

Portals in inpatient care (PIC): Evaluating the usability, use and patient experience associated with patient portal technology at the bedside

Principal Investigator: Ann Scheck McAlearney, ScD, MS
Professor and Vice Chair for Research
Department of Family Medicine, Ohio State University
273 Northwood and High Building
2231 North High Street
Columbus, OH 43201
Phone: 614-293-3716; Fax: 614-293-2715
Email: Ann.McAlearney@osumc.edu

Co-Investigators: Timothy Huerta, PhD, MS
Cynthia Sieck, PhD, MPH
Jennifer Hefner, PhD, MPH
Daniel Walker, PhD, MPH
Po-Yin Yen, PhD, MS, RN
Courtney Hebert, MD, MS

Additional Team Members: Terri Menser, PhD
Alice Gaughan, MS
Lindsey Sova, MPH
Seth Scarborough, MAS
Robert Taylor, MA

Organization: Departments of Family Medicine and Biomedical Informatics
The Ohio State University College of Medicine

Inclusive Dates of Project: 09/30/2015 – 09/29/2017

Federal Project Officer: Steve Bernstein
Agency of Healthcare Research and Quality

Grant Award Number: 1R21HS024349

The research in this report was supported by a grant from the Agency for Healthcare Research & Quality (Grant #R21HS024349).

1. Structured Abstract.

Purpose: This study was designed to assess the use, usability, and impact of inpatient portals on patient experience, engagement, and perceptions of care.

Scope: We assessed Ohio State University Wexner Medical Center's experience as the first academic medical center in the country implementing an inpatient portal to improve our understanding of the potential and impact of this new technology.

Methods: Our mixed methods study assessed: 1) How patients could interact with an inpatient portal; 2) How patients used the portal; and 3) How use of the portal impacted patient experience and engagement. Methods included interviews with patients and providers, a usability study, and quantitative assessments through portal log file analysis.

Results: Usability studies showed that errors encountered by portal users were attributable to issues with system design, assumptions about functionalities, and insufficient user knowledge. Patients reported that access to MCB made them feel more in control of their care and able to ask better questions. Providers were neutral about MCB use. Some reported that teaching patients how to use MCB was beyond their scope of work while others noted it was a good tool or "had potential" to help patients. Log file analyses developed a taxonomy of portal use.

Key Words: patient portal, patient experience, patient education, patient engagement

2. Purpose.

This study, Portals in Inpatient Care (PIC): Evaluating the Usability, Use and Patient Experience Associated with Patient Portal Technology at the Bedside, was designed to assess the impact of hospital-based patient portals on the patient experience, long-term engagement, self-efficacy and post-discharge quality of care.

3. Scope.

Patient portals are becoming a part of the ecosystem of care. Many policymakers and health advocates believe increased use of patient portals will empower patients to engage in better management of their care, and this will result in healthier populations and lower costs. Despite the interest in and proliferation of ambulatory patient portals, little is known about what motivates patients to adopt and continue to use portals, and what functionalities patients consider important for self-management of conditions. At the same time, research on patient engagement through health information technology (HIT) in the inpatient setting has only included small-scale qualitative case studies examining limited technological parameters such as access to medication records or care team information.

In 2013, Ohio State University Wexner Medical Center (OSUWMC) was the first academic medical center in the United States to experiment with wide-scale deployment of inpatient portals through the MyChart Bedside tablet-based application. Our study was focused on evaluating *Usability, Use and Experience* with MyChart Bedside to gain a greater understanding of the process, content, and context in which this tool is embedded and continues to evolve. Our intent in this Portals in Inpatient Care (PIC) study was to explore

how the tool affects use, how use shapes the experience, and why individuals have varied experiences.

4. Methods.

The *Usability Track* focused on usability testing of the MCB application with patients. This Track included a structured usability assessment of MCB to identify how easily patients interacted with the portal. The OSUWMC Patient and Family Experience Department identified 20 patient volunteers who participated in Think-Aloud sessions with our Usability team. Usability was evaluated by observing the interactions between user, tool, and task, and with measures of task completeness and errors (effectiveness), completion time (efficiency), and perception (satisfaction).

The *Use Track* focused on secondary data analysis of EHR log files. MCB usage was tracked by analyzing log files, which are server-side records of tool use and represent a class of data called “Sequential Temporal Data.” The log file analysis involved a quantitative assessment of MCB use and impacts on health outcomes and clinical data quality to understand patterns of MCB use generally as well as within certain population subgroups. Our *Use Track* evaluation involved data from the general patient population across the OSUWMC. Any patient who was offered MCB after the go-live of MCB in January 2014 was included in this analysis.

The *Experience Track* involved an evaluation of patient and provider experience with the inpatient portal through surveys and interviews with patients and caregivers, as well as interviews with care providers and hospital staff. Patients were recruited as close to the time of admission as possible, when they were initially offered the MCB tablet. Interviews were conducted with 60 patients. Individual phone interviews were conducted within 15 days of discharge and focused on what elements of MCB patients utilized, their perceptions of how MCB influenced their hospital stay, and what they liked and did not like about MCB. Interviews were also conducted with 124 care team members during two different time frames of the study. To facilitate participation, we scheduled the interviews to take place in a hospital unit breakroom, with nurses joining the conversation when was convenient.

The data from these three evaluation tracks provided initial input into the development of a logic model. We hosted a preliminary results conference with stakeholders to build a preliminary Logic Model for assessment of a patient portal drawing upon the knowledge gained in the usability, use and experience tracks. Stakeholders included patient volunteers, clinicians and managers across the OSUWMC. We recruited 20 stakeholders to participate in the Nominal Group Technique (NGT) meeting. The highly structured format of NGT meetings promoted equal involvement of participants and controlled extraneous and evaluative discussion that frequently occurs in group sessions when controversial issues are addressed or when there are real or perceived power differentials among participants. We used this process to allow the expansion, development and clarification of the logic model to more thoroughly explore underlying and unacknowledged inputs, activities, outputs and outcomes. NGT participants characterized the work system relevant to MyChart Bedside into four groups: patients; care team; hospital management; and information technology team. NGT participants first developed, and then ranked, the outcomes associated with each group as a result of use of MyChart Bedside.

5. Results.

From Usability Track

- Usability session Think-Aloud participants frequently made operational errors and made the most errors in navigation and by assuming the system had common technology functionalities.
- Several errors could be attributed to system design issues, though others were a result of insufficient user knowledge of the application.
- Participants' learning styles varied, with age as a potential factor that influenced how they learned to navigate the MCB application.
- Participants had mixed opinions about communicating with their providers using a messaging function in MCB; they reportedly preferred to individually message providers and wanted feedback on status.
- Users showed a strong preference for personalized information, and for resources to be available to instruct them how to use MCB.
- Results of this study can inform future technology upgrades of the application, decision-making about the platform, and training programs that may be developed to encourage use of the inpatient portal.

From Use Track

MCB general usage:

1. Most commonly used features: Dining on Demand, followed closely by Happening Soon.
2. Least commonly used features: Sending Messages and Notes
3. The amount of time between admission and tablet provisioning is slightly more than 1 day, on average.
4. Those who use the tablet each day average between 3 and 4 sessions of use.
5. The most common times of use are between 8am and noon, followed by 4pm to 8pm.

MCB secure messaging:

1. The median care team response time to messages is 62 minutes.
2. Approximately 32% of patient inquiries are responded to with a message from the care team.

From Experience Track

Patient Interviews:

- Patients indicated a need for instruction, training on use of MCB.
- Patients mentioned that access to the MCB tablet made them feel more in control of their care, put them at ease (patient education materials), and made them able to ask better questions to their providers.
- Many patients felt that MCB features focused on their health care team helped put names to faces.
- Many patients liked that MCB gave them access to information about their medications and test results
- Patients using the outpatient MyChart portal linked their accounts to the inpatient portal.

Provider Interviews:

- Providers reported needing more training on the inpatient portal, and especially the ability to practice using the tablet with the portal installed. They reported that the mandatory computer-based learning module they had to take for training was not helpful.
- There was confusion on the part of providers about whether use of the tablet should only be for healthcare or whether it was okay for patients to use the portal for entertainment purposes. (The answer was that it was okay and a good thing).
- Overall, providers were neutral about inpatient portal use. Across interviews, a number of staff reported that teaching patients how to use MCB was perceived to be beyond their scope of work. While many staff did not mind, others were reportedly very frustrated with “one more thing to do.” At the same time, others noted that they felt it was a good tool or “had potential” to help patients.
- There were also reportedly issues with the patients themselves using the portal including issues such as health and technological literacy, patients being extremely ill, etc.

Patient Surveys:

- Admitted patients were provided with the opportunity to participate in this study and offered a link to the Admission Survey. Over 3,000 patients completed the admission survey. Our response rate for those patients who consented to participate in the research study was nearly 40%.
- Among respondents, nearly one-third reported their health as fair or poor; 57% of respondents had been admitted to the hospital at least one other time in the past year.
- With respect to technology, 49% of respondents reported having a tablet; 66% reported having a smartphone; 56% had a computer; 71% had personal Internet access.
- For MyChart usage, about half reported using a patient portal prior to this hospital stay; 81% reported strongly agreeing or somewhat agreeing that they liked using the patient portal; among those respondents who had not used a patient portal prior to this hospital stay, 73% reported strongly or somewhat agreeing that they would be willing to use a patient portal.
- Based on feedback from the interviews and admission survey process, a Discharge Survey was also developed for patients discharged from the hospital. We have obtained a response rate of approximately 23% for the 7-day Discharge Survey and an 18% response rate for the 6-month Discharge Survey.

From NGT:

- For patients, the top three most important outcomes were: patient satisfaction, shared decision making, and patient engagement.
- For the care team, the top three most important outcomes were efficiency, communication, and identification of errors.
- For hospital management, the top three most important outcomes were quality, patient satisfaction, and communication.
- For the information technology team, the top three most important outcomes were outpatient portal activation, patient education, and response to messages.

6. Conclusions

Patient portals show promise as a tool that can facilitate patient engagement and improve patients' experiences. The design of inpatient portals can greatly impact how patients navigate and comprehend information in inpatient portals; poor design can result in a

frustrating user experience. With a detailed understanding of user experience associated with using these tools, hospitals can be better positioned to support and encourage patient use of the tool. In particular, hospitals may be able to offer multi-modal approaches to teach patients how to use patient portals, including in-person training. This hands-on approach may be better able to create lasting engagement with the technology that continues as the patient transitions out of the hospital. Organizations should work closely with the development team regarding system design, upgrades, and training so adjustments are made in the best interests of inpatients. Organizations should also clearly define the role of an inpatient portal in regards to patient-provider communication and continuously assess its impact on patient satisfaction and clinician workflow.

7. List of Publications (Use [AHRQ Citation Style for Reference Lists](#)).

Manuscripts Published or In Press:

1. **Sieck CJ, Hefner JL, Schnierle J, et al.** The Rules of Engagement: Perspectives on Secure Messaging From Experienced Ambulatory Patient Portal Users. *JMIR Med Inform.* 2017 Jul 4;5(3):e13. PMID: PMC5516097.
2. **Yen PY, McAlearney AS, Sieck CJ, et al.** Health Information Technology (HIT) Adaptation: Refocusing on the Journey to Successful HIT Implementation. *JMIR Med Inform.* 2017 Sep 7;5(3):e28. PMID: PMC5608986.
3. **Hefner JL, Sieck CJ, Walker DM, et al.** System-Wide Inpatient Portal Implementation: Survey of Health Care Team Perceptions. *JMIR Med Inform.* 2017 Sep 14;5(3):e31. PMID: PMC5620453.
4. **Walker DM, Sieck CJ, Menser T, et al.** Information Technology To Support Patient Engagement: Where Do We Stand and Where Can We Go? *J Am Med Inform Assoc.* 2017 Nov 1;24(6):1088-1094. PMID: 28460042.
5. Yen P, **Walker DM, Menser TL, et al.** Usability Evaluation of a Commercial Inpatient Portal. *Int J Med Inform.* 2017. In Press. DOI: 10.1016/j.ijmedinf.2017.11.007
6. **Yen P, Walker DM, Menser TL, et al.** Usability evaluation of a commercial inpatient portal. *International Journal of Medical Informatics.* 2017. In Press.
7. **Walker DM, Menser TL, Yen PY, et al.** Optimizing the User Experience: Identifying Opportunities to Improve Use of an Inpatient Portal. *Second Applied Clinical Informatics.* 2017. In press.

Manuscripts Under Review:

1. **Hefner JL, Sieck CJ, McAlearney AS.** "Training to Optimize Collaborative Use of an Inpatient Portal: A Case Report." Under review by: *Journal of the American Medical Informatics Association.*
2. **Sieck CJ, Hefner JL, McAlearney AS.** "Improving Engagement for Engagement via Patient Portals: Insights from Experienced Portal Users." Under review by *The Patient: Patient-Centered Outcomes Research.*
3. **Walker D, Hefner JL, Sieck CJ, Huerta T, McAlearney AS.** "Framework for Evaluating and Implementing Inpatient Portals: A Multi-Stakeholder Perspective." Under review by: *BMC Medical Informatics.*
4. **Sieck, CJ, Hefner, JL, McAlearney, AS.** "The Route to Improved Patient Engagement: Perspectives of Experienced Patient Portal Users," Under review by: *Annals of Family Medicine.*