Use of Electronic Technologies to Promote Community and Personal Health for Individuals Unconnected to Health Care Systems

Ensuring health care services for populations outside the mainstream health care system is challenging for all providers. But developing the health care infrastructure to better serve such unconnected individuals is critical to their health care status, to third-party payers, to overall cost savings in public health, and to reducing health disparities.

Our increasingly sophisticated electronic technologies offer promising ways to more effectively engage this difficult to reach group and increase its access to health care resources. This process requires developing not only newer technologies but also collaboration between community leaders and health care providers to bring unconnected individuals into formal health care systems.

We present three strategies to reach vulnerable groups, outline benefits and challenges, and provide examples of successful programs. (*Am J Public Health.* 2011;101:1163–1167. doi:10.2105/AJPH.2010.300003)

John F. Crilly, PhD, MPH, MSW, Robert H. Keefe, ACSW, PhD, and Fred Volpe, MPA

DURING THE PAST DECADE, the United States has experienced a rapid growth of electronic health information technology in hospital and health care provider systems to enhance access and quality for service recipients. State health departments have developed health information exchanges across large health care networks, insurance providers, and independent physician practices, and the use of electronic health records has greatly accelerated.[1] These initiatives evince progress toward achieving a fully connected national health care system by 2014.[2]

Nevertheless, cities and counties struggle to understand the health care needs of individuals who do not or cannot easily access formal health care networks but use expensive services for emergency and routine care. Health information technology is currently designed to benefit primarily populations already connected to such systems. As systems increase their use of health data to influence treatment and policy, developing strategies to include individuals who are largely outside health care networks is critical.

The US health care system has been criticized for low-quality care that produces multiple medical errors[3,4] and high-cost services that limit access to care,[5] perpetuating health disparities. Primary care focused on preventing illness and death is associated with more equitable distribution of health and better outcomes than is specialty care[6–8]; countries directing resources to primary care and enhancing population health have lower costs and superior outcomes.[9] Although the United States has the world's most expensive health care system, other countries regularly surpass the United States on most health indicators, including quality, access, efficiency, equity, and healthy lives.[10] Capturing data on individuals unconnected to health care systems can improve health care access and outcomes while reducing costs—important public health goals.

The federal government allows states and local communities to develop their own health care infrastructures. By making changes at the local level, communities can become more effective in using existing services to capture health care data for hard to reach populations. We have examined several strategies for using existing electronic technologies to better connect such individuals to some aspect of their local health care system.

THE PROBLEM OF HEALTH CARE ACCESS AND POSSIBLE RESPONSES

Converging social problems (e.g., geographic isolation, limited education, poor health, poverty, and the marginalization of vulnerable groups including people of color and the rural poor) inhibit certain individuals' access to health care services.[5] People who have the poorest health tend to receive the least health care, and those with limited health options because of inadequate insurance or unavailable providers often use high-cost services, such as urgent care and emergency rooms, which may not be appropriate to their needs. This problem is significant: nearly 75 million adults—42% of the population younger than 65 years—had either no or inadequate insurance in 2007.[11] Lack of consistent, documented contact impedes the accumulation of meaningful health data for health care planning and intervention development. Uninsured or underinsured groups are at risk for remaining isolated despite health care reform.

Although few health care service data may be collected from these groups, there are other ways to track service use. Data from contacts with other community-based, nonhealth services can be employed to target specific community health needs. For example, some groups without regular health care may have contact with departments of social services, criminal justice, specialty courts (e.g., drug, mental health, veterans, and family), or schools. Data extracted from these systems, using secure data transfer protocols already developed by health information exchanges, could help address and evaluate the health and service needs of these groups. These data can then be used to develop and strategically implement novel health-promotion and grassroots interventions.

Similar approaches have been applied to track or monitor clinical intervention outcomes,[12,13] clinical trials,[14] adherence to specific interventions,[15,16] and infections.[17] Broader cross-systems data-use collaborations between community and health care providers to increase care among unconnected groups have also been successful.[18–21] Clinical trials of cross-program multidisciplinary interventions have reduced such health-related stressors as high blood pressure and cardiac problems among poor families,[22,23] disseminated HIV prevention programs in African American communities,[24] delivered inner-city tuberculosis prevention efforts,[25] and decreased negative birth outcomes among low-income African Americans.[26]

Initiatives derived from these concepts are already under way in some communities. The Partnership for Results in Auburn, New York (http://www.partnershipforresults.org), developed a cross-systems data access and sharing collaboration around children at risk for school violence. San Francisco Children's System of Care (http://nccc.georgetown.edu/documents/ppsanfran.pdf) developed and expanded their collaboration to collect individual-level data on youth across a series of systems, including schools and probation, to target and evaluate novel interventions.

Access to health-related information and health promotion has expanded with the growth of the Internet,[27,28] particularly in the mental health field, which is rapidly developing online versions of actual treatment.[29] No-cost personal health records are available online, allowing individuals to bank and control their own health data. Broadband Internet access and mobile wireless are available in all urban and most nonurban areas, offering new opportunities to reach individuals outside health care networks.

TECHNOLOGY TO REDUCE BARRIERS TO HEALTH CARE

Developing cohesive, community-based strategies for using health information technology and electronic communication technologies optimally is critical to dismantle barriers to health care and health information.[4] To help communities reduce such impediments, we propose several strategies.

Communities: Collaborations for Health-Focused Use of Community-Based Data

Individual-level data exist in public and private agencies and institutions (e.g., social services, criminal justice, colleges, and trade schools). These data are confidential and protected and typically include personal identifiers and service use history. Because of their size and scope, these systems have a similar database infrastructure and often contain data on the same individual. Collective data from these systems could help drive new forms of community-wide health promotion and service delivery. To build such systems, three tasks are essential.

Task 1: Engaging the community. It is essential to understand a community's political geography and to identify entities that will form the infrastructure to facilitate and coordinate the use of data from extant systems for that community to use. Choosing key leaders from potential participating agencies that will form the collaborative should be according to their willingness, influence, and ability to collaborate and properly use centralized data. The collaborative can then team with broader health-focused organizations, such as local health departments in urban areas and offices of rural health in state health departments, to build the initial support base and vision.

Task 2: Developing a plan. Once formed, members of a collaborative must develop an action plan. A critical component is an assessment of the content of all participating data systems. The plan may involve building a comprehensive data dictionary of potential data fields applicable to health-related risk. A feasible system must be relatively simple, low cost, risk controlled, time efficient, and beneficial for participating agencies. A key collaborator in this task is a regional health information exchange, which can assist in providing a secure information exchange environment. Particularly important are the consent and data security processes[30] and the development of effective data use agreements that limit liability regarding the unintended use of data.[31]

Task 3: Forming a collaborative. Building a collaborative to drive this process and use the data requires input from various experts, including researchers, program developers, and trainers, who can introduce fresh ideas regarding program development, care delivery, and outcomes tracking and measurement. Indicators of the success of the initiatives may include fewer missed days of work or school, decreased emergency room visits, and better communication among multiple health care systems. Ideally, the collaborative's leadership should be based at local public health departments because of their community-wide scope.

Veterans returning from overseas could serve as a test case for how such a system might work. Despite available care, many veterans do not connect with the Veterans Affairs health care system and struggle for long periods with adjustment problems affecting their physical and mental health. Identifying points of entry into community systems such as schools or social services may help these systems better meet the needs of veterans with high-risk burdens but only minimal involvement with health or mental health services. The Veterans Affairs health care system has already obtained much information that may be used to improve returning veterans' quality of care.[32,33]

Health Care Systems: Reaching Out Through Electronic Means

Although the Internet can serve as a conduit for reaching geographically and socially isolated individuals, understanding its current usability and limits is necessary for effective planning. Internet access occurs through (faster) broadband or (slower) dial-up depending on geography.[34] Some areas have no access at all; some households choose not to use the Internet (Table 1).

The Internet is the primary way most users (67%) obtain health care information,[36] but only 63% of US households have an Internet connection. Urban areas have greater broadband access than do nonurban areas, which typically have more dial-up connections. Whites use computers to connect to the Internet more often than do African Americans (59% and 45%, respectively), but more African Americans (48%) use mobile wireless devices than does the general population (32%).[28] Wireless handheld devices are better options for contact in rural areas because signal delivery is more flexible, although gaps persist as the result of terrain or geography. Consequently, reaching

TABLE 1—US Internet Connection Types and Use by Region: October 2007

	South (n = 43 370)		Midwest (n = 26 714)		West (n = 26 203)		Northeast (n = 21 553)	
	Urban (n = 32 510), No. (%)	Nonurban (n = 10 861), No. (%)	Urban (n = 20 461), No. (%)	Nonurban (n = 6253), No. (%)	Urban (n = 23 322), No. (%)	Nonurban (n = 2882), No. (%)	Metro (n = 18 154), No. (%)	Nonurban (n = 3399), No. (%)
Dial-up	2872 (8.8)	1976 (18.2)	1752 (8.6)	1374 (22.0)	2093 (9.0)	531 (18.4)	1345 (7.4)	632 (18.6)
Broadband	16 772 (51.6)	3682 (33.9)	10 689 (52.2)	2379 (38.0)	13 227 (56.7)	1376 (47.7)	10 088 (55.6)	1635 (48.1)
No use	9704 (29.9)	4073 (37.5)	5693 (27.8)	1776 (28.4)	5883 (25.2)	724 (25.1)	5421 (29.9)	859 (25.3)
Overall use	19 740 (60.7)	5677 (52.3)	12 494 (61.1)	3764 (60.2)	15 390 (66.0)	1918 (66.6)	11 450 (63.1)	2287 (67.3)

Source. Data from the US Census Bureau, Current Population Survey, Internet Supplement, October 2007.[35]

individuals electronically may require a multifaceted approach.

Health-related Web sites provide information on specific medical diagnoses (e.g., diabetes), general medical guidance (e.g., http://www.WebMD.com), access to medical literature (e.g., http://www.PubMed.com), and treatment options for mental health conditions.[29] Sites such as http://www.patientslikeme.com allow individuals to report their symptoms and evaluations of medications or treatments.[37] Message dissemination technology can now rapidly access targeted groups in communities for specific safety or health purposes.[38] Twitter technology is increasingly used in private industry[39] and is gaining acceptance in medical settings.[40]

Effective use of these technologies by health care systems can increase their range to reach unconnected individuals. Handheld devices can receive brief announcements, appointment reminders, or health tips. Wellness webs (composed of individuals with similar health-related needs who are connected electronically to enhance their ability to work together and better meet their health goals) targeting individuals to receive messages according to need or interest can be built through collaborations among community agencies, insurance companies, and providers. These technologies may also facilitate connection with African Americans and Hispanics. Technology alone cannot alleviate disparities in health care access, but a national study finds that although people with higher incomes use the Internet more for their health records, people with lower incomes and people without college degrees are likely to benefit more from having their health information online.[36] Connection fosters more regular, better coordinated care, with improved outcomes.

Individuals: Building and Maintaining Personal Health Records

Many health care systems and insurance companies offer public health records (PHRs) to help patients coordinate their care and keep in touch with their providers. PHRs allow patients to view parts of their own health record (e.g., lab results, medication history), input data (e.g., weight, blood pressure), and schedule appointments. Insurance companies are the primary providers of PHRs (51%), followed by health care providers (26%), but other health-related organizations offer PHRs to members (e.g., the American Heart Association).[36]

Recently, both Google (Google Health) and Microsoft (HealthVault) introduced publicly available, Internet-based PHRs at no cost. Although these providers pledge that PHR data will be secure and not exploited for advertising or other commercial purposes, users' trust must be developed. Only 25% of potential users report a willingness to use a PHR from a private corporation.[36] Despite these concerns, PHR options have considerable value. PHRs contain functions that can import data over the Internet directly from specific health devices (e.g., blood pressure monitors, weight scales, blood glucose tests) plugged into computers or handheld devices. Both Google and Microsoft products allow individuals to designate specific entities for data sharing. With this feature alone, communities can implement and monitor targeted health-promotion projects and measure progress and outcomes from self-reported data through a central location that links participants. As individuals join health care systems, become insured, or relocate, they can export and import data to electronic health records and back into PHRs no matter where they receive care.

MOVING FORWARD

Although they do pose some risks, using electronic technologies to improve conventional health services offers opportunities to reduce health disparities. It is instructive to examine successful community programs and imperative to continue assessing how best to harness these technologies to advance public health goals without compromising privacy or security. Researchers should conduct rigorous reviews of the literature to identify promising programs and recommend appropriate policies and safeguards.

Developing new avenues of communication with various health care systems has already helped unconnected individuals access health care in some regions. Through strategic collaborations using established technologies, organizations such as participants in the Substance Abuse and Mental Health Services Administration's Drug Free Communities program have been successful, including incorporating accountability measures. One program in Florida (http://www.onevoiceforvolusia.org/data.htm) has included in its mission promoting cross-system data-gathering capabilities to address high-risk groups. Inclusive consensus building and community action planning approaches have produced successful systems-level interventions in several US cities and counties,[41–43] enabling vulnerable groups to take charge of their health information.[44] Such initiatives not only create alternative access but also have important policy implications aligned with Healthy People 2020 objectives.[45]

For example, health policy decisions are generally derived from medical data from health care systems and insurance companies.[46] Using these data as the primary source can invite the appearance of full knowledge when the data actually represent only individuals connected to the system; excluding the unconnected generates an incomplete picture that can perpetuate disparities in access and outcomes.

The new federal health reform legislation is already promoting creative changes by increasing funds for community health centers to boost the number of treated patients.[47] Under this legislation, millions of Americans will gain access to care previously unavailable to them. There is an urgent need to effectively handle this expected rapid growth. Shifting greater focus, responsibility, and control to the local community constitutes one encouraging approach. For example, collaboration to better distribute care may prompt more efficacious distribution of health care funding. At the time of this study, health care dollars flowed directly to formal providers as reimbursement for services rendered. The distribution of funds depends entirely on the delivery structure of those entities, not the broader needs of the community. Without appropriate strategies and infrastructure, communities will have little power to create meaningful, effective partnerships with health care systems to assist their members in need.

Obviously, the challenges, limitations, and risks of using these technologies must be understood and continuously evaluated. New applications for health-related purposes raise many security and privacy concerns that require the attention of consumer health advocates and health policy analysts. Although the Internet remains the largest venue for accessing health-related information and health-monitoring tools, it is neither ubiquitous nor a panacea.

Electronic technologies must be more broadly and effectively implemented to realize their potential to improve health outcomes for vulnerable populations, lower costs, and reduce health disparities. To advance this promising application, we need to devote more attention to developing creative approaches to help people access appropriate resources, devising better safeguards, measuring effects and evaluating programs, and sharing information about programs that are working. But by exploring how to use technology to reach unconnected individuals, community systems and health care providers can begin to address the problem—and enhance the coordination of health care for millions of Americans. ■

About the Authors

At the time of this study, John F. Crilly was with the Department of Psychiatry, University of Rochester Medical Center, Rochester, NY, and the US Department of Veterans Affairs, Canandaigua, NY. Robert H. Keefe is with the School of Social Work, State University of New York, Buffalo. Fred Volpe is with the Drug Free Communities Program, Substance Abuse and Mental Health Services Administration, Leesburg, VA.

Correspondence should be sent to Robert H. Keefe, PhD, ACSW, Associate Professor, School of Social Work, 685 Baldy Hall, University at Buffalo, State University of New York, Buffalo, NY 14260-1050 (e-mail: rhkeefe@buffalo.edu). Reprints can be ordered at http://www.ajph.org by clicking the "Reprints/Eprints" link.

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Contributors

J. F. Crilly conceptualized the article and led the writing of the initial draft. R. H. Keefe edited the initial draft, aided in writing, and led the revisions. F. Volpe outlined the strategies and provided examples of programs that have shown some success.

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