

CHARACTERISTICS OF INDIVIDUALS USING A PATIENT PORTAL VIA MOBILE TECHNOLOGY

Posted on April 15, 2020 by Matt Schlossberg

Categories: [Articles](#), [Winter 2020](#)

Tag: [health information technology](#)

Stephanie Furniss, MS, RHIA; Laurie Rinehart-Thompson, JD, RHIA, CHP; Sarah R. MacEwan, PhD; Cynthia J. Sieck, PhD, MPH; Naleef Fareed, PhD, MBA; Jill Clutter, PhD; Timothy R. Huerta, PhD, MS; and Ann Scheck McAlearney, ScD, MS

Abstract

Accessing patient portals via mobile technology has been proposed as an approach to reach vulnerable populations that may have limited access to portals through other means. Given the ubiquity of smartphones and their availability among individuals in socioeconomically disadvantaged communities, healthcare providers may assume these individuals will use mobile applications to access portals. This study explores characteristics of individuals using a patient portal in Ohio, with a particular focus on those who choose to access the portal via a mobile application. The results show that individuals who were black, living outside of the Columbus metropolitan area, enrolled in Medicaid, or unemployed had lower odds of being mobile portal users than individuals who were white and non-Hispanic, living in the Columbus metropolitan area, commercially insured, or employed. As a result of this insight, healthcare providers may wish to reconsider future strategies to extend patient portal use specifically to underserved groups.

Keywords

Patient-centered care, patient engagement, health information technology, mobile technology, patient portals, internet, digital divide, health disparity, vulnerable populations

Introduction

Healthcare has undergone a paradigm shift toward patient-centered care, with an increased focus on identifying the unique needs of each patient.¹ Sociodemographic factors may influence patients' needs, as individuals can face challenges obtaining high-quality healthcare due to their financial status, location, age, gender, race, ethnicity, or ability to communicate; these individuals are considered members of vulnerable populations.² Furthermore, impeded access to health resources may cause vulnerable populations to experience challenges in accessing care that contribute to differences in disease burden and health outcomes.³ Addressing these potential disparities in access to care is necessary to ensure the equitable delivery of care to all populations and afford each individual an equal opportunity to achieve optimal health. By recognizing the needs of each individual, patient-centered care aims to address some of the challenges currently experienced by vulnerable populations that contribute to poor health outcomes.⁴

With patient-centered care, patients are seen as partners, teamed with their providers, in the management of their healthcare. As partners, patients thus require access to their health information to inform their care decisions and experience. Patient portals are a tool through which individuals can access information about their health and healthcare; they can be used via secure online

websites or through applications accessed on mobile devices (i.e., mobile “apps”). Patient portals provide access to information frequently held in the hospital's electronic health record (EHR), such as medication lists, immunization histories, and test results, and they can also provide a means for patients to send secure messages to their healthcare providers, request medication refills, schedule appointments, and make payments.⁵ By enabling patients to access their personal health information and communicate with their providers, patient portals can facilitate patients' engagement in their own health and thereby support patient-centered care.⁶

Individuals vary in their likelihood, capability, and opportunity to access and use patient portals. For instance, race and age have been shown to influence individuals' likelihood to use a patient portal. Specifically, white patients have been shown to be more likely to sign up to use a patient portal than patients of any other racial group, and patients 65 years of age and older have been shown to be less likely to enroll than younger patients.⁷ Insurance coverage and income level have also been correlated with portal use, with research showing that individuals covered by public insurance (e.g., Medicaid and/or Medicare), or with income below the federal poverty level, have been less likely to log in to patient portals.⁸ Furthermore, when offered patient portals from the same medical center, individuals living in rural areas have been shown to have lower portal activation rates, compared with individuals living in metropolitan areas.⁹

These differences in patient portal use may, in part, be explained by variation in individuals' internet access, referred to as the “digital divide.” Home internet use among adults has been shown to differ by income level; in 2016, 89 percent of American households making at least \$50,000 reported living in a home with internet access, whereas only 59 percent of American households who made less than \$25,000 annually reported having internet access at home.¹⁰ Interestingly, the average cost of high-speed internet service in 2013 was \$90 per month, making this access potentially unaffordable for some individuals.¹¹ Geographic location has also been found to affect internet access, with lower availability and use of the internet in rural areas than in urban locations. In Ohio, major metropolitan areas have high availability of broadband internet, but internet access is lowest in the state's rural Appalachian region. For instance, Franklin County, which contains Columbus, the state capital, was reported to have 99.8 percent broadband internet coverage in 2016, while Monroe County, in southeast Appalachian Ohio, was reported to have no broadband internet coverage at all.¹² With the increasing use of web-based technologies as means to manage one's health, such a division in internet access may contribute to disparities in individuals' abilities to obtain high-quality healthcare. When fixed broadband internet is either unavailable or unaffordable, individuals must rely on cellular data through mobile devices or use public Wi-Fi hotspots to access the internet. Studies have shown that lower-income individuals are more likely to rely on mobile devices for internet

access; in 2014, 13 percent of Americans making less than \$30,000 annually depended on smartphones for internet use, compared with only 1 percent of Americans making more than \$75,000 annually.¹³ This dependence on mobile devices is increasing,¹⁴ with 31 percent of American adults making less than \$30,000 annually reported as smartphone-dependent in 2018.¹⁵ Lower-income individuals who rely on mobile devices may furthermore be limited in the amount of cellular data they can use to access the internet. These individuals must then choose how to use the internet within their data limits.

Offering patient portal access via mobile technology, through either a mobile application or an optimized adaptation of the desktop product via a native mobile browser, is viewed as having the potential to enhance the ability of individuals who are members of underserved populations to engage in their healthcare. For example, mobile access has been shown to increase the frequency of portal use and the timeliness of retrieving test results from a portal among vulnerable patients with diabetes.¹⁶ However, this study was conducted with individuals who were already using a portal via computer; thus barriers to initiating portal use were not taken into consideration. Given the disparities in access to the internet, it is important to understand whether mobile tools can facilitate access to and use of patient portals among vulnerable populations.

Our study sought to describe the types of individuals who use patient portals via mobile device technology. Given that individuals with limited resources or capabilities might be more likely to use a smartphone instead of a computer, because of cost or ease of use, this information may have significant implications for expectations of technology-mediated patient engagement in vulnerable populations. Our findings can help inform healthcare providers about which populations are using mobile patient portal applications, in the hope that this information can help create future strategies to increase use of patient portals in groups that are underutilizing this option.

Methods

The health system offers its patients electronic access to their healthcare information through the MyChart patient portal (Epic Systems; Verona, WI). MyChart features include messaging with providers, prescription renewals, appointment information and scheduling, clinical updates, and billing. MyChart can be accessed on a secure online website or as a mobile application available for iOS and Android operating systems.

This study was a retrospective review of de-identified data collected from the health system's EHR database, including MyChart user status, patient age, gender, race/ethnicity, geographic location, insurance coverage, and employment. The health system's information warehouse has an established Honest Broker protocol, recognized by the health system's Institutional Review Board (IRB), to provide de-identified or limited data sets under rigorous standards to protect the data, without requiring formal IRB approval. Data were acquired from the health system's information

warehouse in accordance with this protocol. Stata 14 software was used to perform statistical analyses including frequency calculations, percentages, means, and logistic regression across variables of individual characteristics.

Logistic regression was performed using the dependent variable of MyChart user status and independent variables of age, gender, race/ethnicity, region, insurance coverage, and employment status. Individual characteristics were based on MyChart user status, which was defined by the following categories: never enrolled, enrolled passive user, and enrolled active user. Enrolled users were those patients who had successfully activated their MyChart account by entering demographic information for verification and creating a username and password. Individuals who did not meet these criteria were considered never enrolled. Enrolled active users were defined as those individuals who sent at least one message asking for general medical advice, requesting a medication refill, or making an appointment during the study period. Enrolled active users were further classified as either non-mobile users or mobile users. Mobile users were defined as those individuals who used the MyChart mobile application at least once during the study period.

Individuals were included in the study if they were 18 years of age or older and had at least one encounter at the health system between January 1, 2013, and December 31, 2015. Additionally, individuals were defined as being in one of four geographic regions based on their county of residence. The Columbus metropolitan area was defined by eight counties (Delaware, Fairfield, Franklin, Licking, Madison, Morrow, Pickaway, and Union), and the southeast Ohio Appalachian area was defined by the eight counties in this established Appalachian area (Athens, Hocking, Meigs, Monroe, Morgan, Noble, Perry, and Washington). Two other geographic identifiers were used: Ohio-other and outside Ohio. The Ohio-other region contained both metropolitan and Appalachian areas.

Results

This study included 796,431 unique individuals. Among these individuals were 248,917 enrolled users, 98,023 enrolled active users, and 15,211 enrolled active mobile users (see [Figure 1](#)). The majority of individuals were white and non-Hispanic (66 percent) and lived in Ohio (96 percent); 61 percent reported living in the Columbus metropolitan region, and 3 percent reported living in the southeast Ohio Appalachian region. Almost half the individuals (49 percent) were covered by a commercial insurance plan, 16 percent were covered by Medicaid, and 16 percent were covered by Medicare. While a slight plurality was employed (41 percent), many individuals were not employed (38 percent). Complete demographics of individuals included in this study are summarized in [Table 1](#) and presented visually in [Figure 2](#). Demographics of individuals by portal user status are summarized in [Table 2](#) and presented visually in [Figure 3](#).

We found that individuals with the highest odds of being mobile patient portal users were ages 31 to 45, white, non-Hispanic, living in the Columbus metropolitan area, commercially insured, and employed ([Table 3](#) and [Figure 4](#)). Notably, individuals living in the southeast Ohio Appalachian

region had less than half the odds of being mobile portal users, compared with those living in the Columbus metropolitan area (odds ratio , 0.40; 95 percent confidence interval , 0.35–0.46). Individuals covered by Medicaid had slightly more than half the odds of being mobile portal users, compared with those covered by commercial insurance (OR, 0.57; 95 percent CI, 0.54–0.60). Unemployed individuals had approximately three-quarters the odds of being mobile portal users compared with employed individuals (OR, 0.74; 95 percent CI, 0.71–0.77).

Discussion

Our analysis revealed that individuals who were white and non-Hispanic, lived in the Columbus metropolitan area, were covered by commercial insurance, or were employed had higher odds of enrolling in a patient portal, being active portal users, and being mobile portal users, compared with individuals who were other races/ethnicities, lived outside the Columbus metropolitan area, were covered by Medicaid, or were unemployed. While individual characteristics such as age, gender, race/ethnicity, and socioeconomic status have been the focus of previous research to understand the use of patient portals by various populations,¹⁷ our study has extended that work to examine portal use through a secure online website as well as via a mobile application. These results suggest that while access to the internet via mobile technology has been proposed as a mechanism to increase patient portal use in underserved populations, additional barriers prevent some individuals from using patient portals.

When internet access is held constant, portal users differ from non-users on the basis of socioeconomic factors such as education.¹⁸ For example, individuals with lower levels of education, who were less likely to be portal users, may have limited health literacy and computer skills that make using a patient portal more difficult.¹⁹ These same groups may also have lower levels of digital literacy, defined as “the ability to use information and communication technologies to find, evaluate, create, and communicate information.”²⁰ Therefore, internet access and mobile technology alone may not be enough to encourage patient portal use by members of vulnerable populations who find this technology intimidating. Despite their perceptions about the value of these tools,²¹ factors such as lack of comfort with technology and lower digital literacy level may deter their use of a patient portal. Furthermore, individuals’ attitudes toward technology may present a barrier to portal use, as those who are non-adopters of portals may be generally less willing to use information technology than those who are portal adopters.^{22, 23}

Distance from healthcare providers may also contribute to variation in patient portal use, as shown in previous studies that reported lower portal use by patients living more than 50 miles from their healthcare center.²⁴ We found that individuals living in the southeast Ohio Appalachian region, as well as those within Ohio who lived outside of the Columbus metropolitan area or the southeast

Ohio Appalachian area (i.e., the Ohio-other group), were less likely to use the patient portal than those who lived within the Columbus metropolitan area and were therefore closer to the medical center; notably, these individuals represented a significant portion of our study population. Future analyses should be conducted to examine the issues of both geography and distance and their impact on portal use and to consider how to address these issues in the development of strategies to increase portal adoption and use by individuals who live farther from their providers and healthcare centers.

In practice, many healthcare providers are now required to offer their patients access to certified EHR technology as part of the Meaningful Use objectives of the American Recovery and Reinvestment Act of 2009.²⁵ Specifically, healthcare providers must show that they have offered patients access to their healthcare information electronically via a patient portal and that patients are using portals to view, download, and/or transmit their information to other healthcare providers. However, to better promote patient portal use, healthcare providers need to understand how different individuals use patient portals. The insight provided by our study can help advance efforts to develop strategies that can provide all patients with the opportunity to use such tools and, as a result, increase engagement in their care.

Additional studies are needed to better understand how to facilitate use of patient portals among underserved populations, including developing strategies to engage individuals in ways that best leverage limited resources by addressing issues such as inadequate access to the internet and mobile technology, as well as insufficient health literacy and technological skills.²⁶ Research must include populations facing obstacles to using patient portals to understand what barriers are most crucial to overcome. Furthermore, as the landscape of internet access continually evolves through the expansion of broadband internet services, it will be important to evaluate how patient portal use progresses with increasing internet availability. Future research should be conducted to elucidate why individuals choose or choose not to enroll in patient portals, actively use portals, and access them through mobile applications. Feedback from individuals would be particularly useful in understanding reasons why individuals may or may not choose to use mobile patient portals. Feedback from healthcare providers would additionally be valuable to understand whether and how providers are a factor influencing mobile patient portal use based on the way that healthcare organizations choose to offer portals to various populations. Investigating these questions through qualitative methods, such as interviews or focus groups, would be well suited to support the exploration of diverse perspectives on the facilitators and barriers to the use of mobile patient portals.

Our study has several limitations that should be considered in the interpretation of our results. First, the race/ethnicity data in our study were obtained from the EHR and therefore may differ from self-reported race/ethnicity data, particularly when categorizing patients who identify with multiple race/ethnicity groups or with minority groups not included in the categories established in the

EHR.²⁷ Second, the data used in this study were acquired from one institution and involved the use of one patient portal platform. The health system uses standard practices for the design of the patient portal, supporting generalizability to some extent among patient portals from various vendors. Third, this study was focused on geographic locations near Columbus and southeastern Ohio. These communities may experience unique factors related to resources involved in accessing healthcare and patient portals. While we cannot guarantee that this work can be generalized to broader populations, our local analysis of patient portal users is a critical first step to inform healthcare providers about the preferences of their patients and to suggest future actions that may be taken to increase portal use among vulnerable populations.

Conclusion

As the use of mobile technologies is expanding, the implementation of mobile patient portal applications aims to increase portal use, including among members of underserved populations. Our study reveals that mobile tools designed to provide access to patient portals may not be accessible to vulnerable groups. Future research is needed to understand why certain individuals and groups do not use portals and to develop strategies to increase patient portal use in underserved populations, thereby better addressing the persistent digital divide.

Authors

Stephanie Furniss, MS, RHIA, is a clinical applications consultant at The Ohio State University Wexner Medical Center in Columbus, OH.

Laurie Rinehart-Thompson, JD, RHIA, CHP, is a professor of health and rehabilitation sciences at The Ohio State University College of Medicine in Columbus, OH.

Sarah R. MacEwan, PhD, is a postdoctoral researcher at CATALYST, the Center for the Advancement of Team Science, Analytics, and Systems Thinking in Health Services and Implementation Science Research, at The Ohio State University College of Medicine in Columbus, OH.

Cynthia J. Sieck, PhD, MPH, is an assistant professor of family medicine at CATALYST, the Center for the Advancement of Team Science, Analytics, and Systems Thinking in Health Services and Implementation Science Research, at The Ohio State University College of Medicine in Columbus, OH.

Naleef Fareed, PhD, MBA, is an assistant professor of biomedical informatics at CATALYST, the Center for the Advancement of Team Science, Analytics, and Systems Thinking in Health Services and Implementation Science Research, at The Ohio State University College of Medicine in Columbus, OH.

Jill Clutter, PhD, is an associate professor of health and rehabilitation sciences at The Ohio State University College of Medicine in Columbus, OH.

Timothy R. Huerta, PhD, MS, is a professor of family medicine, biomedical informatics, and health services management and policy at CATALYST, the Center for the Advancement of Team Science,

Analytics, and Systems Thinking in Health Services and Implementation Science Research, at The Ohio State University College of Medicine and College of Public Health in Columbus, OH.

Ann Scheck McAlearney, ScD, MS, is a professor of family medicine, biomedical informatics, and health services management and policy at CATALYST, the Center for the Advancement of Team Science, Analytics, and Systems Thinking in Health Services and Implementation Science Research, at The Ohio State University College of Medicine and College of Public Health in Columbus, OH.

References

1. Holmstrom, I., and M. Roing. "The Relation between Patient-centeredness and Patient Empowerment: A Discussion on Concepts." *Patient Education and Counseling* 79, no. 2 (2010): 167–72.
2. Chang, B. L., et al. "Bridging the Digital Divide: Reaching Vulnerable Populations." *Journal of the American Medical Informatics Association* 11, no. 6 (2004): 448–57.
3. National Academies of Sciences, Engineering, and Medicine. *Communities in Action: Pathways to Health Equity*. Washington, DC: National Academies Press, 2017.
4. Epstein, R. M., et al. "Why the Nation Needs a Policy Push on Patient-centered Health Care." *Health Affairs* 29, no. 8 (2010): 1489–95.
5. Ancker, J. S., et al. "Use of an Electronic Patient Portal among Disadvantaged Populations." *Journal of General Internal Medicine* 26, no. 10 (2011): 1117–23.
6. Tang, P. C., and D. Lansky. "The Missing Link: Bridging the Patient-Provider Health Information Gap." *Health Affairs* 24, no. 5 (2005): 1290–95.
7. Goel, M. S., et al. "Disparities in Enrollment and Use of an Electronic Patient Portal." *Journal of General Internal Medicine* 26, no. 10 (2011): 1112–16.
8. Wallace, L. S., et al. "Patterns of Electronic Portal Use among Vulnerable Patients in a Nationwide Practice-based Research Network: From the Ochin Practice-based Research Network (PBRN)." *Journal of the American Board of Family Medicine* 29, no. 5 (2016): 592–603.
9. Oest, S. E. R., M. Hightower, and M. D. Krasowski. "Activation and Utilization of an Electronic Health Record Patient Portal at an Academic Medical Center—Impact of Patient Demographics and Geographic Location." *Academic Pathology* 5 (2018): 2374289518797573.
10. Ryan, C. "Computer and Internet Use in the United States: 2016." *American Community Survey Reports*. Washington, DC: U.S. Census Bureau, 2017.
11. Geoghegan, T. "Why Is Broadband More Expensive in the US?" *BBC News* (October 28, 2013). Available at <http://www.bbc.com/news/magazine-24528383>.
12. Ghose, C. "Appalachian Ohio Lags Other Regions in Broadband Access Despite Millions in Federal Investment." *Columbus Business First* (October 24, 2016). Available at <http://www.bizjournals.com/columbus/news/2016/10/24/appalachian-ohio-lags-other-regions-in-broadband.html>.
13. Pew Research Center. "U.S. Smartphone Use in 2015." April 2015. Available at

- <http://www.pewinternet.org/2015/04/01/us-smartphone-use-in-2015/>.
14. McHenry, G. "Evolving Technologies Change the Nature of Internet Use." National Telecommunications and Information Administration. April 19, 2016. Available at <https://www.ntia.doc.gov/blog/2016/evolving-technologies-change-nature-internet-use>.
 15. Pew Research Center. "Mobile Fact Sheet." 2019. Available at <http://www.pewinternet.org/fact-sheet/mobile/>.
 16. Graetz, I., et al. "Mobile-Accessible Personal Health Records Increase the Frequency and Timeliness of PHR Use for Patients with Diabetes." *Journal of the American Medical Informatics Association* 26, no. 1 (2019): 50–54.
 17. Yamin, C. K., et al. "The Digital Divide in Adoption and Use of a Personal Health Record." *Archives of Internal Medicine* 171, no. 6 (2011): 568–74.
 18. Graetz, I., et al. "The Digital Divide and Patient Portals: Internet Access Explained Differences in Patient Portal Use for Secure Messaging by Age, Race, and Income." *Medical Care* 54, no. 8 (2016): 772–79.
 19. Czaja, S. J., et al. "The Usability of Electronic Personal Health Record Systems for an Underserved Adult Population." *Human Factors* 57, no. 3 (2015): 491–506.
 20. American Library Association. "Digital Literacy." 2019. Available at <https://literacy.ala.org/digital-literacy/>.
 21. Czaja, S. J., et al. "The Usability of Electronic Personal Health Record Systems for an Underserved Adult Population."
 22. Emani, S., et al. "Patient Perceptions of a Personal Health Record: A Test of the Diffusion of Innovation Model." *Journal of Medical Internet Research* 14, no. 6 (2012): e150.
 23. Agarwal, R., and J. Prasad. "A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology." *Information Systems Research* 9, no. 2 (1998): 204–15.
 24. Oest, S. E. R., M. Hightower, and M. D. Krasowski. "Activation and Utilization of an Electronic Health Record Patient Portal at an Academic Medical Center-Impact of Patient Demographics and Geographic Location."
 25. Centers for Medicare & Medicaid Services. "Promoting Interoperability Programs." Available at <https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html?redirect=/EHRIncentivePrograms/>.
 26. Chang, B. L., et al. "Bridging the Digital Divide: Reaching Vulnerable Populations."
 27. Klinger, E. V., et al. "Accuracy of Race, Ethnicity, and Language Preference in an Electronic Health Record." *Journal of General Internal Medicine* 30, no. 6 (2015): 719–23.

There are no comments yet.