Published in final edited form as:

Am J Emerg Med. 2014 July ; 32(7): 797–799. doi:10.1016/j.ajem.2014.04.025.

Kiosks as Tools for Health Information-Sharing: Exploratory Analysis of a Novel Emergency Department Program

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It is widely recognized that the demand for emergency services is rising. Emergency Department (ED) utilization increased from 36.9 visits per 100 persons per year in 1995 to 42.8 in 2010.^{1,2} With increasingly time- and personnel-constrained EDs, self-service kiosks have emerged as one potential solution to perform simple tasks such as registration and information distribution. This process-oriented solution may free up health care providers for more complex duties and is particularly relevant to EDs, whose core mission is to provide emergency care for potentially life-threatening conditions.

A non-targeted opt-in rapid oral fluid HIV testing program has been part of standard of care in this ED since 2005.^{3,4} Recently, we evaluated the feasibility and outcomes of a kiosk approach to testing in order to improve efficiency and reach a greater proportion of patients.⁵ As part of that quality insurance program evaluation, we included a structured questionnaire on the kiosk to determine patient comfort level with using kiosks to share and update personal health information with ED staff. This report presents a secondary analysis of data.⁵

Kiosk-facilitated screening involved two stages, a front-end registration kiosk to engage those interested in HIV testing, and a back-end testing kiosk that collected demographic data and provided a single location for testing.⁵ The front-end kiosk surveyed patients about comfort level with using kiosk technology, measured via a 5-point Likert scale (Figure 1). Level 1 Emergency Severity Index (ESI) patients who were sent directly to treatment rooms and non-ambulatory patients were excluded from the program evaluation, due to inability to use the free-standing kiosks.⁶ The study was approved by the Johns Hopkins University School of Medicine Institutional Review Board.

Between December 2011 and April 2012, 4,351 patients completed the kiosk module. Table 1 summarizes patient demographic and clinical information collected from the electronic

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The authors do not have associations that might pose a potential conflict of interest.

medical record. The majority of patients (57%) responded positively to using the kiosk, indicating that they felt either “very comfortable” (32%) or “somewhat comfortable” (25%) with using it to update their information. 15% rated “neutral”, while 6% answered “not very comfortable” and 16% “not at all comfortable” (Table 2). We performed a multivariate regression analysis to determine whether patient characteristics were associated with kiosk comfort level (Table 3). Men were less confident than women with using kiosks to enter information (OR: 0.8) and patients age 65 and older were less likely to express comfort utilizing kiosks for this purpose relative to those 18–24 years old (OR: 0.6).

To the best of our knowledge, our analysis is one of the first to examine patient preferences surrounding kiosk utilization for personal data entry. Porter, et al. (2004) reported the use of a kiosk in ED pediatric asthma cases. Parents entered information about their child’s illness experience and the kiosk provided parent-child needs and recommended actions to improve the child’s care. Parents’ responses to the asthma kiosk were extremely positive as most found it easy to navigate, characterizing the kiosk interaction as a valuable use of time, and appreciating the action item outputs.⁷

Our study revealed age and gender discrepancies in level of comfort with using kiosks as men and elderly patients were less comfortable using kiosks to enter and update personal information. Although we did not specifically assess logistical challenges associated with the module, we have reported previously that higher education levels and prior experience with kiosks are associated with less time spent on specific kiosk modules and higher patient-reported ratings of ease of use.⁸ The 2008 U.S. Census Bureau reports that 14.5% of men over age 18 in Baltimore City do not graduate from high school, as compared to 12.7% of women.⁹ This may pose an intrinsic challenge to kiosk usage if men in certain locations on the whole are less educated and less comfortable with new technologies. In regards to elderly patients, it is likely that a certain amount of the discrepancy will disappear as self-service kiosks become more common in settings outside the hospital such as airports, grocery stores, banks, retail stores, etc. In order to be widely implemented as a tool for data entry and information disbursement, kiosks must be easy to understand and navigate for most patients.

Our findings suggest promise for use of kiosks in the ED as a supportive communication tool with the majority of patients expressing comfort with using the kiosk to share health information with providers. Self-service kiosks have the potential to speed up ED visits because patients can fill in medical and surgical history and medication lists during wait times. This study provides an excellent foundation upon which to introduce kiosk interventions into an urban ED setting with the goals of optimizing ED throughput and improving information sharing.

Acknowledgments

Support provided by Gilead Sciences, Inc.’s HIV FOCUS program. Hsieh, Rothman, and Gaydos are also supported by NIH U54EB007958.

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The Emergency Department is thinking about letting patients review and make corrections to their medical and surgical history as well as to their medication list on a kiosk such as this one.

Would you feel comfortable doing this on a kiosk?

Very	Somewhat	Neutral	Not very	Not at all
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Continue

Figure 1.

Table 1

Baseline Characteristics of All Study Patients (N = 4351)

Characteristic	Number (%)
Age	
18–24	1038 (23.9)
25–34	1102 (25.3)
35–44	698 (16.0)
45–54	880 (20.3)
55–64	450 (10.3)
>64	182 (4.2)
Female sex *	2454 (56.4)
Race *	
African American	3356 (77.1)
White	742 (17.0)
Other	253 (5.8)
Acuity *	
1	2 (0.1)
2	17 (0.4)
3	3010 (69.2)
4	1124 (25.8)
5	67 (1.5)
Chief complaint *	
Abdominal pain	466 (10.7)
Headache	166 (3.8)
Back pain	175 (4.0)
Abscess	112 (2.6)
Chest pain	112 (2.6)
Other	3320 (76.3)
Disposition *	
Admit	380 (8.7)
Discharge	3333 (76.6)
Other (observation)	638 (14.7)
ED primary discharge	398 (9.2)
diagnosis related to infectious disease *	

* Gender, race, chief complaint, and disposition information was missing in 128 patients; triage acuity information was missing in 131 patients; ED primary discharge diagnosis information was missing in 147 patients

Table 2

Patient Comfort with Reviewing and Making Corrections to Medical and Surgical History and Medication Lists on a Kiosk (N = 4351)

Comfort Level	Number (%)
Very comfortable	1398 (32.1)
Somewhat comfortable	1074 (24.7)
Neutral	635 (14.6)
Not very comfortable	249 (5.7)
Not at all comfortable	674 (15.5)

Table 3

Regression Results on Patient Comfort with Using Kiosks

	Odds Ratio (95% CI)
Age 18–24	1.0
Age 25–34	0.9 (0.8–1.1)
Age 35–44	1.2 (1.0–1.4)
Age 45–54	1.0 (0.8–1.1)
Age 55–64	1.1 (0.9–1.4)
Age >64	0.6 (0.4–0.8)
Female sex	1.0
Male sex	0.8 (0.7–0.9)
Non-black	NS
Black	NS
CC: other	NS
CC: abd. pain	NS
CC: headache	NS
CC: back pain	NS
CC: abscess	NS
CC: chest pain	NS

NS: not significant; Abd. Pain: abdominal pain