

SECURED MESSAGING IN PATIENT PORTAL: IMPROVING EFFICIENCIES IN  
PATIENT-PROVIDER COMMUNICATION

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## SECURE MESSAGING IN PORTAL

### Abstract

**Problem:** Patient portals are an easily accessible health care application, allowing patients and parents/caregivers 24/7 access to their health information and the ability to engage with their providers through asynchronous communication. Emailing patients is not a reliable form of communication if personal health information is discussed. Secure messaging within the patient portal is an appropriate substitute for emails as it fulfills the requirements of the HIPAA Security Rule without compromising the conveniences of mobile technology or security.

**Purpose:** The purpose of this quality improvement project was to improve enrollment and patient engagement in the patient portal to increase the use of secure messaging amongst cardiology patients and providers (primary cardiology, electrophysiology, and adult congenital).

**Methods:** To increase the enrollment of portal users by patients techniques were implemented in the clinic to include: patients informed about the portal at the front desk and with the nursing staff; each patient visit focused attention on the secure messaging feature; additionally, patients over the age of 13 were given the option to self-enroll on iPads in the clinic. Providers were required to complete an online module related to secure messaging.

**Results:** The Patient Engagement Team tracked the number of messages sent, received, and other portal related statistics for the pediatric cardiology clinic for 12 weeks before the intervention and 12-week post-implementation. These messages were collected and analyzed. Pre-implementation, the pediatric cardiology department received an average of 60 messages and sent an average of 39 messages back to patients or other providers. During the implementation period, the messages received increased to 102 per month, and messages sent by our staff also increased to 66 messages per month. Significant barriers during implementation included parent/caregiver delays receiving the portal enrollment email notification and the portal closing for a month during execution.

**Conclusion:** Despite limitations, messaging increased by near 60 percent for inbound and outbound messages. Patient-provider secure messaging communication is a viable and effective method for non-urgent communication between patients and providers. A renewed focus on the importance of secure patient communication is highlighted in this patient improvement initiative. Sustainability of messaging within the portal use will require time, consistency, and support from the entire cardiology team, including cardiologists.

Keywords: patient portal, secure messaging, personal health record, patient-provider communication

## SECURE MESSAGING IN PORTAL

### **Introduction**

Technology has become a driving force behind improvements in healthcare from the widespread adoption of computerized provider order entry (CPOE) to patients' ability to conveniently access their personal health information (PHI) through their patient portal to telemedicine, all available at any time from any electronic device. Breakthroughs in technology are making impacts on data collection, research, and treatment modalities.

In 2009, the American Recovery and Reinvestment Act (ARRA) was signed into law; it included the Health Information Technology for Economic and Clinical Health (HITECH) Act (Health & Human Services, 2017). The HITECH Act worked in conjunction with the Center for Medicare & Medicaid Services, one of the main drivers in encouraging eligible clinicians and hospitals to adopt and meaningfully use certified electronic health record (EHR) technology. Promoting Interoperability programs (formally known as Meaningful Use) aimed to improve quality, safety, efficiency, and reduce health disparities; engaging patients and their families; improving care coordination, population, and public health; and maintenance of the privacy and security of patient health information (Conway, 2013).

As more patients are gaining access to their personal health information, security remains a significant concern. The concerns for external attacks or accidental exposures of PHI by healthcare workers have pushed hospitals and practices to rethink the way they discuss and protect patient data. The patient portal is easily accessible, allowing patients and parents/caregivers 24/7 access to their health information and the ability to engage with their providers through asynchronous communication (The Office of National Coordinator, 2015).

## SECURE MESSAGING IN PORTAL

Emailing patients is not a reliable form of communication, while personal health information is discussed. While many hospitals are increasing their encryption and security measures, those techniques are still not sufficient according to the Health Insurance Portability and Accountability Act (HIPAA). Secure messaging is an appropriate substitute for emails as it fulfills all the requirements of the HIPAA Security Rule without compromising the conveniences of mobile technology (U.S. Department of Health and Human Services, 2019). The purpose of this scholarly quality improvement project was to implement and evaluate the efficiency of the use of secure messaging provider-patient communication within the patient portal.

### **Literature Review**

A literature review was conducted on the most current and best evidence supporting the use of secure messaging as a viable and HIPAA compliant method of patient-provider communication. Evidence was reviewed for interventions in pediatric populations related to secure messaging communication amongst patients, caregivers, and their providers. Included studies were summarized and critically appraised based on the key elements recommended by Melnyk and Fineout-Overholt in Table 1 (Melnyk & Fineout-Overholt, 2015).

The emergence of the internet and the electronic health record created new opportunities for patients and their families/caregivers to play a more active role in their health (Ammenwerth, Schnell-Inderst, & Hoerbst, 2012). Patient portals gained interest as a promising and secure mechanism to support engagement in personal health records (Irizarry, Dabbs, & Cirran, 2015).

## SECURE MESSAGING IN PORTAL

Utilization of health IT technologies within the electronic medical record like secure messaging is essential to increase the efficiency of communication between patients and providers, but the impact has not been thoroughly evaluated (AHRQ, 2011).

Irizarry, Dabbs, and Curran (2015) systematically reviewed 120 studies on portals and found several common themes. Those themes included user acceptance, personalization, and shared communication. For patients to actively utilize and engage with providers electronic, that communication exchange must ensure privacy and be meaningful.

Kruse et al. (2015) also analyzed 27 articles assessing portal use, areas for improvement, and the similarities of portal populations; the common themes were an increased self-management of chronic disease, improved communication, and favorable attitudes toward messaging. While there were no studies specifically on secure messaging in pediatric cardiology, but some of the analyzed studies included the cardiology department among the other pediatric or chronic specialties.

Masterman et al. (2016) evaluated the adoption of messaging via the patient portal in several of their pediatric sub-specialties and reported a growth of secure messaging from 2,860 to 18,722 messages over three years. Secure messaging has resulted in overall increased outcomes such as appointment adherence and satisfaction with their communication with the provider (Kruse, C., Bolton, K., Freriks, G. (2015) & Scott- Kruse, C., Argueta, D., Lopez, L. & Nair, A. (2015) & Fiks, et al., (2015).

Sieck et al. (2017) found post-implementation patients were concerned about if their use of messaging was appropriate, and physicians were concerned whether the content of their messages would help all them to manage patients' questions and concerns effectively. Their

## SECURE MESSAGING IN PORTAL

study further suggests portal training for patients/families and additional training for physicians, which a concern of our patient engagement team after one year of piloting secure messaging with the gastrointestinal team and the lead to training module changes for the physician and other providers.

A pediatric-focused randomized controlled trial that evaluated portal usage among pediatric asthmatics followed in a primary care setting (Fiks et al., 2015). The findings showed the effectiveness of portal usage, high satisfaction ratings, and a decrease in flares.

While there are limited studies on the usage of portal messaging in pediatric populations, the effectiveness of secure messaging over other electronic modalities like text messaging or emailing, and the literature has consistent reports of rapid adoption of secure messaging in the pediatric subspecialties (Masterman et al., 2016; Cronin et al., 2015; Steitz et al., 2017).

### **Theoretical Framework**

Adoption of eHealth technologies by patients is an essential topic in healthcare (Tavares & Oliveria, 2016). The conceptual framework used to guide the implementation was the Unified Theory of Acceptance and Use of Technology (UTAUT) (see Appendix A). Venkatesh and colleagues developed this theory aimed at explaining technology acceptance by examining user intentions to use an information system and subsequent usage behavior. The theory focuses on four constructs (performance expectancy, effort expectancy, social factors, and facilitating factors) that have a direct effect on behavior intention. Additionally, the model also includes four moderating variables: age, gender, education, and voluntariness of use.

Patients with chronic illnesses and disabilities are more likely to use eHealth technologies if they have the resources and support available (Kruse, Argueta, and Nair, 2015). UTAUT

## SECURE MESSAGING IN PORTAL

focuses on user behavior and usage intention, which are two essential aspects that will drive engagement. Usage behavior of patients and caregivers within the portal lead to an increase in secure messaging when educated on its use and benefits, if the user is technologically-savvy. Tech-savvy is directly related to the portal user's age, experience, and voluntariness of use. Currently, it is not required that cardiology patients utilize the portal for non-urgent communication. If that requirement changes and we continue to study to data and trends of messages sent and received for the cardiology pools, this framework will lend itself to explaining how usage and behavior are impacted by gender, age, experience, and voluntariness of use.

### **Methods**

This quality improvement project was conducted at a pediatric cardiology clinic located in an academic children's hospital. Submissions to the University of Maryland and the institution's Institutional Review Board (IRB) determined that this project was approved as a quality improvement project Non-Human Subjects Research. The inclusion criteria for this project were pediatric or adult congenital cardiology patients over the age of 13-years old who could self-enroll and parents/caregivers of cardiology patients under the age of thirteen. The exclusion criteria included patients or parents/caregivers who do not speak or write in English.

The cardiology clinic staff of the clinic was comprised of front desk staff, certified nursing assistants, registered nurses, and providers (doctors and advanced practice nurses). The DNP student acted as the project coordinator. A nurse representative from each cardiology portal pool/team (general pediatric cardiology, adult congenital, and electrophysiology) served as stakeholders and champions for their team members.

## SECURE MESSAGING IN PORTAL

The patient portal secure messaging feature opened for patient-provider use in January 2019. This quality improvement took place over 14-weeks, from the end of August 2019 to the end of November 2019. Education on the quality improvement was delivered to staff and providers. Preceding implementation, the DNP project leader confirmed all staff had completed the secure messaging online learning module, verifying that staff users of the portal were knowledgeable in sending, replying, and saving secure messages to the electronic medical record. Additionally, staff and providers were individually educated on the importance of secure messaging and patient engagement and enrollment within the patient portal.

A structural change occurred in the way staff communicated with patients about the portal. The DNP project leader coached staff individually about how to inform patients about the benefits of secure messaging to gain their buy-in. The DNP leader met with the clinic supervisor to confirm nurses assigned to the secure messaging pools daily to avoid lag in message response.

Baseline secure messaging rates were audited since the inception the secure messaging feature in January 2019. Pre-implementation data included three months of secure messaging rates in the month of October, November and December 2019. This data was compared to QI pre-implementation data. The implementation was announced to the staff at the September 2019 staff meeting. Reinforcements to all staff members on tasks to remind patients to sign up for secure messaging was accomplished in monthly staff meetings, bi-weekly check-in with champions or individual staff members. Staff were reminded to ask patients if they were signed up for the portal and inform patients or caregivers that they could communicate securely message their healthcare team about their non-urgent needs.

## SECURE MESSAGING IN PORTAL

Four weeks into the implementation process, the portal closed to new enrollments to allow for system upgrades and improvements. This upgrade lasted 6 weeks of the 12-week implementation period. The staff was informed of the change and instructed to now push previously enrolled patients to securely message their providers. For patients who were not previously enrolled, staff was instructed to educate patients about the patient portal and the importance of the secure messaging feature.

The Patient Engagement Team, comprised of IT specialist and patient engagement specialist hired to improve engagement with the portal, accumulated the secure messaging totals and response times from all the three pools within the cardiology division and the rest of the hospital. Each month, their team disclosed secure messaging engagement statistics. The DNP project leader shared these statistics with the champions when available to encourage the staff consistency at each patient visit and increase overall secure messaging totals. In Mid-October, the cardiology fellows were emailed to remind patients at the end of their patient care visits to ensure they were recommended patients to securely message.

### **Results**

The pediatric cardiology department was successful at making changes in structures and processes to lead to successful implementation. Before the start of the project implementation, the manager of the cardiology clinic ensured the compliance of all staff and reported 100% completion of the secure messaging online module.

Over the twelve-week data collection period, the three messaging pools for the cardiology department were audited monthly for the number of inbound messages, replies and response times (see Figure 1). Despite the portal barriers to allow new enrollees who were

## SECURE MESSAGING IN PORTAL

informed about the portal messaging feature, there was a significant improvements in messaging. The Primary Cardiology pool began with 29 secure messages sent pre-implementation which increased to 43 post-implementation; secure message replies were 17 pre-implementation and it increased to 23 post-implementation. The Electrophysiology (EP) pool sent 17 secure messages pre-implementation, which increased to 40 messages post-implementation; the EP providers were sent 12 replies pre-implementation and an underwent an interval increase to 34 secure messages replies post-implementation. The Adult Congenital pool begin with 12 secure messages pre-implementation and increased to 19 messages post-implementation. The ACHD sent 10 secure messages pre-implementation and experienced a decreased to 9 messages post-implementation.

In total, sixty secure messages sent pre-implementation which increased to 103 inbound messages post-implementation. Similarly, 39 secure message replies were recorded pre-implementation which increased to 66 messages post-implementation. Among the three pools, there was minimal difference in response times pre-implementation and post-implementation; they were 0.68 and 0.64 in days respectively (see Figure 2). The hospital set a benchmark of response times of less than 72 hours was achieved both pre and post implementation.

### **Discussion**

This QI project implementation resulted in similar findings by Masterman et al., Cronin et al., and Steitz et al. that found that clinics could rapidly adapt to an online secure messaging system. While there was at least 50% uptrend in the utilization of secure messaging during the project implementation period, this project had several limitations. Parents and caregivers

## SECURE MESSAGING IN PORTAL

provided feedback that a significant lag occurred when waiting for the access code to be emailed, allowing them access to their child's electronic health records via the patient portal. Closing of portal registration proved for new portal enrollments for six weeks while they were updating the system and to improving the delays reported in the access code email to allow caregiver portal access to their child's electronic health record. The Ambulatory Department leadership was unable to provide a specific number of cardiology patients eligible for portal enrollment nor was the Patient Engagement team was unable to provide the number of new enrollments for patients in the cardiology department during the implementation period. A contributing limitation to more robust adoption of secure messaging were changes in the front desk staff leading to lack of consistency in messaging while the portal was open for new enrollments. There was also a lack of physician reinforcement of secure messaging versus emailing them to communicate their non-urgent questions or concerns. Provider reinforcements are imperative to a more rapid and sustainability.

The limitations to generalizability of the findings are related to the significant barriers that affected during project implementation. In order for the results to be generalizable, additional implementation time would be necessary to combat the missed opportunities for new enrollments to the portal.

Overall the results of this project still exceeded the goal of doubling usage despite the barriers. While there was an improvement to previous messaging rates, there are still some opportunities for changes in front desk staff, lack of consistency from providers to require usage of the portal and unexpected closing of the portal for 6 weeks affected how robust the overall adoption rates could have been.

## SECURE MESSAGING IN PORTAL

### **Conclusion**

This quality improvement project doubled the frequency of non-urgent communication between cardiology patients and their providers by utilizing the secure messaging feature within the patient portal. Since the inception of the secure messaging feature, monitoring and auditing of the number of secure messages sent and received have been made available to every department. Despite untimely barriers, utilization of secure messaging goals were met. There remains opportunity for improvement in the pediatric/adult congenital cardiology clinic in the area of portal use and engagement with providers.

Sustainability proved achievable within the cardiology department with consistent communication and reminders from providers and staff that enrollment is required. There is ample opportunity for portal enrollment and engagement to improve and be disseminated among all ambulatory departments within the hospital with buy-in from departmental stakeholders. The Patient Engagement Team already monitors all secure messaging for all ambulatory departments and it is their focus to increase engagement especially among providers.

The implications for future practice may warrant this project be conducted over an extended period. It is a priority to have providers consistently highlight the features and security of a patient portal while also reinforcing the usage of the purpose of secure messaging. As patient portal engagement and secure messaging continues to increase, more studies are needed to understand the implications for provider workflow and patient care.

## SECURE MESSAGING IN PORTAL

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## SECURE MESSAGING IN PORTAL

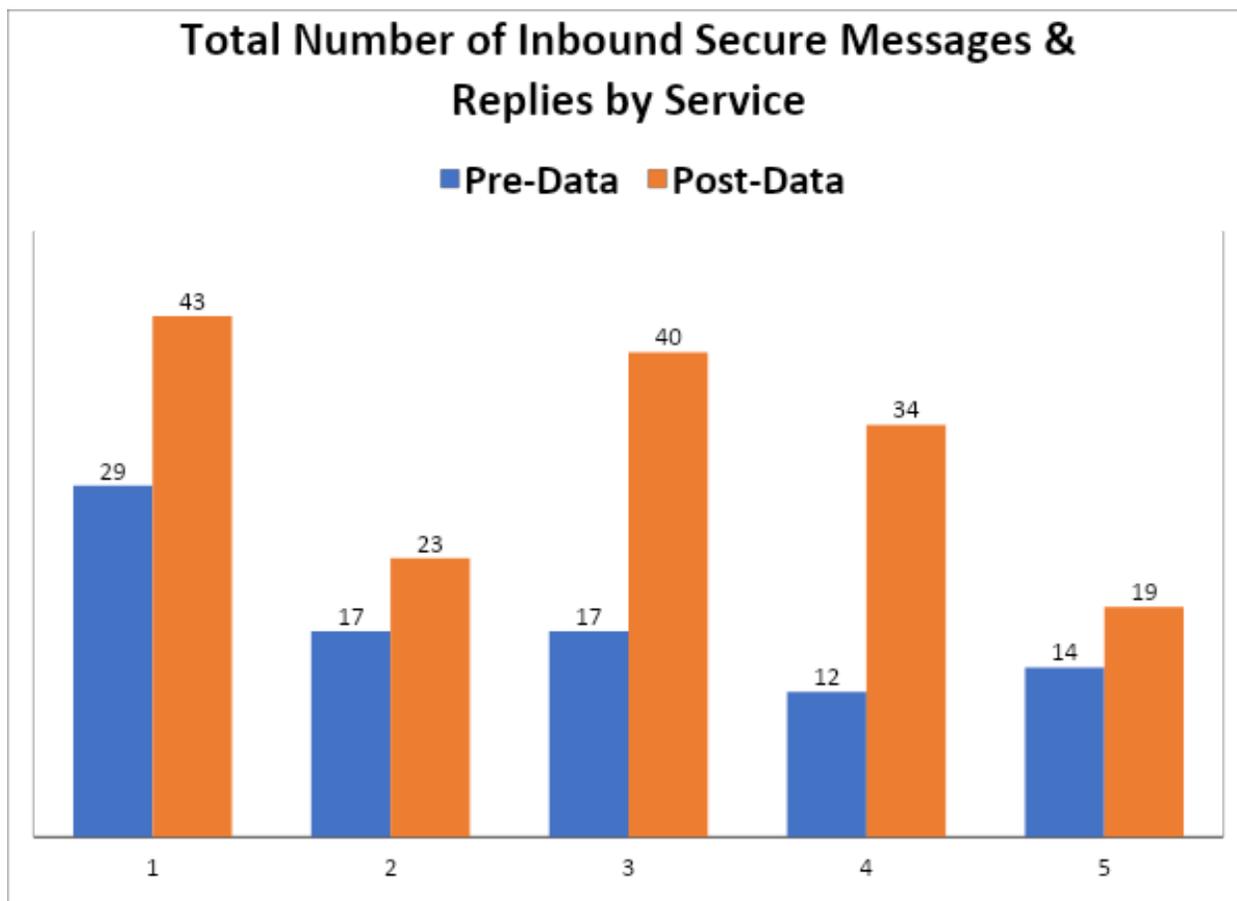
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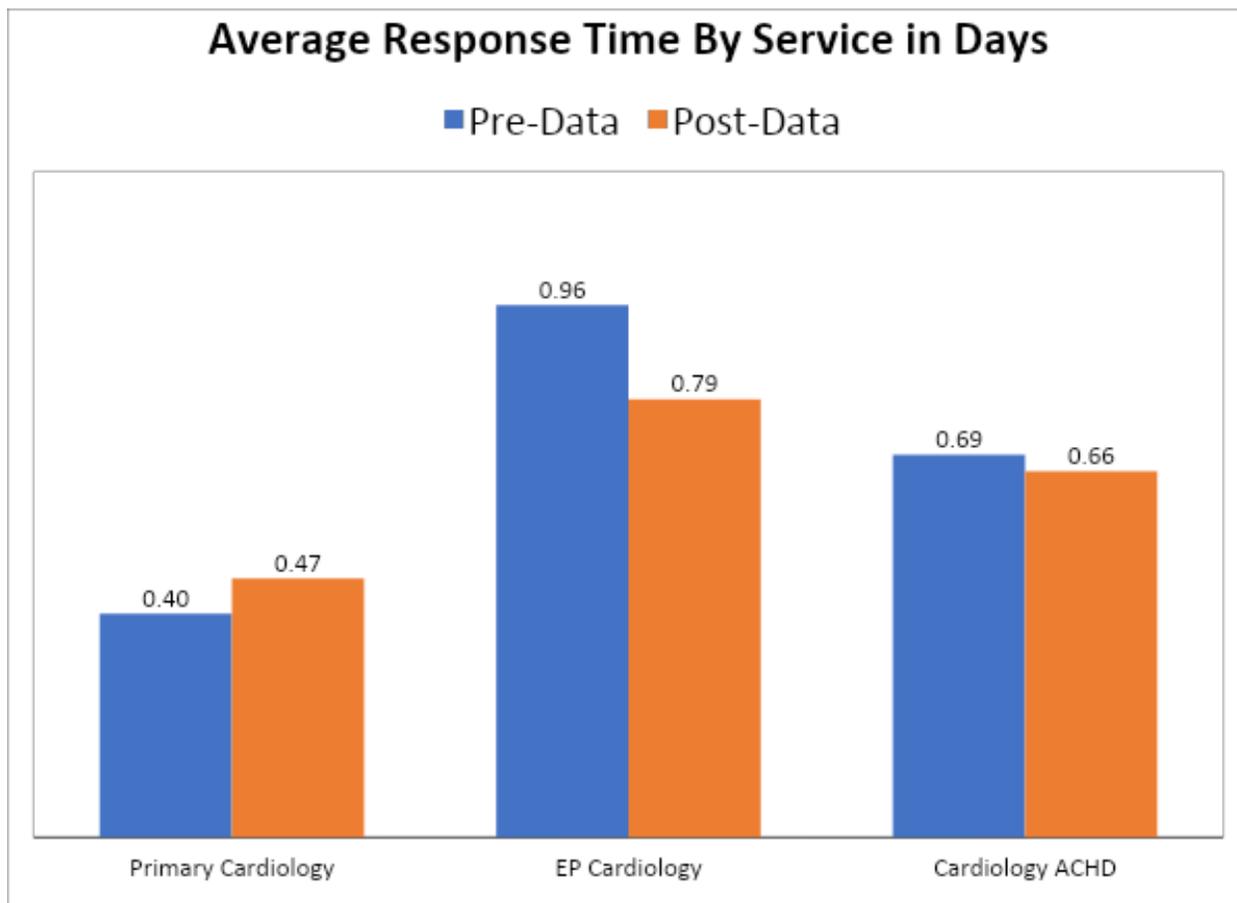
## Appendix A



*Figure 1.* Bar graph demonstrating secure messages sent and received within the pediatric cardiology department broken down by service.

*Note:* Pre-data (May, June, July 2019); Post-data (September, October, & November 2019); August 2019 was implementation month

## SECURE MESSAGING IN PORTAL



*Figure 2.* Bar graph demonstrating response times to secure messages sent and received within the pediatric cardiology department broken down by service.

*Note.* Pre-data (May, June, & July 2019); Post-data (September, October, & November 2019); August 2019 was implementation month

## Appendix B

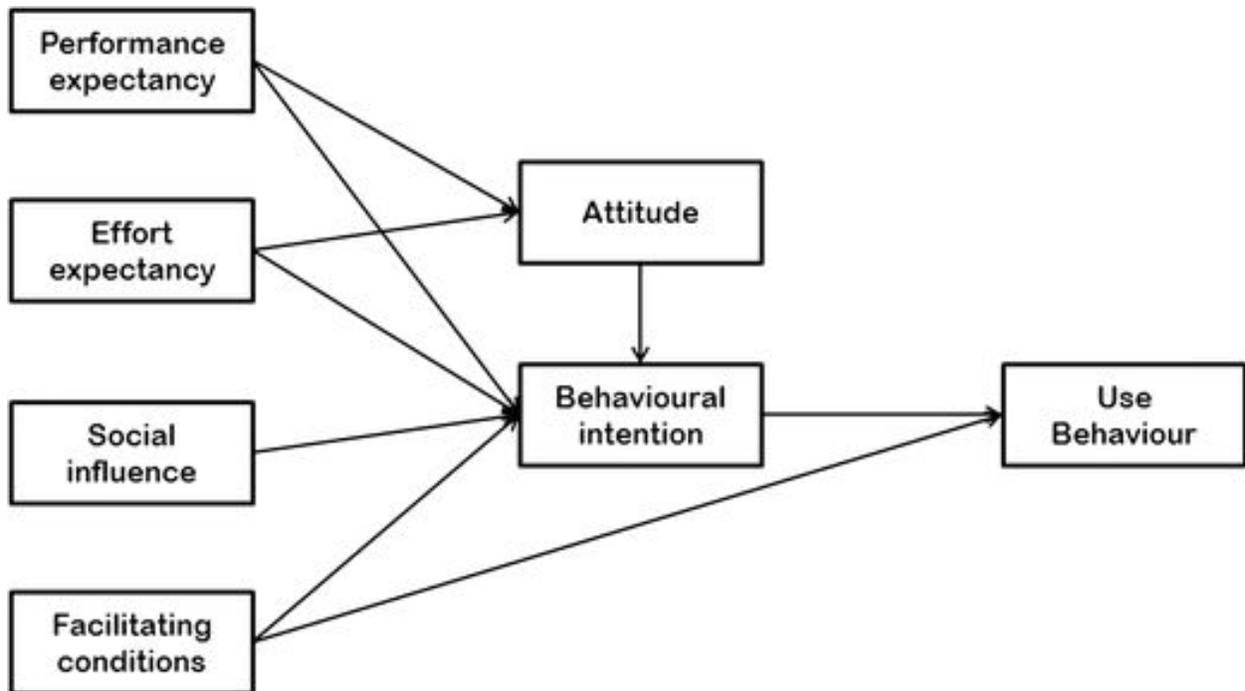


Figure 3. Venkatesh et al. (2003) UTAT theoretical model

## Appendix C

Table 1. Evidence Review Table

Using the Melnyk-Fineout-Overholt Evidence Rating Criteria and Newhouse Rating Scale for Quality of Evidence

<b>Author, year</b>	<b>Study objective/intervention or exposures compared</b>	<b>Design</b>	<b>Sample (N)</b>	<b>Outcomes studied (how measured)</b>	<b>Results</b>
Reicher, J.J. & Reicher, M.A. (2016)	To assess the usage of meaningful use compliant HER technology and bi-directional messaging in radiology practice	Single Center Cohort Study	N=36 vendors	Outcomes were tracked by auditing of messaging and feedback from patients and radiologists	After tracking of two years, secured messages rose from 752,496; organizational users from 667 to 39
Kruse, C., Bolton, K., Freriks, G. (2015)	To evaluate the relationship of different features of patient portals on patient care outcomes and Meaningful Use Stage 2 requirements	Systematic Review	N=27; 26 studies, 1 systematic review	Outcomes from the different types of studies were separated by year; there were a mix of experimental and non-experimental studies	The use of patient portals resulted in a retention rate of adherence, lower no-shows. The use of portal users and women, Caucasians, degrees and under 30 years of age, with a preference for electronic information
Riera, K. M., Robinson, J. R., Van Arendonk, K. J., Jackson,	To characterize the adoption of portals in pediatric surgical specialties and describe the content of messages exchanged	Single Center Cohort Study across 10 surgical specialties	N=1679 (total messages)	Manual analyzing of all message threads using taxonomy: (Categories included: informational, medical, logistical, social, and other)	Messages were frequently regarding younger patients (p=0.001); Half of the messages were from physician patients (55%)

## SECURE MESSAGING

G.P. (2018)					<p>Otolaryngology the most thread subspecialties (42.1%)</p> <p>Most threads in direct medical (42.1%), then so (33%); medical (27.7%), and tr (23.3%)</p>
Firks, et al., (2015)	Evaluate the impact of portal outcomes/ portal engagement in pediatric outpatient pulmonary/asthma patient population	Randomized Controlled Trial	N=30	Outcomes measured over 6-month period included enrollment survey (3 total	<p>Children with n severe asthma u portal more ofte those with mild moderate asthma</p> <p>Portal satisfacti 92% per survey</p> <p>More than half parents in the tr group used the 5 of the 6-mont period</p>
Scott-Kruse, C., Argueta, D., Lopez, L. & Nair, A. (2015).	Evaluation of portal use, portal users, and areas for improvement	Systematic Review	N=27 (articles/studies)	Articles were surveyed that specifically evaluated portal use and users	<p>1/3 of the studie experienced an in users with ch disease and an improvement in management of disease</p> <p>Messaging and communication overall were im nearly 40% with of the portal</p>

