

# Use of Health Information Technology among Racial and Ethnic Underserved Communities

*by Michael Christopher Gibbons, MD, MPH*

## **Abstract**

This article examines the potential role of health IT in addressing healthcare disparities among racial and ethnic minority populations. An overview of health IT utilization among healthcare providers notes certain characteristics that may disproportionately affect minority populations. Current and emerging health IT use among racial and ethnic minority populations is examined, highlighting areas in which technology use in these populations differs from that of nonminority populations and emphasizing the importance of new social media applications in healthcare education and delivery. Following a discussion of adoption and utilization barriers for providers as well as for patients and caregivers, specific opportunities to address healthcare disparities through health IT use are identified at the provider, patient/caregiver, and healthcare system levels. The article identifies several technical, practical, and human challenges to health IT adoption and stresses the need for the healthcare system to embrace the full spectrum of emerging health IT opportunities to address healthcare disparities.

**Keywords:** health information technology, electronic health records

## **Introduction**

The advances in information technology (IT) that have been transforming our society have tremendous potential to improve healthcare in areas such as consumer health, clinical care, administrative and financial transactions, public health, professional education, and biomedical and health services research.<sup>1</sup> Indeed, it has been suggested that IT must play a central role in the redesign of the healthcare system if substantial improvement in healthcare quality for all patients is to be achieved.<sup>2</sup> Interest is also growing in understanding the potential role of health IT in addressing healthcare disparities among racial and ethnic minority populations.<sup>3-5</sup>

In order to adequately and appropriately evaluate the potential of health IT to address healthcare disparities, adoption and utilization barriers must be understood. Furthermore, because healthcare is increasingly being delivered in noninstitutional, ambulatory, and home- and community-based settings, barriers and opportunities within these differing delivery settings must be identified. Identification of these barriers and opportunities will enable an evidence-based approach to the design, development, and deployment of appropriate tools and applications. It will also facilitate targeted, tailored, and even personalized approaches to health IT development and enable meaningful monitoring and evaluation of costs, processes, and outcomes.

## Understanding Current Electronic Health Record and Health IT Use

### *Provider Health IT Utilization*

To date, much of the attention paid to health IT has focused on the role of electronic health records, health information exchanges, telemedicine, computerized provider order entry (CPOE) systems, e-prescribing, and electronic radiological systems. While national adoption data are limited for most forms of health IT, the most recent data for electronic health records (EHRs) indicate that the EHR adoption rate in U.S. medical offices is 36.1 percent, a 3.2 percent increase since February 2009. Providers use these EHR systems mostly for electronic notes but also for viewing or ordering labs or x-rays and for e-prescribing. Several factors tend to be associated with higher EHR adoption rates. These include having a larger number of physicians in a practice, having a higher number of available exam rooms, and having higher daily patient volumes.<sup>6</sup>

Data from the 2005 and 2006 National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) indicate that EHR adoption is lower among providers serving Hispanic or Latino patients who are uninsured or rely on Medicaid. The surveys also found lower EHR adoption among providers of uninsured non-Hispanic black patients than for providers of privately insured non-Hispanic white patients. Primary care providers in private solo or small group practices have the lowest adoption rate (5.7 percent), whereas those in other office settings (including HMOs, faculty practice plans, and urgent care centers) have the highest adoption rate (38.3 percent). The adoption rates for hospital outpatient departments exceed the rates for solo and partner practices. Finally, EHR adoption rates among community health centers are higher than the rates for solo and small group practices.<sup>7</sup>

### *Use of Current and Emerging Health IT among Racial and Ethnic Minority Patients and Caregivers*

Patients and their caregivers have many potential opportunities to utilize technology in the context of managing their health and healthcare. The Institute of Medicine, the Centers for Medicare and Medicaid Services, and other bodies are increasingly beginning to emphasize that care should not occur just within face-to-face visits but should be provided in a variety of formats, using a range of current and emerging health IT tools, to increase patient access, enhance patients' engagement in their care, reengineer patient-centered care, and foster the continuous healing relationships needed to appropriately manage chronic illnesses.<sup>8-10</sup> Within the healthcare arena, much of the patient-oriented focus has been on the role of personal health record (PHR) systems. PHRs have been defined as Internet-based tools that may be linked with existing EHRs or electronic medical records (EMRs) and that allow patients to access, input, change, coordinate, and control their health information. The major difference between a PHR and an EMR or EHR is that patients cannot access or control the EMR or EHR.<sup>11</sup>

Although national data regarding PHR adoption rates are limited, a recent national survey by the California Healthcare Foundation found that 7 percent of respondents were using a PHR.<sup>12</sup> Use of PHRs is higher in the West (11 percent) and higher still in California (15 percent). Most users (64 percent) said that it enabled them to make sure their health information is accurate, while about 50 percent found it useful to e-mail providers and renew prescriptions online.<sup>13</sup> More than half of PHR users think that using a PHR makes them feel as though they know more about their health and about the care their doctor gives them. Finally, while most PHR users tend to be younger, highly educated, and of higher income, those with less education and lower incomes and those with chronic illnesses derive the most value and achieve deeper engagement in the process of managing their health and healthcare.<sup>14</sup>

A recent study of Kaiser Permanente enrollees found significant racial and ethnic disparities among enrollees who registered to use the PHR available to all Kaiser members. Among African American members, 30.1 percent registered, compared with 41.7 percent of whites ( $p < .01$ ). Those with baseline Internet access were more likely to register, and a significant educational gradient was also observed (with registration more likely among those of higher educational levels). Interestingly, differences in education, income, and Internet access did not account for the disparities in PHR registration by race.<sup>15</sup>

Rates of PHR adoption by consumers and caregivers may not adequately characterize the extent to which patients and consumers are utilizing health IT tools to support their health and healthcare needs. Emerging evidence suggests that rapidly growing numbers of patients, caregivers, and consumers are turning to online and electronic resources largely developed outside of the healthcare establishment for health information and support. To date, approximately 160 million Americans have used online health tools.<sup>16</sup> In fact, the average person in the United States now relies on a variety of electronic media and Internet-based resources to research diseases and treatments and to access general health information and support, resulting in the Internet's surpassing physicians as the most popular health resource.<sup>17, 18</sup> Collectively, these tools have been called consumer health informatics (CHI) tools.<sup>19-25</sup> Although the value of these tools has not been definitively characterized, one-third of online health seekers feel they have been helped by the information and resources they have found, and early scientific evidence suggests that select tools may improve certain clinical outcomes in some patients.<sup>26</sup>

National rates of CHI utilization among racial and ethnic minority patients and caregivers have not been assessed. It is likely, however, that racial and ethnic minorities' use of CHI tools exhibits at least some degree of digital disparity, as do general Internet utilization patterns across these populations. For example, between 2000 and 2010 the proportion of Internet users who are black or Latino has nearly doubled, increasing from 11 to 21 percent. At the same time, African Americans remain [less likely](#) than whites to go online. Similarly, African Americans [continue to trail whites](#) in broadband use at home and are less likely than whites to own a desktop computer (51 percent for African Americans vs. 65 percent for whites).<sup>27</sup> US born Latinos are almost identical to whites in their use of the Internet and home broadband, yet foreign-born Latinos are much less likely than whites or US born Latinos in Internet utilization (80 percent native-born Hispanic vs. 51 percent foreign-born Hispanic).<sup>28</sup>

Finally, social media use is emerging as a potent resource among healthcare consumers. In 2004 the term *Web 2.0* was introduced to describe this shift in both consumer demand and application functionality.<sup>29</sup> The main difference between Web 1.0 (the first generation of the Internet) and Web 2.0 is the level or intensity of interaction that the technology makes possible.<sup>30</sup> Web 1.0 consisted of mostly unidirectional information seeking, whereas Web 2.0 allows the user to add information or content to the Web, thus enabling interaction, information sharing, and collaboration.<sup>31</sup> Increasingly, the terms *social media* and *social networking* are being used to describe Web 2.0 tools and applications.

Examination of social media utilization patterns by race suggests potential opportunities to help address healthcare disparities via this form of health IT. Minority Americans are higher utilizers of mobile Internet access, especially via handheld devices. According to a Pew Research Center study, "Nearly two-thirds of African-Americans (64 percent) and Latinos (63 percent) are wireless internet users, and minority Americans are significantly more likely to own a cell phone than their white counterparts (87 percent of blacks and Hispanics own a cell phone, compared with 80 percent of whites). Additionally, black and Latino cell phone owners take advantage of a much wider array of their phones' data functions compared to white cell phone owners."<sup>32</sup>

Social media has entered the mainstream healthcare system in several ways. Entrepreneurs who understand healthcare trends and consumer demands are leading creative business startups that are developing health-oriented social networks, health content aggregators, medical and wellness applications, and tools to enable health-related vertical searches (searches focused on a specific content area).<sup>33</sup> Online patient communities are rapidly growing through both mainstream social communities and more recently established condition-specific communities (PatientsLikeMe, QuitNet, CureTogether). Meanwhile, hospitals and academic medical centers are using social media, with more than 300 YouTube channels and 500 Twitter accounts now available online. Hospitals are moving from experimentation (Twitter updates from the OR, Flip videos) to strategic use of social media to recruit new patients.<sup>34</sup> Finally, some online physician-only communities have more than 115,000 members.<sup>35</sup>

People are clearly drawn to the higher levels of engagement and interactivity possible through the use of social media and Web 2.0. In addition, the context of social encounters offered by many social media applications seems to be of particular interest to users. The importance of social context, interactivity, and engagement among Web 2.0 users suggests the opportunity and potential these tools may offer in helping to address important issues related to healthcare disparities such as patient activation/engagement, access

to care, health education and self-management support, and minority patient recruitment into clinical trials.

## **Health IT Adoption Barriers among Minority Populations**

### *Barriers Related to Health IT Design and Development*

Digital disparities exist in the adoption and utilization of various forms of health IT. To comprehensively understand these disparities, potential barriers to health IT adoption and utilization must be considered from several perspectives. These include the provider and healthcare system perspective; the perspective of patients, families, and caregivers; the impact of the technology itself; and finally the setting or environment (hospital/clinic, home/community, or safety-net organization) in which the technology is used and the care is delivered and/or received. Barriers, issues, or problems in any one of these domains could impact health IT adoption, utilization, and ultimately outcomes. If the problems are of a nature such that one population benefits more than another from the technology, the adoption of health IT could actually increase or exacerbate existing healthcare disparities or even create new ones.

How humans interact with devices in challenging environments is the province of human factors engineering. These interactions are related to the people, tasks, environments, and technologies involved in the care process, which are often different for racial and ethnic minority patients. Because healthcare cost-control efforts are pushing more and more care into the home and ambulatory settings, the relative importance of patient and environmental human factors issues will likely increase. Many environmental aspects of not only the hospital but also the home and community may be associated with human factors challenges that may impact the safe, effective, and error-free utilization of health IT. To date, the literature on healthcare disparities includes little empirical research along these lines. Critical research needs to be done to precisely characterize the extent, nature, and impact of these issues on healthcare quality, utilization, outcomes, and disparities.

### *Provider Adoption and Utilization Barriers*

Several barriers to physician adoption of health IT have been identified in the literature. For example, positive physician attitudes toward health IT and information systems are associated with adoption.<sup>36-38</sup> Positive attitudes include interest, perceived usefulness, and motivation in working with technology.<sup>39</sup> The negative impact of health IT on clinical workflows and the absence of technical assistance for office staff and physicians have also been found to negatively impact physician adoption rates.<sup>40-42</sup> The inability of EHR and health IT systems to communicate with each other (interoperability) has also been identified as a barrier to provider adoption. Interoperability among IT systems may facilitate provider adoption because it could potentially reduce rework by care providers as well as improve dissemination of new medical knowledge among physicians.<sup>43-46</sup> Finally, positive communication in which providers share thoughts, opinions, and information by speech, in writing, or through peer professional or social networks has been shown to be associated with provider health IT adoption.<sup>47-49</sup>

### *Patient and Caregiver Adoption and Utilization Barriers*

Numerous barriers to adoption have been reported among underserved patients and caregivers. One major barrier for patients, as for clinicians, is the lack of a perceived benefit of health IT. If patients do not perceive a benefit to be gained from using a given system, they are unlikely to use it, especially when there is a significant degree of inconvenience in data entry, if the patient is already doing well, or when there are only a small number of other users.<sup>50</sup> Another barrier is a perception of the health IT creating more work for patients, or patients' finding it difficult to fit the health IT into their busy everyday lives.<sup>51-54</sup> Lack of trust in the device, technical problems, confusing educational or instructional materials and/or technology content, limited access to computers or hardware, technology fears/anxiety, and cognitive and physical disabilities have all been shown to be barriers to health IT utilization and adoption among vulnerable populations.<sup>55-68</sup> The competing responsibility of taking care of a family has been identified as a barrier for some minority patients.<sup>69</sup> Poor computer knowledge, literacy, and skills are also barriers

among minority populations.<sup>70-74</sup> Lack of cultural relevance as well as privacy and trust concerns all have been reported as barriers to the use of CHI tools and applications.<sup>75-79</sup>

## **Potential Opportunities for Health IT to Help Address Healthcare Disparities**

### *Provider-Related Opportunities*

Several provider-level determinants of healthcare disparities may be impacted by health IT. For example, the goal of many provider-oriented health IT tools is to make pertinent patient information seamlessly and unambiguously available to providers at the point of care. In so doing, these tools can reduce clinical uncertainty related to unclear or incorrect patient information that may be found in a handwritten medical record. In the absence of needed information (or in the presence of unclear or ambiguous data), providers may undervalue patient-specific information while at the same time overweighting their own clinical beliefs, assumptions, biases, or stereotypes about certain types of patients.<sup>80</sup> If clear and accurate patient information is presented to the clinician in the EHR, the use of this information should increase, obviating the need for relying on less-appropriate data. Over time this could have the cumulative effect of promoting high-quality personalized care and reducing select healthcare disparities.<sup>81</sup>

Electronic health records also provide physicians with information about appropriate treatment options, thus providing clinical decision support and enabling clinicians to make the best treatment decisions among available options.<sup>82</sup> Health IT tools may also provide clinical decision support by generating feedback for providers regarding their clinical performance through reminders, quality reports, or clinical benchmarking. Reminders and quality reports provide feedback to providers about the quality of care they provide to a particular patient during a clinical encounter or about the care they have provided patients over a given time. If these reports include specific disparities indicators, this type of information could help reduce disparities by exposing unrecognized clinical practices that fall short of accepted standards and guidelines and by highlighting a provider's performance across all patients. With this information, providers may then work to reduce identified disparities by focusing on areas that need improvement.<sup>83</sup>

Health IT, including some EHR systems, can function to connect physicians with other people. Health IT tools such as e-mail, e-consultation, e-prescribing, and CPOE systems enable providers to connect with other healthcare professionals.<sup>84</sup> These tools may facilitate reductions in healthcare disparities in ways similar to the potential effects of reminder systems, quality reporting, and benchmarking described above. They also may provide ready access to needed clinical expertise to facilitate better diagnostic and therapeutic decisions. Other forms of health IT, including telemedicine, remote monitors and sensors, patient e-mail, and increasingly the Internet and social media, connect providers and healthcare systems to patients and caregivers.<sup>85</sup> These tools may reduce disparities by being used to provide care, education, or support to disparity populations and enabling access to care not otherwise available. However, disparities may actually increase if these tools are used unevenly across populations.<sup>86</sup>

Another way in which health IT tools that connect providers with patients may impact healthcare disparities is by enabling increased monitoring of important clinical parameters among racial and ethnic minority patients. Because many patients often poorly self-manage or fail to monitor their conditions, patient sensor ("smart") technology can enable remote monitoring and direct delivery of patient data (glucose levels, weight, vital signs, falls, psychological or musculoskeletal stress/injury, etc.) to a device or even to an EHR. These data could facilitate better clinical management and enhance disease control (blood sugar levels, weight gain/loss), resulting in lower complication rates (blindness, renal failure, limb loss), delays in disease progression (diabetes, congestive heart failure), and potentially the narrowing of disparities. These tools may also facilitate stable relationships between patients and providers by enabling patients to overcome barriers to achieving regular communication, accessing care, or otherwise maintaining provider relationships. Whether a patient has a regular source of care has been described as a significant determinant of healthcare disparities.<sup>87, 88</sup> By improving doctor-patient communication and enabling more stable therapeutic relationships, these tools may also help promote enhanced patient engagement in care, facilitate shared decision making, and increase patient-centeredness of care, all of

which are recognized as determinants of healthcare disparities and are essential for high-quality healthcare.<sup>89-95</sup>

### *Patient and Caregiver Opportunities*

Addressing healthcare disparities through patient-oriented health IT was partially addressed in the discussion above about health IT tools that connect providers to patients and caregivers. In addition, health IT tools designed primarily for patients (consumer health informatics tools) could, in the future, become important options to support patient health education. Because of the prevalence of health literacy challenges, which occur disproportionately among minority populations, many patients appear to lack the skills necessary to fully understand or comprehend provider instructions, read medication and healthcare product labels, or adhere to complex self-management regimes.<sup>96, 97</sup> Incomplete or partial understanding of health and healthcare issues may fuel lack of trust in the healthcare system. Mistrust has been linked to devaluing or disregarding of provider instructions and to patient nonadherence among certain disparity populations.<sup>98-103</sup> Thus, providing culturally, linguistically, and cognitively appropriate and accessible health education is a necessary part of providing high-quality, patient-centered care. Because of time constraints imposed on clinicians, however, providing appropriate health education for all who need it is an increasingly formidable challenge. Health IT may offer significant new promise for addressing healthcare disparities by improving the availability, appropriateness, and efficacy of patient health education.<sup>104</sup>

Finally, patient-oriented health IT tools also offer future promise for supporting patient health behaviors. By enhancing social support and interaction, these tools may improve patient engagement, particularly among minority populations whose utilization of social media and mobile applications is significantly higher than that of white populations.

### *Opportunities at the Healthcare System Level*

Opportunities to address healthcare disparities through health IT at the healthcare system level are related to the potential of health IT to improve patient-centeredness, timeliness, efficiency, and effectiveness of healthcare delivery. This is especially true among providers and patients delivering and receiving care within the nation's healthcare safety-net system. This system provides the care for many of the nation's most vulnerable patients, often under resource limitations not present in other healthcare systems and facilities.<sup>105</sup>

The ability of health IT to connect patients to providers and healthcare systems may lend itself to interesting opportunities for providers and healthcare systems to improve care processes and outcomes by actually learning from large groups of patients. Health-oriented social networking groups, including PatientsLikeMe and CureTogether, may represent a future for healthcare, medical practice, and medical research that is radically different from today. Indeed, reports are beginning to emerge regarding what is increasingly becoming known as "crowdsourcing." Crowdsourcing is the practice of enabling a population (crowd) to solve a problem or offer an answer to a particular question.

Using patient-contributed and patient-controlled data, groups like CureTogether, with more than 15,000 members in 112 countries, who have contributed 1.3 million data points across 625 conditions, are claiming to have replicated a dozen published disease correlations and have released what they are calling infographics for multiple diseases. Infographics are essentially scatter plots of treatment effectiveness versus popularity. These infographics indicate that the most-prescribed treatments are not always the most effective.<sup>106</sup> By applying similar approaches to problems related to healthcare disparities (i.e., cultural competency), providers or healthcare systems could learn vast amounts about the attitudes, beliefs, preferences, behavioral patterns, and cultural norms among populations of patients for which they are responsible for providing care. This information could reduce disparities by enabling providers and healthcare systems to better target, tailor, and even personalize healthcare service delivery in ways not currently possible.

## **Achieving the Potential of Health IT among Vulnerable Populations**

The use of health IT among racial and ethnic minority populations carries significant promise and potential. Yet realizing the potential will not come without surmounting several significant technical, practical, and human challenges. In order to measure success or failure, it will be important to conduct ongoing surveillance and monitoring of national progress. Because of the great diversity in the types of technologies, types of users, and settings in which health IT may be employed, obtaining accurate estimates of adoption and utilization will be a significant challenge. The development of the “meaningful use” criteria and the linking of meaningful use to provider reimbursement will help but will not be sufficient. As providers meaningfully use health IT, it will be possible to track provider utilization among participating providers. Additionally, as patients become more involved in accessing, managing, and using their health information, a need to develop “meaningful patient use” criteria may arise.

The day may also come when a voluntary process will need to be put into place to certify health IT devices and applications for cultural, linguistic/literacy, and human factors appropriateness for use among one or more vulnerable populations. Assuming these challenges can be overcome, the need for new provider- and patient-oriented health IT tools, devices, interventions, treatments, and educational content will be ongoing. Currently, most of this developmental work is done outside the formal healthcare system. Perhaps, then, the most important question regarding the potential of health IT to help address healthcare disparities is whether or not the healthcare system will embrace the full spectrum of emerging health IT opportunities and lead the charge toward achieving the goal of a more equitable healthcare system and a healthy society.

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## Notes

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