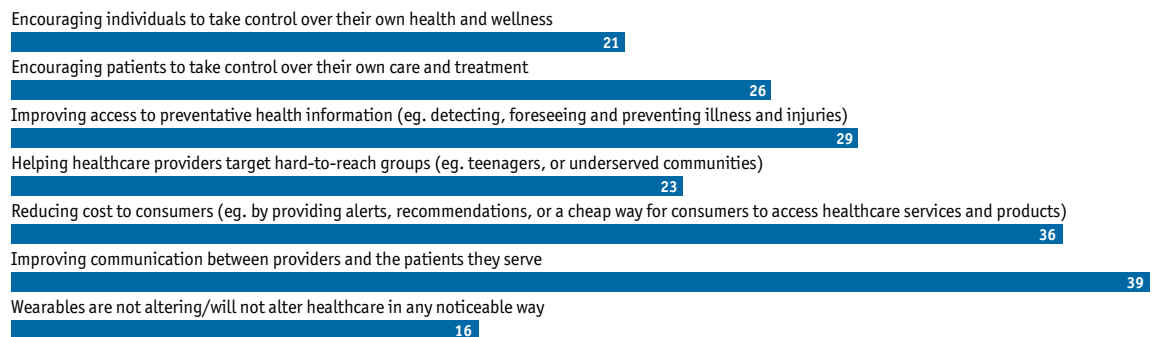
Please select the top two.

(% respondents)

**How will wearable technologies on mobile platforms be changing the relationship of individuals to their health five years from now?**

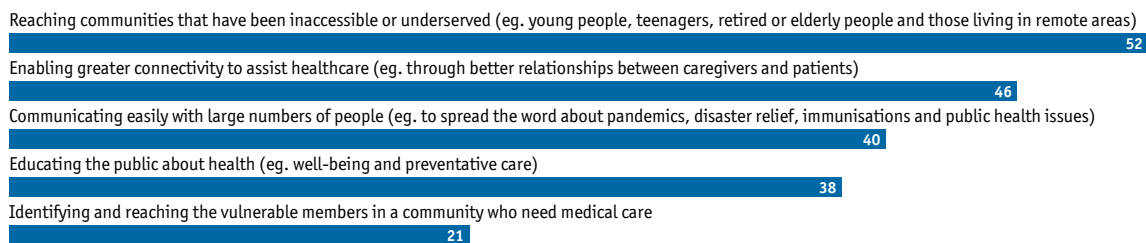
Please select the top two.

(% respondents)



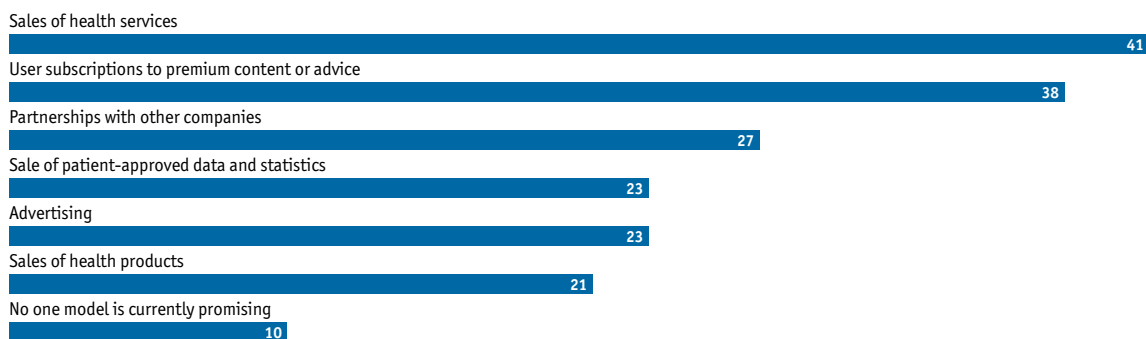
Please select the top two most promising roles for mobile phone technology over the next 5 years.

(% respondents)



Please select the top two most promising revenue models supporting mobile health technology over the next 5 years

(% respondents)



Which mobile features can customers, or citizens, currently use?

Please select all that apply.

Mobile feature

(% respondents)



Which mobile features does your organisation expect to support three years from now?

Please select all that apply.

Mobile feature

(% respondents)

**Which mobile features does your organisation expect to support five years from now?**

Please select all that apply.

Mobile feature

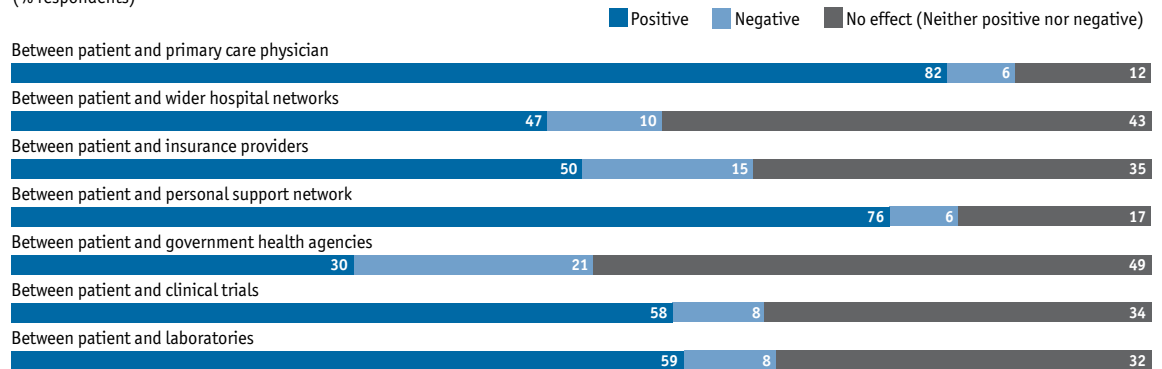
(% respondents)



To what extent do you believe mobile technologies currently have a positive or negative effect on the following types of patient communications?

Please select one in each row.

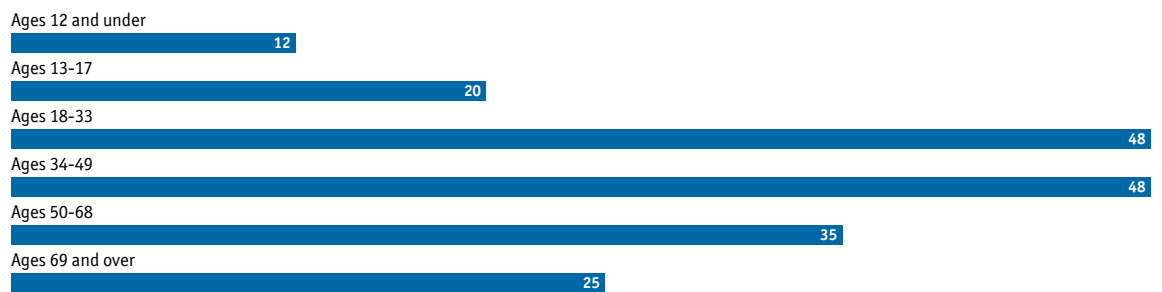
(% respondents)



Which age demographics are currently the most important audience for mobile health?

Please select the top two.

(% respondents)



Which age demographics will be the most important three years from now?

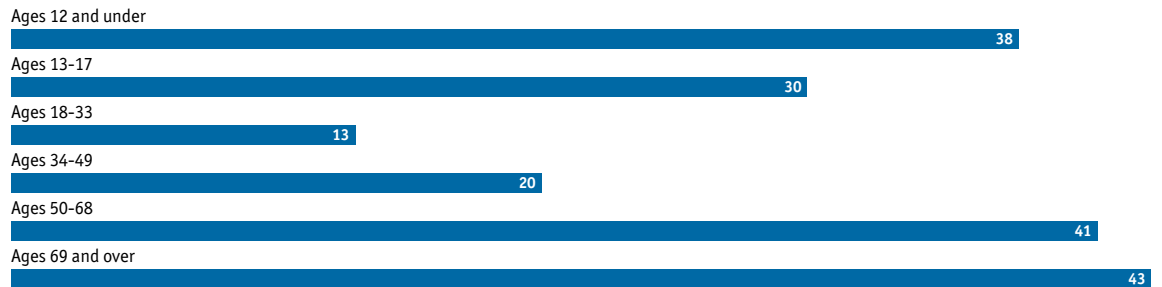
Please select the top two.

(% respondents)

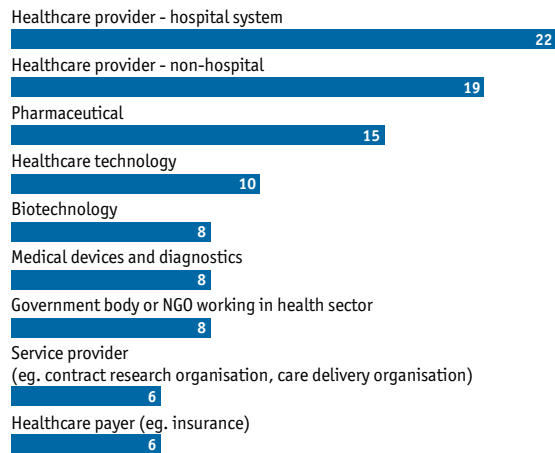


Which age demographics will be the most important five years from now?

Please select the top two.
(% respondents)

**What is your primary industry?**

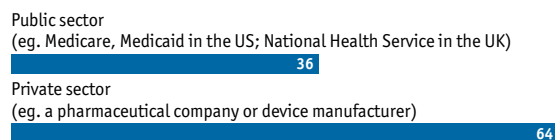
(% respondents)

**Are you familiar with mobile technology trends in healthcare?**

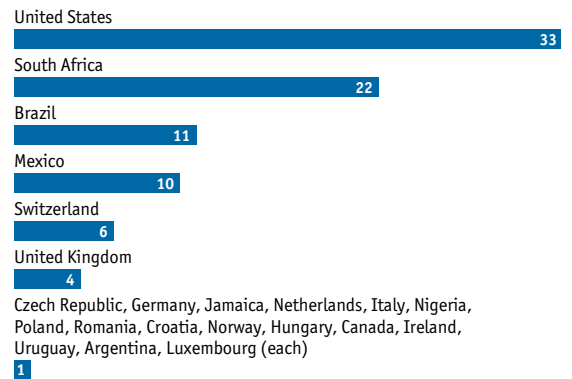
(% respondents)

**Is your organisation:**

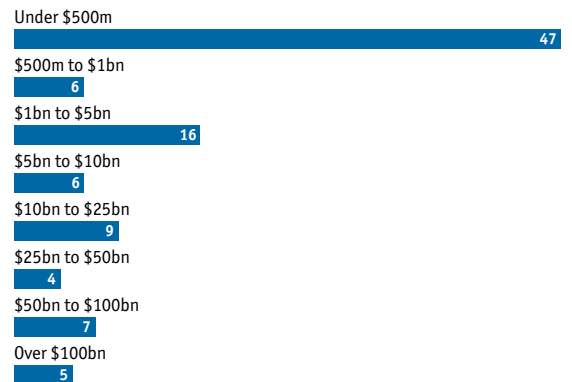
(% respondents)

**In which country are you personally based?**

(% respondents)

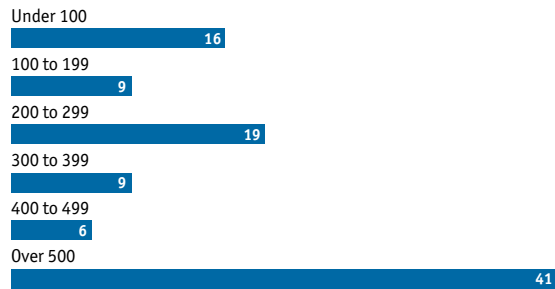
**What are your organisation's global annual revenues in US dollars?**

(% respondents)



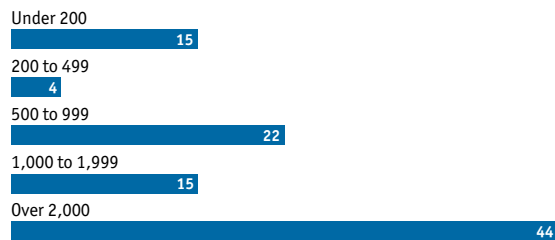
What is the approximate number of beds in your facilities?

(% respondents)



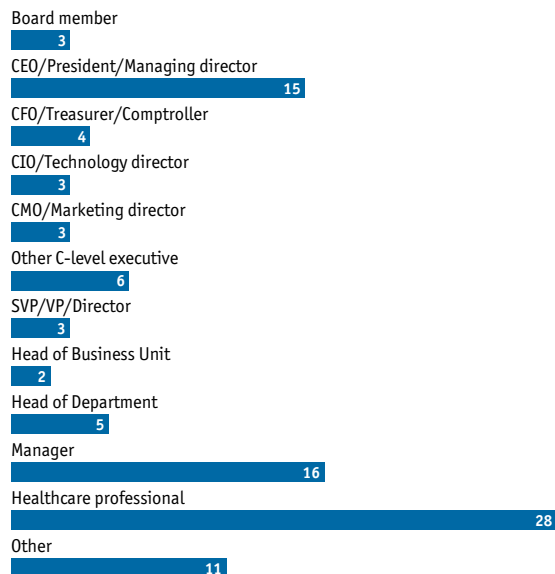
What is the approximate number of patients served annually?

(% respondents)



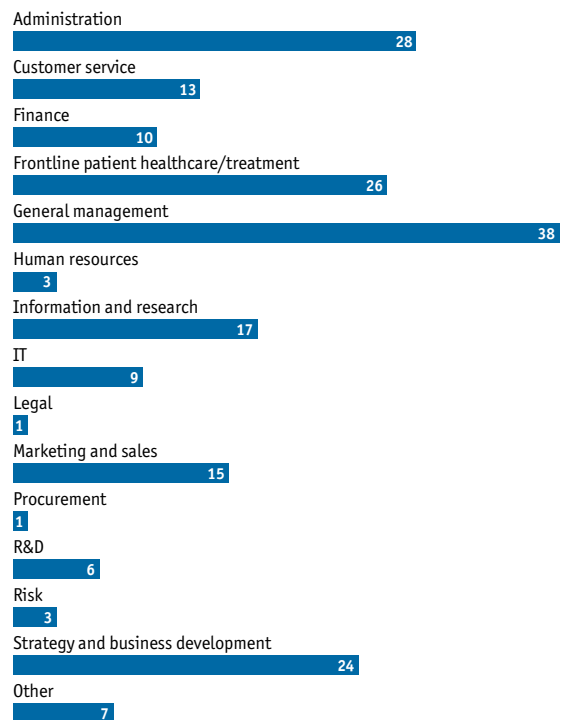
Which of the following best describes your title?

(% respondents)



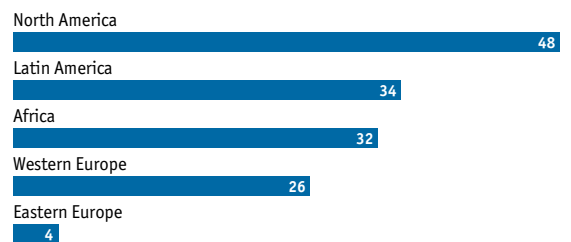
What are your main functional roles?

Please select no more than three.
(% respondents)



Embedded data field: region

(Number of respondents)



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