

## How Can Health Kiosks Facilitate Patient Engagement?

Sophia Cothrel, PharmD Candidate Class of 2019

Olufunmilola Abraham, PhD, MS, BPharm

---

**Keywords:** kiosk; patient care; health education; health information

### Disclosures

This is an original manuscript and we have no conflicts of interest to disclose.

### Abstract

The purpose of this manuscript is to describe how health kiosks have evolved to increase access to health information and patient engagement. Health kiosks were first introduced to promote public health by providing easy access to educational resources to individuals with difficulty acquiring health information. Health kiosks now offer a range of features beyond disseminating health information in both clinical and non-clinical settings. The acceptance of health kiosks by users within the general public is a key factor in predicting their use. Numerous studies have found that health kiosks are typically easy to use and useful, but the user-interface of kiosks needs to be better designed to facilitate learning of health information. One benefit of kiosk use is increased user knowledge on information presented by kiosks such as condition-related health information, and another is self-reported positive behavior change in diet and exercise. An additional potential benefit of using kiosks is increased communication between patients and healthcare professionals. The value of using health kiosks to facilitate effective communication between patients and healthcare professionals has been significantly understudied. Since health kiosks are useful for facilitating patient-provider communication, they could be a critical approach to improving patient engagement and health outcomes. Emerging uses of health kiosks could provide users with greater incentives to use kiosks because they allow patients to more directly engage in man-

aging their own health. More research is needed to elucidate how user demographics, kiosk settings, and acceptability of kiosks may influence health outcomes.

### Introductions

Health kiosks are interactive computer terminals with screens that provide access to health information or otherwise engage users in their healthcare. The purpose of this manuscript is to describe how health kiosks have been used, their benefits, and how they continue to evolve to increase access to health information and patient engagement. The development and implementation of health kiosks for community use to improve public health first began in the early 1990s.<sup>1</sup> A primary reason for introducing health kiosks with modules and internet access into public settings was to increase access to health information.<sup>1-3</sup> Prior to kiosk implementation, there was insufficient access to specific health information tailored to patients' preferences and needs. Health information provided by kiosks varies widely; examples of health information include but are not limited to specific information on conditions such as obesity or high blood pressure as well as general tips on health and safety. Health kiosks make it easier for patients with limited access to healthcare providers or the internet to seek and receive health information.<sup>1-6</sup> In more recent years the role of health kiosks has expanded, and it is evolving continuously as technology and health information advance. Kiosks now offer a range of features beyond disseminating health information, which include measuring patient health parameters such as weight and obtaining patient medical information in clinical and non-clinical settings. As the design of health kiosks evolves, this health information technology has the potential to facilitate and increase patient engagement in healthcare.

### Methods

Searches were conducted on Medline via PubMed electronic database and on Google Scholar™ to identify relevant literature regarding health kiosks in clinical and community settings. The searches were conducted using combinations of key terms including “health kiosk,” “interactive,” and “public,” as well as citation and author searching. Articles published after 1995 were included for a comprehensive view of public health kiosks and their progression over time. Studies conducted both within and outside the United States concerning health kiosks and their varying roles in clinical and non-clinical settings were included in our analysis. We included primarily studies that focused on educational and patient engagement uses of health kiosks and other roles for health kiosks such as collecting patient information in clinical settings.

### Target Populations for Kiosk Use

Though health kiosks can be used to deliver health information to anyone in the general public, they are particularly useful for populations that might otherwise have difficulty acquiring health information.<sup>7</sup> Accordingly, many studies on the use of health kiosks have targeted populations with limited access to health information, including low-income, Latino, non-native English-speaking, and other minority populations.<sup>4-11</sup> Kiosks that serve low-income populations are more critically needed because individuals of higher socioeconomic status frequently have greater access to health information via direct contact with healthcare professionals and the internet.<sup>5-6,8-9</sup> Some kiosks have been designed to allow minority populations that do not speak English to have easier access to health information by providing multiple language options. Kiosks that offer language options have proven successful as a manner of dissemination of health information to ethnic groups.<sup>7,8,10,11</sup> Age appears to be an important factor that impacts kiosk use. Younger individuals such as teenagers are more likely to use health kiosks.<sup>3,6</sup> Compared to older adults, younger people are more comfortable and familiar with adapting to new health information technologies.<sup>12</sup> One study found that health kiosk users were significantly younger than the general local population.<sup>13</sup>

### Kiosk Use in Clinical and Non-Clinical Settings

Over the past few decades, about half of health kiosks have been in clinical settings such as pharmacies, physician offices, clinics, and emergency departments.<sup>1,8,14-18</sup> The other half have been in non-clinical settings including libraries, churches, shopping centers, laundromats, and fast food restaurants.<sup>1,2,5,8,13-15,19</sup> Table 1 summarizes kiosk types, locations, features, and targeted populations. Kiosk users visiting clinical settings frequently have an existing

health-related purpose to their visit. For instance, health kiosks are often located in retail pharmacies and individuals picking up prescriptions can use kiosks to learn more about their unique health and medication use challenges. An individual picking up a medication for high blood pressure may be more likely to retrieve information on how to manage high blood pressure from the kiosk, for example. On the other hand, kiosk users in non-clinical settings such as supermarkets or libraries may use health kiosks to obtain non-specific health information such as advice on diet and exercise.<sup>14</sup> Consequently, health kiosks located at non-clinical community sites have been found to be more successful in disseminating general health information to the public.<sup>6,13,14,20</sup>

Table 1: Kiosk Details

Kiosk Types		Kiosk Features
Internet-based Module-based Tailored health information Information-gathering Highly interactive		Internet browsing Step-wise educational lessons/modules Kiosk information browsing Obtaining patient medical information Measuring health parameters Multiple language options Printing capabilities Visual and auditory output
Kiosk Locations		Targeted Populations
<b>Clinical</b>  Physician's Office Clinic Pharmacy Emergency Department Hospital Health Center	<b>Non-Clinical/Community</b>  Public Library Shopping Center Church Laundromat Community Center Beauty Salon Social Service Agency Cinema Licensed Club Fast Food Restaurant	Low-Income and underserved Latino and Spanish-speaking African Americans Younger generations Parents

### Acceptance and Design of Health Kiosks

The acceptance of health kiosks by users within the general public is a key factor in predicting their use.<sup>7,8,21</sup> Specifically, studies have shown that usability and usefulness are important components of acceptability.<sup>3,8,13,18,21</sup> Most studies found that health kiosks were generally easy to use and useful.<sup>5,13,21,22</sup> Factors that contribute to perceived usefulness include age, ease of use, and reason for use.<sup>3</sup>

Health kiosks should be designed to facilitate use by older adults. Older adults have the most difficulty using health kiosks because they are less comfortable with adapting to new technology.<sup>12,17</sup> It appears that age and ease of use are influential factors on the perceived usefulness of health kiosks because kiosks that are not user-friendly are less likely to benefit the user. The user-interface of kiosks needs to be designed to facilitate use and learning of health information by users. For example, larger print size on the kiosk screen and a simplified user interface may be beneficial. In a study on veterans' preferences using health information technologies, focus group participants suggested that kiosk screens have clean user-friendly designs with uncluttered and easy to use central dashboards containing easily recognizable icons and large text to promote kiosk usability.<sup>23</sup>

**Health Kiosks Facilitate Learning, Behavior Change, and Communication**

Users with known health conditions or an interest in specific health topics are able to use health kiosks to tailor the information to their unique needs. This information is more highly corroborated than information found on the internet.<sup>24</sup> On a small scale, health kiosks have been proven effective in increasing dissemination of health knowledge that patients seek and desire to know.<sup>9,14,20,25</sup> Many kiosks provide general health information while others focus on a single health topic such as cancer, heart health, or smoking cessation.<sup>11,15,26</sup> Each kiosk can be unique in the content and presentation of information, which may impact the health outcomes of users in different ways. One consistent benefit of kiosk use is increased user knowledge on information presented by kiosks. Two studies found that when parents used child safety health kiosks during an emergency room or physician office visit for their children, kiosk use improved parents' knowledge of and compliance to child safety guidelines.<sup>16,17</sup> Another study demonstrated that 90% of kiosk users learned something new from kiosk use, reinforcing the value of health kiosks in spreading health information.<sup>9</sup> Self-reported positive behavior change in diet and exercise is also a benefit of kiosk use. One study demonstrated that after receiving information on physical activity and encouragement through a health kiosk, about half of participants had increased physical activity at the three-month follow-up.<sup>27</sup> Another study showed that kiosk use can be beneficial to the health of overweight adults in the short-term.<sup>18</sup> Participants in another study reported increased physical activity, positive diet changes, and improved communication with their physicians.<sup>19</sup> The most consistent benefit identified from the limited research on kiosk use was increased communication between patients and healthcare profes-

sionals. Kiosk users are often led to ask their pharmacists or physicians about specific health topics after kiosk use, for example.<sup>15</sup> Health kiosks can both disseminate knowledge and facilitate conversations between users and healthcare professionals concerning the topics addressed within health kiosks.<sup>5,8,14,16,20</sup> The value of using health kiosks to facilitate effective communication between patients and healthcare professionals has been significantly understudied. Since health kiosks are useful for facilitating patient-provider communication, they could be a critical approach to improving health outcomes. Some additional benefits and challenges of kiosk use are shown in Table 2.

**Table 2: Benefits and Challenges of Kiosk Use  
Emerging and Innovative Uses of Health Kiosks**

Benefits of Kiosk Use	Challenges of Kiosk Use
Increased patient-provider communication <sup>5,15,29</sup>	Preference for direct contact with healthcare professionals/distrust in technology <sup>4,28</sup>
Increased physical activity/self-reported positive behavior change <sup>19,25</sup>	Lack of computer/health kiosk literacy <sup>4</sup>
Reinforced/increased user knowledge of health information presented by kiosk <sup>9,16,17</sup>	Inadequate privacy <sup>10,13,15</sup>
Potential cost savings <sup>28</sup>	Not every patient able to use the kiosk <sup>21,29</sup>
Potential time savings for patients and providers <sup>28</sup>	Accuracy of health parameter readings/perceptions of accuracy <sup>28,29</sup>
Increased patient and provider awareness <sup>29</sup>	Workflow limitations <sup>29</sup>
Potential improved patient outcomes <sup>18,26</sup>	Kiosk maintenance <sup>19,27,30</sup>

Within the last decade, health kiosks have begun providing information about an individual's health such as weight, heart rate, and blood pressure to both kiosk users and their healthcare providers in some instances.<sup>18,28-32</sup> This emerging use of health kiosks could provide users with greater incentives to use kiosks, as it allows patients to directly engage in managing their own health. Health kiosks that enable patients to monitor their blood pressure are increasingly being implemented in retail pharmacies across the United States.<sup>28,32</sup> One study conducted in a retail pharmacy demonstrated that kiosks could be used not only by patients to monitor their blood pressure but also by pharmacists to identify patients for remunerable medication therapy management services.<sup>28</sup> Another study in community pharmacies demonstrated how a collaboration between a health plan and a pharmacy could

utilize health kiosks to improve blood pressure monitoring and management.<sup>32</sup> Health kiosks can aid the management of users with chronic conditions who have limited health literacy and who lack access to primary healthcare.<sup>30</sup> This opportunity is particularly important to encourage community pharmacists to spend more time counseling patients about their health and medications. Health kiosks can provide engagement to patients while also saving healthcare professional time and costs when used in certain clinical settings.<sup>30,31,33</sup> Health kiosks are increasingly being used to obtain patient medical information in clinical settings.<sup>33-36</sup> Many clinical settings in the United States are incorporating kiosk-based patient registration and intake into office visits, and in one chemotherapy clinic for example, kiosk-based medication reconciliation built into patient registration reduced nursing time dedicated to reconciliation activities by nearly 50% without compromising accuracy.<sup>33</sup> Health screenings can also be conducted via health kiosks in clinical settings, such as an HIV screening in emergency departments or behavioral health assessments in primary care.<sup>22,36</sup> Several studies have found that individuals prefer to interact directly with healthcare providers.<sup>37</sup> However, another emerging use of health kiosks is to connect patients and healthcare providers via telemedicine approaches such as video or a messaging system to discuss patients' health-related concerns. Linking patients to healthcare professionals through kiosks is particularly beneficial to patients in rural areas with limited access to healthcare providers, but it has some logistical challenges.<sup>24</sup> Kiosks need to be more user-friendly in the type and amount of information provided to users to facilitate widespread adoption into healthcare processes and services.<sup>35</sup> Kiosks used in combination with provision of adequate primary care and public health services could significantly impact the health of users.<sup>27</sup> As health kiosk use expands nationally, it is important for healthcare organizations to consider the cost-effectiveness of implementing this health information technology.<sup>25</sup>

## Conclusions

Health kiosks are a promising approach to improving public health and facilitating positive health behavior changes. Beyond their success in increasing user knowledge, health kiosks have proven to be successful facilitators of communication between users and healthcare professionals. Health kiosks have the potential to impact users' health outcomes, since increased patient-provider communication leads to a greater likelihood of improved health outcomes. However, users are unable to benefit from public health kiosks if they cannot comprehend the health information presented or adequately access that information through use of the kiosk. Therefore, successful use of

health kiosks will be influenced by user populations, usability, and location. Overall, studies show that health kiosks are useful and easy to use, but more research is needed to elucidate how user demographics, kiosk settings, and acceptability of kiosks may influence health outcomes.

## References

- Jones R. Making health information accessible to patients. *Aslib Proceedings* 2003;55:334-8. DOI 10.1108/00012530310498905
- Lasky T, Kogut S, Campbell S, Markham Risica P. Computer kiosks to deliver medication information in the pharmacy. *J Consum Health Internet* 2011;15:347-60. DOI 10.1080/15398285.2011.623579
- Nicholas D, Huntington P, Williams P, Chahal P. Determinants of health kiosk use and usefulness: case study of a kiosk which serves a multi-cultural population. *Libri* 2001;51:102-13. DOI 10.1515/LIBR.2001.102
- Bean K, Davis O, Valdez H. Bridging the digital divide: a bilingual interactive health kiosk for communities affected by health disparities. *The Journal of Community Informatics* 2013;9.
- Thompson DA, Lozano P, Christakis DA. Parent use of touchscreen computer kiosks for child health promotion in community settings. *Pediatrics* 2007;119:427-34. DOI 10.1542/peds.2006-2669
- Kreuter MW, Black WJ, Friend L, et al. Use of computer kiosks for breast cancer education in five community settings. *Health Educ Behav* 2006;33:625-42. Epub 21 Aug 2006. DOI 10.1177/1090198106290795
- Bolin JN, Ory MG, Wilson AD, Salge L. Diabetes education kiosks in a Latino community. *Diabetes Educ* 2013;39: 204-12. Epub 22 Feb 2013. DOI 10.1177/0145721713476346
- Joshi A, Trout K. The role of health information kiosks in diverse settings: a systematic review. *Health Info Libr J* 2014;31:254-73. Epub 11 Sept 2014. DOI 10.1111/hir.12081
- Rosas LG, Trujillo C, Camacho J, Madrigal D, Bradman A, Eskenazi B. Acceptability of health information technology aimed at environmental health education in a prenatal clinic. *Patient Educ Couns* 2014;97: 244-7. Epub 21 Jul 2014. DOI 10.1016/j.pec.2014.07.018
- Matthews PH, Darbisi C, Sandmann L, Galen R, Rubin D. Disseminating health information and diabetes care for Latinos via electronic information kiosks. *J Immigr Minor Health* 2009;11:520-6. Epub 8 Apr 2008. DOI 10.1007/s10903-008-9134-6
- Cupertino AP, Richter K, Sanderson L, et al. Feasibility of a Spanish/English computerized decision aid to facilitate smoking cessation efforts in underserved communities. *J Health Care Poor Underserved* 2010;21:504-17. DOI 10.1353/hpu.0.0307
- Pew Research Center. Tech adoption climbs among older adults. <http://www.pewinternet.org/2017/05/17/tech-adoption-climbs-among-older-adults/> (accessed 2017 Dec 27).
- Radvan D, Wiggers J, Hazell T. HEALTH C.H.I.P.s: opportunistic community use of computerized health information programs. *Health Educ Res* 2004;19:581-90. Epub 15 Jun 2004. DOI 10.1093/her/cyg080
- Nicholas D, Huntington P, Williams P. The impact of location on the use of information systems. *J Doc* 2002;58:284-301. DOI 10.1108/00220410210425610
- Harini S, Goodyer L, Anderson C, Meyer J. CardioPharm: interactive multimedia health promotion software for community pharmacy. *Nutrition & Food Science* 1997;2:71-5. DOI 10.1108/00346659710161876
- McDonald EM, Solomon B, Shields W, et al. Evaluation of kiosk-based tailoring to promote household safety behaviors in an urban pediatric primary care practice. *Patient Educ Couns* 2005;58:168-81. DOI 10.1016/j.pec.2004.08.015
- Gielen AC, McKenzie LB, McDonald EM, et al. Using a computer kiosk to promote child safety: results of a randomized, controlled trial in an urban pediatric emergency department. *Pediatrics* 2007;120: 330-9. DOI 10.1542/peds.2006-2703
- Gleason-Comstock JA, Streater A, Jen KL, et al. Consumer health information technology in an adult public health primary care clinic: a heart health education feasibility study. *Patient Educ Couns* 2013;93:464-71. Epub 12 Aug 2013. DOI 10.1016/j.pec.2013.07.010
- Dulchavsky SA, Ruffin WJ, Johnson DA, Cogan C, Joseph CL. Use of an interactive, faith-based kiosk by congregants of four predominantly, African-American churches in a metropolitan area. *Front Public Health* 2014;2:1-6. DOI 10.3389/fpubh.2014.00106
- Demiris G, Thompson H, Boquet J, Le T, Chaudhuri S, Chung J. Older adults' acceptance of a community-based telehealth wellness system. *Inform Health Soc Care* 2013;38:27-36. Epub 9 May 2012. DOI 10.3109/17538157.2011.647938
- Demiris G, Thompson H, Boquet J, Le T, Chaudhuri S, Chung J. Older adults' acceptance of a community-based telehealth wellness system. *Inform Health Soc Care* 2013;38:27-36. Epub 9 May 2012. DOI 10.3109/17538157.2011.647938
- Hsieh YH, Gauvey-Kern M, Peterson S, et al. An emergency department registration kiosk can increase HIV screening in high risk patients. *J Telemed Telecare* 2014;20:454-9. DOI 10.1177/1357633X1455563723. Haun JN, Chavez M, Nazi K, et al. Veterans' preferences for exchanging information using veterans affairs health information technologies: Focus group results and modeling simulations. *J Med Internet Res* 2017;19:e359. Epub 23 Oct 2017. DOI 10.2196/jmir.8614
- Nicholas D, Huntington P, Williams P, Gunter B. Perceptions of the authority of health information. *Health Info Libr J* 2003;20:215-24. Epub 26 Nov 2003. DOI 10.1111/j.1471-1842.2003.00453.x
- Yvonne Chan YF, Nagurka R, Bentley S, Ordonez E, Sproule W. Medical utilization of kiosks in the delivery of patient education: a systematic review. *Health Promot Perspect* 2014;4:1-8. DOI 10.5681/hpp.2014.001
- Alcaraz KI, Kreuter MW, Bryan RP. Use of GIS to identify optimal settings for cancer prevention and control in African American communities. *Prev Med* 2009;49:54-7. Epub 5 May 2009. DOI 10.1016/j.ypmed.2009.04.016
- Houle SK, Chuck AW, Tsuyuki RT. Blood pressure kiosks for medication therapy management programs: business opportunity for pharmacists. *J Am Pharm Assoc* 2003;52:188-94. DOI 10.1331/JAPhA.2012.11217
- Houle SK, Chuck AW, Tsuyuki RT. Blood pressure kiosks for medication therapy management programs: business opportunity for pharmacists. *J Am Pharm Assoc* 2003;52:188-94. DOI 10.1331/JAPhA.2012.11217
- Resnick HE, Ilagan PR, Kaylor MB, Mehling D, Alwan M. TEAHM—Technologies for Enhancing Access to Health Management: a pilot study of community-based telehealth. *Telemed J E Health* 2012;18:166-74. Epub 24 Feb 2012. DOI 10.1089/tmj.2011.0122
- Bahadin J, Shum E, Ng G, Tan N, Sellayah P, Tan SW. Follow-up consultation through a healthcare kiosk for patients with stable chronic disease in a primary care setting: a prospective study. *J Gen Intern Med* 2017;32:534-9. Epub 9 Dec 2016. DOI 10.1007/s11606-016-3931-8
- Chung CF, Munson SA, Thompson MJ, et al. Implementation of a new kiosk technology for blood pressure management in a family medicine clinic: from the WWAMI Region Practice and Research Network. *J Am Board Fam Med* 2016;29:620-9. DOI 10.3122/jabfm.2016.05.160096
- Frail CK, Cooper S, Gallagher T, Sarkis J, Topor L, Bruzek RJ. A technology-supported collaboration between a health plan and a community pharmacy to improve blood pressure control. *J Am Pharm Assoc* 2017;57:630-634. DOI 10.1016/j.japh.2017.05.013
- Lesselroth B, Adams S, Felder R, et al. Using consumer-based kiosk technology to improve and standardize medication reconciliation in a specialty care setting. *Jt Comm J Qual Patient Saf* 2009;35:264-70.
- Lobach DF, Silvey GM, Willis JM, et al. Coupling direct collection of health risk information from patients through kiosks with decision support for proactive care management. *AMIA 2008 Symposium Proceedings*, Washington, DC, November 8-12, 2008.
- Jones R. The role of health kiosks in 2009: literature and informant review. *Int J Environ Res Public Health* 2009;6:1818-55. Epub 11 Jun 2009. DOI 10.3390/ijerph6061818
- Wrenn G, Syed I, Kasiah F. Using a self-service kiosk to identify behavioural health needs in a primary care clinic serving an urban, underserved population. *J Innov Health Inform* 2015;22:323-8. DOI 10.14236/jhi.v22i3.134
- Williams P, Nicholas D, Huntington P. Non use of health information kiosks examined in an information needs context. *Health Info Libr J* 2003;20:95-103.