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PATH

eHealth, mHealth, reproductive health

The rapid increase in access to new information technologies over the past two decades—computers and mobile phones in particular—has stimulated a flood of creative approaches to harnessing these tools to address reproductive health challenges, including consumer behavior change, patient support, staff training, and management information and logistics systems. Because of the lack of "older" communications infrastructure in low-resource areas, well-designed eHealth interventions (see definitions on page 2) could potentially have a much greater impact there than in developed areas with functioning phone landlines and cable modems.[1]

In some countries, even health workers in remote settings are able to receive, and submit, relevant data, text, photos, and videos in real time and on demand. A nurse in rural Kenya can consult with a specialist in the capital regarding a difficult case, using voice, text, and photo messages. A contraceptive storekeeper in a remote corner of Uganda can order supplies from headquarters much more efficiently than in times past, and thereby reduce stock-outs. And teens in Thailand can connect with peers through a social marketing site specifically designed to support safer sex and reduce infection with HIV and other sexually transmitted infections (STIs).

In 2003 the World Health Assembly passed a resolution urging member states to endorse eHealth to strengthen health systems.[2] And in 2009 the mHealth Alliance was created, with founding partners the United Nations Foundation, the Rockefeller Foundation, the Vodafone Foundation (later joined by the GSMA, an international mobile phone policy and technical group), the US President's Emergency Plan for AIDS Relief (PEPFAR), Hewlett Packard, and the Norwegian Agency for Development Cooperation (NORAD), to "harness the power of wireless technologies to improve health outcomes in low- and middle-income countries."[3] The Alliance has worked in close collaboration with the US Agency for International Development (USAID), the Innovation Working Group (supported by NORAD), and others to organize global competitions seeking innovative mHealth concepts; look at linkages between mHealth and mFinance (using phones for savings, payment, and loan systems often in places where access to physical banks is limited); and connect private- and public-sector partners for new collaborative efforts.

All of this technology can be seductive, and intuitively feels useful. But how much do we know about the real impact of these eHealth initiatives? What advantages do they offer that are not available through more traditional, and proven, channels? What challenges do they present to already-stressed reproductive health programs in terms of budgets, system redesign and change management, training needs, the supply and resupply of relatively expensive (and not very robust) equipment, and coordination among diverse initiatives that all seek to support the same community reproductive health worker?

Perhaps an easier question to answer is who actually uses, or has access to, the tools needed for eHealth. Health workers and managers often have access to online services through their offices, and in the

The "e-lexicon"

A number of terms have been coined to describe systems using these new tools, and the terminology can be confusing.

eHealth, according to The World Health Organization and the International Telecommunication Union, "is concerned with improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems."[4] In this document, eHealth is used synonymously with the common phrases "information and communication technologies" and "health information technology."

mHealth (mobile health) can be thought of as a subset of eHealth, focusing on the use of mobile phones (both simpler phones capable only of voice and text message communication and smartphones with many other capabilities, including access to websites and application software known as "apps"). The distinction between phones and computers blur in the case of smartphones and tablets configured to connect with wireless phone networks.

eLearning and **mLearning** are concerned primarily with training and education initiatives. They also are subsets of eHealth and can be implemented on computers, tablets, or phones.

developing world the bulk of eHealth interventions are created for professional staff. City dwellers may have better broadband computer access than those in rural areas. In the community, young people tend to be more knowledgeable and comfortable with computers and other technologies, and many of them have access to mobile phones, especially in Asia and Latin America. Fewer adult women own phones than men—by some estimates women in low- and middle-income countries are as much as 21 percent less likely to be phone subscribers and also tend to be less familiar with electronic technologies.[5] The very poor—male or female—also are unlikely to own a phone or have online access.

Yet these same individuals may be most likely to benefit from reproductive health support, so some programs are seeking to develop lower-cost public or nongovernmental organization (NGO)-based systems. Those organizations are struggling with issues of planning, introducing, and supporting eHealth solutions at scale. As PEPFAR and USAID stated in a 2011 paper on information and communication technology (ICT) and family planning, "Existing ICT—particularly mobile technologies—have the capacity to improve access to family planning and reproductive health information and services for women, men, and youth, with the ultimate potential to better both their health status and their quality of life."[6]

This issue of *Outlook* explores the promise, and current realities, of new information technologies in service to reproductive health programming in low-resource settings (including HIV/AIDS prevention and treatment, and maternal and child health interventions). The issue examines the strengths, costs, and vulnerabilities of new approaches, including compared to more traditional approaches; reviews the scant evaluation literature; and looks to the future in terms of current needs and potential solutions.

Diverse options for eHealth implementation

eHealth

As the broadest category, eHealth can include web and interactive products on computers, personal digital assistants (PDAs), phones, and tablets. It also includes television, radio, and landline phones, though this issue of *Outlook* focuses on newer media, not more traditional communication tools. New eHealth products show impressive variety; for example, online reproductive health resource libraries (such as the Knowledge for Health, or K4Health.org, website[7]), "serious video games" (designed for solving problems) and other interactive television products, Facebook or Twitter sites, and organizational data entry portals.

eHealth systems can offer many benefits:

- Data collection and analysis can become faster, more accurate, and more cost-effective.
- Digital files are easy to share, search, store, and file.
- Computers and smartphones are not limited only to voice and text, but also may offer audio and video to mitigate literacy issues and to "bring abstract ideas like family planning to life."[8]
- It is relatively easy to create content in both printable and screen-friendly formats.
- eHealth can help break down resistance to discussing sensitive or private topics. An evaluation involving counselors who used PATH's RiskAdvisor software while talking about HIV/AIDS risk reduction with clients in the Philippines found that both clients and the counselors appreciated being able to read short descriptions of sexual practices on a computer screen, instead of naming them out loud, even though both parties were sitting next to one another, looking at the same screen. Counselors reported covering important sex practices that they said they might have skipped over without the computer.[9]
- Agencies can save the cost of printing and distributing documents and forms.
- Online content is inexpensive to update compared with paper-based information—the latest information can be offered across the globe very rapidly.

eHealth approaches also come with unique requirements for implementation. Decisions around whether to use eHealth instead of conventional mechanisms should take account of the following:

- Many eHealth systems rely on computers and operators capable of using the software; they also require

general technical support for the computer and programming support to design, or adapt, computer code.
- These systems need reliable, clean electrical power, either to run a computer or to charge a mobile phone or tablet.
- Users often lack connections to the Internet, and even when they have access many still struggle with low bandwidth (an inability to move large files or watch streaming videos) or unaffordable costs.
- Much eHealth work is textual and requires some level of literacy.
- eHealth formats do not diminish the need to "manually" create language and culturally appropriate versions of materials.
- It can be expensive and time-consuming to create a variety of multimedia and interactive content.
- Some projects prefer to store or back up data on stand-alone computers rather than use web-based data entry and storage on servers or via cloud computing. The global Health Information System Programme[10] now insists on more secure storage after Nigeria lost data when the power failed and thousands of text messages were automatically deleted.[11]
- Beneficiaries obviously need internet access. Only about 23 percent of households in the developing world have computers[12] and only about 11 percent of the population in Africa uses the Internet.[13]

mHealth

mHealth expands on the strengths of eHealth through use of SMS (text)-capable phones, smartphones, and tablets with phone accounts. According to the World Health Organization there are more than 5 billion wireless phone subscribers worldwide, and more than 70 percent of them live in low- and middle-income countries. Furthermore, commercial wireless signals cover more than 85 percent of the global population, providing even greater reach than the electrical grid.[5]

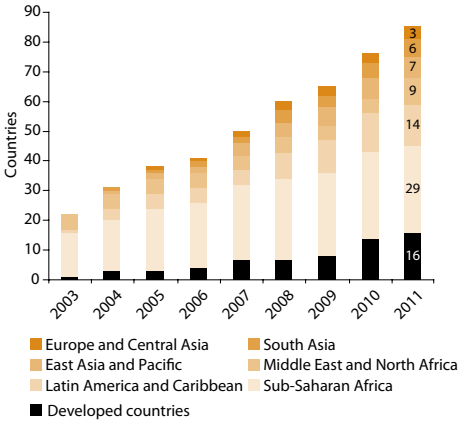
More than 500 projects involving mHealth have been implemented around the world[14]—but some view this proliferation as a problem (see Challenges for eHealth and mHealth, page 6). See Figure 1 for information on the geographic spread of such projects.

In addition to many of the strengths of eHealth documented above, mHealth initiatives also can store and refer to information preloaded on the phones or downloaded to them. For older phones the data would be text only, but as sophisticated smartphones and tablets become more common, they can be used to also show images, play audio and video, and run software such as the Hesperian Foundation's free "Safe Pregnancy and Birth" application, which reformats key messages and pictures from their print publications to a searchable, smartphone-friendly design.[15]

Another advantage is that mobile devices can continue to function during electrical brownouts and blackouts, at least until they need to be recharged.

Naturally there are specific requirements for mHealth strategies. Phones require sustainable and affordable agreements with telecommunication providers—the costs of such plans can change at any time. Older phones lack interoperability, meaning that software designed for a Nokia phone, for example, may not run on a Motorola phone. To some extent that problem is lessened with smartphones and tablets which tend to be designed to run on an Apple, Android, or Microsoft platform, but having to program for three different systems still remains a burden for software developers and a conundrum for planners—which equipment should they choose? Finally, while computers often remain securely locked in an office (or carefully stowed in a laptop bag), phones generally have a more difficult life—they are thrown into pockets with keys and coins, left in hot cars, or sometimes get wet. If broken, mobile devices usually cannot be repaired, or they have to be sent to the capital for repair, causing immediate challenges of cost and resupply if the health system depends on all staff having constant access to a working phone.

Figure 1. Number of countries with at least one mHealth deployment, by World Bank region.



World Bank. 2012. *Information and Communications for Development 2012: Maximizing Mobile.* Washington, DC: World Bank.

eLearning and mLearning

From early on, eHealth initiatives were adapted for the dissemination of information, including for distance education and training. Both systems offer "training on demand"—courses available 24 hours a day and seven days a week, when the Internet is functioning—so that health workers can learn at their convenience and can access information when they need it. eLearning can reach many trainees simultaneously and at a much lower cost than traditional classroom training. Online courses allow for the integration of interactive modules and can easily collate and analyze trainee quiz results (though it may not be possible to ensure that the people answering the questions are indeed who they claim to be).

In addition to not knowing who really is sitting at the keyboard, eLearning suffers from some unique challenges. Studies have shown that in some situations virtual training (when the student is not interacting with the teacher in real time) may not have the same impact as live interaction with a trainer and other trainees, as happens in a classroom.[16,17] This becomes more of a problem with certain training topics than with others. For example, it probably would not be appropriate to attempt to train a nurse to insert intrauterine devices using only a virtual connection and without live, expert supervision. However, training the

Building on a Strong Mobile Network in Africa

The Uganda Health Information Network (UHIN), inaugurated in 2003, began by preloading solar-powered personal digital assistants with a mobile, clinical library that included information about reproductive health and HIV/AIDS.

Over the following decade their mandate expanded, in part because Uganda has one of the most robust mobile phone systems in Africa.[5] Taking advantage of what already existed, the UHIN created SMS functionality in their phones aimed at gathering data for public health monitoring, reporting, and logistical purposes (e.g., collecting monthly reports, disease surveillance data, and drug and contraceptive usage and stock information), facilitating email among health workers, and providing two-way communication between providers and their managers.

In 2010 a seven-year evaluation of the UHIN demonstrated that it had reduced the cost of managing health information by 25 percent compared to "cumbersome paper-based manual systems that are delay-prone, less reliable, and in some cases incomplete."[18]

Dr. Eddie Mukooyo, of the Uganda Ministry, noted that "the network provided the Ministry of Health with an efficient and cost-effective way of fulfilling its mandate to deliver quality health services to the population of the districts." Due to this success, the Uganda MOH is incorporating UHIN processes into its new, comprehensive strategy for a national health information system.

same nurse to complete a new form, or providing the latest information on new programs, might be appropriate for eLearning, especially if the trainee is able to submit questions and receive answers with minimum delay.

Furthermore, when training focuses on stigmatized topic areas (such as safe abortion or youth sexual health), face-to-face dialogue with trainers and peers may be the best way to assess the students' attitudes and overcome those prejudices.

How eHealth can improve reproductive health services

PEPFAR and USAID posit that ICTs can advance results for all of the Millenium Development Goals (MDGs). "In particular, ICT applications used for family planning/reproductive health efforts are critical for moving ahead on MDG 3 (promote gender equality and empower women), MDG 4 (reduce child mortality), MDG 5 (improve maternal health), and MDG 6 (combat HIV/AIDS, malaria, and other diseases)."[5]

More specifically, the authors suggest that eHealth has the potential to enhance reproductive health services in several key arenas as discussed below.

Training staff

Addressing the reproductive health training and professional development needs of doctors, nurses, midwives, paramedical, and administrative staff can be facilitated through eHealth in a number of ways. For example, clinical decision support can be provided either using real-time expert consultation at a distance or through access to high-quality reference materials or other resources. A PATH project in India provides on-demand guidance on post-natal and newborn care for midwives in rural India through SMS services.[19] In Mali, IntraHealth International and SpacedEd.com are developing an in-service course on postpartum family planning and a program for monitoring family planning protocols for community health workers. The course will deliver training via SMS and interactive voice response on mobile phones.[5] These projects share a few common goals: to make health worker training more accessible (especially in more remote regions), to ensure that health workers receive up-to-date information, and to reduce the cost of staff training and retraining.

eHealth also can be useful for strengthening human resource management functions such as hiring, deployment, and staff orientation. A tool called iHRIS Manage helps managers—including reproductive health program managers—assess human resource issues and functions, and plan and evaluate appropriate responses. iHRIS Manage was designed primarily for use within a national ministry of health (MOH), a hospital, or other large health care organization, but it can also be used by private service providers, such as reproductive health-focused NGOs, and can be adapted to other settings. The software is already showing results in Kenya and Uganda, helping manage the workforce more efficiently and reducing costs and data errors.[20,5]

Communicating effectively

Correct and consistent use of contraceptives and sustained adherence to STI and HIV treatment protocols depends in large part on clients having accurate information, appropriate skills (such as how to use a condom), and support systems for reinforcing healthy behaviors (e.g., supportive staff and community groups). From the early days of eHealth, planners have looked for ways to use the new tools for dissemination of accurate, timely information to a wide variety of audiences and for creating support communities. Sometimes information is simply offered for download from a website, while some interactive systems allow users to submit questions and receive expert responses, attend lectures remotely and at their convenience, or engage in online chatting with experts and peers.[21]

As mHealth has expanded, so have opportunities for interactivity in real time. "CycleTel" in India is an interesting example of how a traditional reproductive health tool has been

adapted for the digital age. For many years women have been tracking their fertility with a product called Cycle Beads® (a physical string of beads). The Institute for Reproductive Health at Georgetown University created an mHealth version called CycleTel. Women subscribe to CycleTel through SMS on the first day of their menses, after which they receive daily follow-up text messages on their fertility status. Users also are able to receive text messages on other family planning and reproductive health methods, STI/HIV prevention, and condom use.

An example of community-building through eHealth can be seen in Thailand where PATH is developing a chatroom application for real-time interaction with trained health care experts and other patients concerned about sexual and reproductive health issues. The team is also developing an HIV risk self-screening application for Apple and Android smartphones. Users with identified risk factors will be linked to websites for available services.[22]

Many sexual and reproductive health services are outpatient-based. The Health Management and Research Institute of Hyderabad, India, responds to such needs by offering "104 Advice," a phone center that has served more than 10 million callers in Andhra Pradesh and three other states. For families who live in areas where traveling to a medical facility could be costly and time-consuming, and where some unmet requests for outpatient care could be treated by phone—such as questions about contraceptive use—104 Advice provides a free hotline for medical consultations.[23]

The 104 Advice database now contains more than 10 million unique health records, making it the largest public health database in the world.[24]

Basing decisions on evidence

Reproductive health service managers need reliable evidence to set priorities and make appropriate decisions—they benefit from access to electronic health records, laboratory information, pharmacy stock data, and patient tracking updates. eHealth tools are natural extensions of traditional record-keeping systems and electronic databases facilitate data analysis at a greatly reduced cost.[1]

For example, a pilot project in Senegal used EpiSurveyor, a free, open-source mHealth data collection tool, to gather maternal health data. As data accumulated, the MOH realized that the use of partograms (a tool to record measurements used by midwives to enable healthy births) was lower than expected. In response, the MOH distributed partograms more widely and encouraged midwives to use them for every delivery. Follow-up surveys revealed that partogram use increased by almost a third in the study area, compared with a 1 percent increase outside the pilot project area.[25]

eHealth initiatives can also be useful for management and tracking of reproductive health supplies. By digitally linking central supply divisions with their far-flung storerooms, managers are able to "see" stock on hand at service delivery points, track procurement status in real time, increase logistics efficiency, reduce stockouts and wasteful surpluses, and fight drug counterfeiting.[5] In Bangladesh, the government's new Supply Chain Information Portal (SCIP) is central to their improved procurement management system. The Procurement Tracker allows officials to monitor the status of their procurement processes at each step, which helps prevent delays and increases transparency. The SCIP also provides information on current government tenders and procurement opportunities, tender documentation, results of past tenders, a news page, and a photo gallery.[5] Serving as a broader source of information on supplies, a global website called the RHInterchange provides access to up-to-date data on more than $1 billion worth of shipments of contraceptive supplies for more than 140 countries around the world.[26]

Does eHealth make a difference?

Some of the eHealth implementation examples above include evaluation findings. The focus of these evaluations vary depending on the goals and objectives of each specific project. Unfortunately, with the exception of evaluations of data collection using PDAs—initiatives that have been in place for some time—most assessments have focused on qualitative and descriptive evidence.[27] There is little rigorous scientific information on eHealth in the developing world, and especially on the impact of eHealth at scale.[1] There is even less evaluation data specifically on sexual and reproductive eHealth efforts.

Most eHealth programs exist as geographically limited pilots that benefit relatively small numbers of people (compared to the total population), and most evaluations examine short-term effectiveness, patient and provider assessments of the technologies, and costs associated with small-scale implementation. While such data are useful, they are not sufficient to answer questions about the overall impact of the interventions or their sustainability outside of an externally funded pilot model. If a very basic eHealth intervention is effective and can be deployed at scale, is this more or less successful or preferable than a much more comprehensive and technically elegant solution that is highly effective but not scalable?

Globally many agencies are calling for more robust, and more relevant, evaluation data. However, researchers are constrained by some special challenges related to eHealth and mHealth assessment. The rapid pace of technological change, health worker unfamiliarity with new technologies and how to use them, and the technical complexity of eHealth infrastructures inhibit impact research on eHealth.[11]

Finally, when eHealth is used for education or outreach, as with other communication products, evaluation can be difficult because humans receive and digest information from multiple sources and the impact of content delivered via a single channel (such as an

mHealth tool) cannot be clearly disentangled from everything else the subject hears or sees or from non-communication barriers to service access (such as transportation, inability to take time from work, and lack of supplies at the health post).

In their 2010 systematic review of evaluations of eHealth programs in developing countries, Blaya et al. found (noting that the evidence base was not as rich as might be desired) that there was evidence that the following eHealth functions could result in a positive impact: patient tracking and follow-up (including reminders to come to the clinic for prenatal care or pick up supplies for family planning methods, adhere to antiretroviral treatment), tools to foster communication between institutions, tools to label or register samples and patients, gathering clinical or research data using PDAs, and reduction of data errors.[1] Unfortunately the researchers did not look at evaluations of patient education or behavior change interventions in their study.

A 2012 systematic review that focused on mHealth interventions for behavior change found that most assessments had been conducted in the developed world. When the authors looked only at developing world evaluation data (16 articles), they did not find consistent demonstration of significant effects on intended audiences. They concluded with, again, a call for more evaluation to establish stronger evidence.[28]

While there is not yet conclusive evidence on impact, individual studies continue to encourage eHealth program developers. For example the Men's INTernet Study II (MINTS-II) for HIV Prevention, conducted in the United States among Latino men who have sex with men, created a website called *Sexpulse 1.0*, incorporating 14 interactive modules developed in accord with "persuasive computing" principles. Compared to a control group, the 650-participant intervention group showed a statistically significant 16 percent reduction in risk behavior at 3 months.[29]

But not all findings are as clear cut. A 2010 study in Uganda found that of 1,503 secondary school students in the town of Mbarara, 27 percent had mobile phones and about half (51 percent) of all students and 61 percent of those who owned a mobile phone believed that they would access a text messaging-based HIV prevention program if it were available. That said, the students also reported that other forms of program delivery modality (e.g., the Internet, religious organizations, and schools) were preferred to text messaging.[30]

Challenges for eHealth and mHealth

In addition to a paucity of evidence on the impact of eHealth initiatives, a number of other challenges are described in the eHealth literature. The World Bank warns that "the great expectations for m-health may be fueling a bubble and are almost certainly resulting in policy and funding decisions that could be fine-tuned to avoid duplication and wasted effort—especially in the absence of standards for the platforms on which applications run and the data that they use."[23] Some argue that "the success of e-health is lagging behind expectations."[31]

Several of these challenges are shared in common with other reproductive health communication tools (the need to adapt content for local languages and cultures, for example). Others are specific to eHealth technologies (such as the vulnerability of electronic devices to heat, water, and dust and the lack of standard platforms for mHealth deployment) and are discussed below.

Sustainable support

Chief among the challenges is sustainable funding for sexual and reproductive eHealth initiatives.[24] Will the agencies who paid for initial procurement of equipment and software development agree to pay ongoing costs of Internet and mobile network access over the years, for routine system troubleshooting, and for replacement of lost or broken equipment? Or can the government commit to taking on those expenses? Such costs may be affordable in a pilot model, but could become overwhelming at national scale.

Lack of interoperability and coordination

As noted, mHealth programs in particular suffer from the fact that software that runs on one company's phone may not work on another phone. And software developed by different teams may require different operating systems to function, even if they can be used on the same phone.[5,23] If mHealth initiatives have exploded in small pilots throughout a country, paid for and implemented by different agencies (as in the case of Uganda), a community health worker could be required to conduct some of his or her reproductive health reporting on one device, malaria reporting on another device, and the rest of the work on paper. This is a serious problem, and one which many are trying to resolve.[2,4,6,24]

Additional burden on health staff

For eHealth tools aimed at replacing reproductive health record-keeping or procurement systems, the burden on field staff can be heavy during the changeover process from paper-based systems to eHealth systems.[11] During pilots, the old systems typically are not jettisoned since the decision has not yet been taken to adopt the new tools because they have not proven themselves at that point. Health workers may find themselves required to file contraceptive uptake reports twice, using the mobile phone application and also having to fill out and submit the old forms. Even after a successful pilot, the scale-up process can take years, during which time both systems may still be in place. Furthermore, some staff may not have faith that the new system will work consistently over the long term and may find ways to avoid switching.

Language

Because eHealth development typically lies in the hands of programmers, and text appears in many places (not

only in text boxes, but also on buttons and in menus for example), cultural and language adaptation becomes more complex. It is not as simple as sending a Word file on safe abortion to a translator and then loading the translation into a document template. Aside from content developed specifically to communicate with patients or to train providers, it is rare to find eHealth tools developed in local languages.[5]

Need for extensive training and supportive supervision

Most health staff, and many health care consumers, are literate and do not need to be taught how to use a pen and paper, but the same is not true for software running on computers or phones. All users have to be trained not only on how to use the tools, but also what to do when problems arise (failure of Internet or mobile network access or damaged or lost equipment, for example).[5,23]

Privacy and security

For systems involving patient records and other sensitive information about sexual and reproductive health, privacy issues are a serious concern. Electronic systems may be more vulnerable to abuse (e.g., hacking and stealing data) than paper-based systems because the mischief can be done from a distance, and the perpetrator has access to many records in one place. On the other hand, it is easier to back up electronic files and store copies in a separate, secure location to reduce loss in case of fire or other physical disasters.[24]

Current needs, trends, and future directions

Concerns about these challenges, and the future of eHealth in general, are remarkably consistent across authors and agencies. Most would agree that reproductive health program managers advocating for eHealth should be required to articulate a clear rationale for why an eHealth solution is more attractive than a more traditional approach, how it will integrate with other eHealth efforts, how a pilot would be brought to scale in a timely manner (should it prove to be effective), and how to ensure long-term sustainability of the system.

The Albanian Ministry of Health piloted a computerized immunization registry to replace the existing paper-based system, through collaboration with PATH's project Optimize. This nurse signs in to the registry through a web browser to view her monthly vaccination appointments. Photo: PATH/Ilir Kaso.

Managers interested in sexual and reproductive eHealth must take a critical perspective on which interventions would be most appropriate in a given situation (not which are the flashiest and most exciting on their own), and which have the potential to be the most cost-effective, increase productivity, and provide the greatest impact improving their program. Good starting points for sexual and reproductive health (SRH) eHealth might be in the areas of systems to remind patients about appointments or tracking treatment, to provide SRH information to health workers, or to manage contraceptive and other inventory.

The interoperability and coordination issue is a difficult one and reproductive health program managers need to take it seriously. Fortunately, current work to develop open-source software that is freely available as a platform for new eHealth development, along with health program insistence on interoperability before a new program can start, could help move the global SRH eHealth agenda forward.[32] In some countries, like Kenya, governments are actively managing mHealth planning and implementation to ensure that initiatives complement national policy and further national goals.[24]

Finally, some critics argue that eHealth initiatives have been driven more by private companies with products to sell or by enthusiastic developers with exciting ideas, rather than by demand from the health system or communities.[2,23,24,31] As has been learned repeatedly in development programs, paying close attention to user needs and preferences early on in intervention design will result in more successful products, more extensive uptake, and more sustained use.[5]

Conclusion

The rapid global spread of computers, mobile phones, tablets, and other new media technologies have stimulated extensive interest in creating "interventions serving entirely new functions in the health system, less costly substitutes for existing interventions, and interactive functions that multiply the power of existing interventions."[23] Hundreds of pilot projects targeting a variety of health topics have shown good results, especially for staff training, community education, and program and supply system monitoring and response.

Clearly eHealth is here to stay. The potential of such eHealth, mHealth, and eLearning tools to positively impact sexual and reproductive health programs is impressive. The global challenge now is to "work smarter" at it.

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