Patient Attitudes about

Patient Portal Functions

by

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Abstract

As part the U.S. government's ongoing efforts to improve health care quality, the

Electronic Health Records (EHR) Incentive Program from the Centers for Medicare and

Medicaid (CMS) offers financial incentives to eligible health care providers (EP) who

adopt, implement, improve, and demonstrate meaningful use of EHR. Beginning 2014,

the Stage 2 Meaningful Use core objectives included the ability of patients to use online

patient portals to view, download and transmit their health information. As a result, many

EP offer a patient portal and encourage sign up, yet not all patients have done so. How

patients perceive the patient portal, whether positively or negatively, may affect their

adoption and use of the portal. A survey collected attitudes and beliefs about the patient

portal from adult, female, primary care patients (n=257). The beliefs of patients who

signed up, along with those who had not, were considered within the framework of the

theory of planned behavior (TPB) to identify methods to increase patient use of the

portal. The TPB correctly predicted portal sign up behavior in attitude ($p<0.05$) and

intention ($p<0.05$) subscales. Overall, patients viewed portal characteristics as useful, but

patients who had signed up identified them as significantly ($p<0.01$) more useful, and

also, were found to have significantly ($p<0.05$) more education than those who did not

sign up. Few methods to increase patient sign up were identified apart from targeted

education to promote the portal's usability and utility. More research is needed to identify

potential methods health care providers can use to increase portal use in primary care

patient populations. Implications for advanced public health nurse practice, training,

policy, and research were identified and recommendations given.

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Patient Attitudes about Patient Portal Functions

Background/Statement of the Problem

In 2004, President George W. Bush initiated the national health care priority to maintain all patient medical records in an electronic format with the formation of the Office of the National Coordinator for Health IT via Executive Order No. 13335 (2004). Under President Barack Obama, the initiative to digitize health records gained momentum with passage of the Health Information Technology for Economic and Clinical Health Act (HITECH) included in the American Recovery and Reinvestment Act of 2009. Included in the HITECH Act, the federal government earmarked monies to assist eligible providers to adopt EHR as part of the economic stimulus package. Although the HITECH Act strengthens the privacy, security, and enforcement rules of the Health Insurance Portability and Accountability Act (HIPAA), the HITECH Act also sought to promote the use of health information technology, primarily through widespread electronic interoperability (final rule, 2013, p. 5568).

The Institutes of Medicine (IOM), as part of a review on health IT-assisted care, summarized the existing knowledge of the effects of health IT on patient safety. In their final report titled *Patient Safety: Building Safer Systems for Better Care* (2011), the committee stated that the evidence of health IT effects on patient safety is inconclusive. It has been shown that it can improve patient safety, but also can cause harm. The committee issued ten recommendations to improve safe use of health IT, and concluded that health IT is expected to make health care more efficient and safe.

Tzeng, Yin, & Fitzgerald (2015) assert health care providers must value this new culture of patient involvement, including supporting tools such as patient portals which

allow patient and health care provider collaboration. As the largest segment of health care providers, nurses may be best positioned to lead adoption of EHR to promote better patient care, as stated in a 2010 report, "The Future of Nursing: Leading Change, Advancing Health" from the IOM. Indeed, as is best summarized in the position paper for the Alliance for Nursing Informatics:

To effectively achieve health outcome improvements, patients and families will need to become an integral part of the care team, with access to their health information in order to participate in decision making about their wellness and illness care. Nurses serve as patient advocates for encouraging adoption of these collaborative practices. (Westra & Murphy, 2011)

The Centers for Medicare and Medicaid Services (CMS) seek to facilitate Meaningful Use of EHR by outpatient health care providers via financial incentives (CMS, 2015). To obtain the incentive payment, eligible providers (EP) must demonstrate their ability to meet increasingly higher benchmarks of Meaningful Use objectives set by CMS. Initiated in 2014, one of the 17 mandatory core measures of Stage 2 Meaningful Use states that EP must "provide patients the ability to view online, download and transmit their health information within four business days of the information being available to the EP," and more specifically, this action must be done by "more than 5 percent of all unique patients seen by the EP during the EHR reporting period" (CMS, 2014). Additionally, beginning in 2015, CMS will reduce payments to eligible providers who do not demonstrate Meaningful Use (CMS, 2015).

Meaningful Use objectives increasingly have focused on patient use of health records, including the ability to download and transmit electronic health records.

Subsequently, there has been increased focus on the implementation and use of patient portals. According to HealthIT.gov (2012), "A patient portal is a secure online website that gives patients convenient 24-hour access to personal health information from anywhere with an Internet connection." More specifically for the EP, a patient portal is a website application operated/managed by the EP which allows patients to electronically access their health records (Ammenwerth, Schnell-Inderst, & Hoerbst, 2012).

While CMS may incentivize EP to provide EHR access via a patient portal, successfully meeting the above Meaningful Use objective relies on increasing the number of patients using the portal. It may fall to the EP to find ways to get more patients to sign up for, and use, the portal in their organization. To understand how patients' adoption and use of patient portals might be increased, it is important to know patients' attitudes toward patient portals.

Literature Review

A patient portal is a software application hosted by the health care provider and linked to an EHR which allows patients to use the Internet to access their personal health information. The type of information available to a patient depends on the setup of the portal, but typically it includes: office visit notes, medications, lab results, allergies and immunizations. The patient portal may also have features to allow patients to perform health care related tasks, such as request refills, make payments, view educational materials, and send secure messages to their provider. Given that the portal is a secure website and only those with a username and password are allowed access, patients must indicate their interest to the health care provider, or "sign up" to use the portal. Once patients have their username and password, the portal is available 24/7 via the Internet (HealthIT.gov, 2015).

Previous research regarding patients' attitudes toward the patient portal was examined. Articles were obtained from searches in PubMed, CINHAL, and Cochrane databases using the free text phrase "patient portal", which resulted in 179 records. Additional searches using the MeSH term "patient access to records" did not return any novel results. The articles were reviewed for patient perspectives or attitudes towards patient portals, features or characteristics of the patient portals used by patients, and barriers or facilitators of patient portal usage by patients. Of the initial results, 43 articles were retained.

Qualitative Research

Early EHR research explored patient attitudes toward the initiation of patient portals, that is, prior to patient portals being widely available to patients. Zickmund et al.

(2008) conducted 10 focus groups with a total of 39 patients with a diagnosis of diabetes from four primary care practices. The researchers explored patient attitudes about using a newly-designed interactive patient portal program to help manage their diabetes. They found an inverse relationship between patient satisfaction with the relationship with their provider and interest in using the patient portal. Patients who were dissatisfied with their care from their provider were interested in using the portal to get more access to information on diabetes, such as discussions on nutrition or explanations of lab results. Additionally, patients expressed dissatisfaction with a "gate-keeper" effect, that is, the inability to get their phone call past the person at the front desk and talk to their provider.

Patients who were satisfied with their relationship with their provider had concerns about the patient portal having a detrimental effect on the clinical relationship, especially the person-to-person aspect of health care. Many patients also stated that their provider was currently very responsive to calls and emails, and saw no need to use another method to contact their provider, even if the new electronic messaging system was encrypted and more secure. Additionally, patients had fears that the new system would be time-consuming and difficult to learn (Zickmund, et. al., 2008).

Later qualitative studies further explored patient perceptions of patient portals, which were increasingly being created and promoted by health care providers under Meaningful Use objectives. Consistent themes emerged from both patients, as well as, parent-caregivers of patients regarding the benefits and concerns of using a patient portal. Benefits consistently reflected the convenience of using the patient portal, such as making appointments and refilling prescriptions (Zarcadoolas, Vaughon, Czaja, Levy, &

Rockoff, 2013), or viewing lab/test results (Haun et al., 2014) and providing more rapid access to download/print the EHR (Bush, Stahmer, & Connelly, 2015).

Britto, Hesse, Kamdar, & Munafo (2013) found that, in addition to the convenience benefits, parents of children with chronic illness described the patient portal as giving them a "sense of control" over their child's care. Parents did not have to wait for a provider to give them the results of tests. Access to test results allowed them to be proactive and to be re-assured that they were correctly managing their child's illness, thereby, reducing their anxiety.

Qualitative research has also explored potential barriers to using the patient portal. Dhanireddy, Walker, Reisch, Oster, Delbanco, & Elmore (2014) conducted focus groups in medically underserved and HIV/AIDS patient populations to gather patients' attitudes towards patient portals. These patients demonstrated a lack of knowledge of online access to health records, but were overwhelmingly positive toward the concept. The authors conclude that these vulnerable patient groups may need additional support to acquire online access to their health records.

Haun et al. (2014) recruited and interviewed 33 Veterans who had used the Secure Messaging tool on the patient portal to identify barriers to and facilitators of using Secure Messaging. The majority (82%) reported being satisfied with Secure Messaging and noted its convenience for communicating with their provider to manage health care needs. In addition to perceived benefits (convenience and user-friendly features), perceived barriers to using Secure Messaging were found. Themes included knowledge barriers (how to register, not able to find the secure message link, and not understanding appropriate situations for messaging), privacy and security concerns, and VA staff

resistance to using Secure Messaging instead of traditional methods such as the telephone.

Mishuris et al. (2014) conducted in-depth semi-structured interviews with 14 Veterans receiving home-based primary care to identify barriers to and facilitators of VA patient portal use in this vulnerable patient population. They found three barriers: a) limited knowledge of the patient portal's functionality despite receiving informational mailings from the VA, b) contentment with current home-based care and concern about the portal changing it, and c) limited access to computer and/or internet service. Mishuris et al. concluded that although most Veterans in this study expressed a strong desire to learn, which would facilitate adoption and use of the patient portal, this vulnerable population has significant barriers to use.

Zarcadoolas et al. (2013) additionally used focus groups to examine potential barriers to portal use in patients who had low levels of education (high school or less) and were racial/ethnic diverse. They found that most patients liked the patient portal features, especially those that were viewed as increasing convenience (e.g., refill requests). However, black respondents were significantly less likely (p<0.05) than white respondents to consider features assisting self-management, such as getting test results, positively. Potential barriers to using the portal included lack of information or interest (60%), negative attitudes (e.g., security concerns) toward the portal (30%), and access obstacles (8%). The authors concluded that portals must be user-friendly, in both reading level and navigation, to be effective for all patients.

Differences in Patient Portal Use by Patient Populations

Researchers have examined the differences in the populations that have adopted and consistently used the patient portal, registered and used it infrequently, or did not sign up at all. Savoy, Hammond, & Castellano (2015) found significant differences among older adults who did or did not register to use the patient portal. Older adult users were more likely to be white, college graduates, with adequate health literacy. In addition to demographic differences, Shimada et al. (2014) found that there were significant differences in the diagnoses of patients who did or did not use the portal. Patients with HIV, hyperlipidemia and spinal cord injury had the highest probability of adoption, while patients with schizophrenia, alcohol/drug abuse and stroke had the lowest.

Irizarry, DeVito Dabbs, & Curran, (2015) conducted a review of 120 articles that reported on the patient experience and its impact on their decision to initiate using the portal and continue to use it over time. They divided the articles into five topics areas including patient adoption, provider endorsement, health literacy, usability, and utility.

Patient adoption. Patients must adopt the patient portal for it to have any impact on their health care. Potential barriers to adoption include language barriers, age, race and ethnicity, socio-economic status, and whether patients are active and engaged in their care. Irizarry et al. (2015) included 62 articles that covered patient adoption of the patient portal. Although results were mixed regarding gender differences, several studies have shown that ethnic minorities, and patients who are younger (<35 years), healthier, and less educated were less likely to adopt patient portals. Patients with higher use of health care (including disabilities and chronic conditions), as well as, caregivers of elder parents or children have the most interest in patient portals.

Provider endorsement. A patient's decision to adopt and continue to use the patient portal has been found to be influenced by their health care provider's endorsement and engagement with the portal. Irizarry et al. (2015) included eight articles that covered provider endorsement of the patient portal. Prior to implementation of the portal, many clinicians had concerns about negative effects on their relationship with the patient, volume of workload, and patient anxieties about information such as test results. After implementation, the clinicians' negative concerns were found to be unjustified. In fact, many clinicians believed that the patient portal had a positive effect on patient care.

Health literacy. Patients must have some degree of health literacy to be able to understand basic health information to make appropriate decisions about their health care. Irizarry et al. (2015) included 16 articles that specifically addressed health literacy. One study found that participants who intended to adopt the patient portal had higher health literacy versus those who were not interested in patient portal adoption. Another study found that if the health information involved numeric concepts, then patients had problems understanding the information, even if they were considered to have adequate health literacy. Results of four studies showed that patients were more successful when medical jargon and abbreviations were translated into "patient friendly" language on the portal. In fact, several studies showed that specific health topics (e.g., medications, lab results, and allergies) are more likely to be misunderstood by a layperson who does not possess a health care background, and that patient portals require additional considerations of health literacy to be used successfully by non-clinicians.

Usability. The usability of the patient portal, that is, how easy the software application is to operate, directly impacts the patient's willingness to adopt and continue

using the portal. Irizarry et al. (2015) included 20 articles that addressed usability of

patient portals. Most studies confirm that ease of portal navigation and the perceived

usefulness of the available information directly affect patient adoption and sustained use

of the portal. One study performed usability testing of a medication management module

in the patient portal and found that patients required a balance of various data fields in

order to provide useful data to the patients without confusing or overwhelming them.

      Utility. Patients will adopt and continue to use the patient portal if they find it

useful. Usefulness is a combination of usability and utility, i.e., the availability of needed

features. Irizarry et al. (2015) included 76 articles that focused in some way on patient

portal utility. Patients were found to prefer functions that offered convenience, such as,

ability to easily communicate with providers, order prescription refills, and access to

medical records for family members, such as their children. Additionally, personalization

(patient or disease specific functions or information) and collaborative communication

(ability for patients and providers to communicate efficiently) were the two patient portal

qualities that were deemed most utilitarian for patients.

Chronic Illness and Outcomes

      Much of the recent body of research has focused on the ability of patient portals

to improve clinical outcomes of patients with chronic illness. Indeed, three systematic

reviews have looked at the effect of patient portals on clinical outcomes of patients with

chronic diseases (Amante, Hogan, Pagoto, & English, 2014; Kruse, Argueta, Lopez, &

Nair, 2015; Kruse, Bolton, & Freriks, 2015). Findings concluded that patient portals have

a varying, but overall positive effect on clinical outcomes.

In their review, Amante et al. (2014) found 16 studies on portal enrollment and utilization among patients with diabetes. They sought to describe patient characteristics associated with the adoption and use of the patient portal by diabetic patients. They found that portal adoption was associated with greater diabetes and insulin-related knowledge, and better-controlled diabetes. Portal usage was also associated with better-controlled diabetes, as well as insulin usage.

In their review, Kruse, Bolton, & Freriks (2015) found 26 studies and one review article on the effect of patient portals on clinical outcomes of chronic illness. They sought to identify clinical outcomes that can be associated with use of patient portals. They found that fewer than expected (37%) articles reported improvements of clinical outcomes. In those that did, patients were reported to have improvements in medication adherence, disease awareness, self-management of disease, number of office visits, and utilize of preventative medicine.

In their review, Kruse, Argueta et al. (2015) found 26 studies and one review article on the attitudes of patients and providers toward the use of patient portals for the management of chronic disease. They found patient portals significantly improved the ability of patients to self-manage their chronic disease, and improved the quality of care given by providers. In 37% of the articles, both patients and providers attributed these improvements to patient-provider communication associated with the patient portal. They also found that 41% of articles cited negative patient perceptions about the safety of secure messaging, and the user-friendliness (complex portal design, lack of instruction, and inability to understand clinical information) of the patient portal, which may inhibit use and consequently, clinical outcomes.

In an effort to understand the means by which portals affect clinical outcomes, Otte-Trojel, de Bont, Rundall, & van de Klundert (2014) completed a systematic review of 32 studies evaluating patient portals. A realist review method was used, which focuses on identifying mechanisms by which an intervention does or does not work, and exploring how they work under what conditions. By analyzing patterns between context, mechanism, and outcomes, they concluded that portals are a complement to existing care and can improve clinical outcomes. They specifically identified four mechanisms by which the patient portal improves clinical outcomes, none of which include the efficacy of the health care provider: 1) patient insight into personal health information, 2) activation of information, 3) interpersonal continuity of care, and 4) service convenience.

Patient insight into personal health information. Otte-Trojel et al. (2014) found that the mechanism of having access to personal health information motivated patients and caregivers to be involved in its accuracy and comprehensiveness. Having access to their EHR was viewed by patients as consumer empowerment, allowing them to have autonomy and self-sufficiency in their care. Additionally, access to personalized patient education and clinical information based on their specific chronic illness improved patients' ability to self-manage their illness. Finally, a patient-controlled personal health record linked to the EHR provides patients with the ability to review and update their health information and may improve adherence to care.

Activation of information. Otte-Trojel et al. (2014) found that tools available through the portal provided new and effective methods of communicating information to patients, thus illustrating the mechanism of activation of information to improve clinical outcomes. The most often cited tool was the ability to send targeted reminders to patients,

and was viewed as very important for achieving patient adherence. For patients to make decisions about their health care, they need access to clinical information; for patients to act on their choices, they need logistical information such as service reminders.

Interpersonal continuity of care. Otte-Trojel et al. (2014) found that the mechanism of easier and improved access to their preferred providers enhanced the patient-provider interpersonal continuity of care. By allowing patients to easily communicate with their provider, they were able to build a more trusting, personal type of relationship. This enhanced interpersonal continuity of care allowed patients and providers to mutually understand illness management from a long-term perspective, which improved both clinical outcomes and patients' satisfaction with their care.

Service convenience. Otte-Trojel et al. (2014) found that the increased convenience of the portal improved clinical outcomes by increasing patients' ability to access health care services and their satisfaction with their care. One study found that 73% of patient messages to providers via the portal were sent during non-clinic hours, demonstrating the convenience of being able to communicate with providers on the patient's schedule. Another study found that many patients believed that using the portal saved them an office visit, and consequently, saved both time and money. Portals can provide easy access to reliable health-related information and resources, which may improve clinical outcomes.

Primary Care Population

While research has focused on patient populations with chronic medical conditions, a few have studied the general primary care population. Mostly, these have involved the Veteran populations and their use of characteristics/features of the patient

portal. Nazi, Turvey, Klein, Hogan, & Woods (2015) surveyed Veterans about viewing their clinical notes on the patient portal. They found that patients agreed that the ability to view the notes after the visit would improve their care by facilitating taking medications as prescribed and being better prepared for future clinic visits. Turvey et al. (2014) surveyed Veterans with patient portal access about their use of the "Blue Button." The Blue Button is a hyperlink; a "clickable" blue circle on the patient portal home page allows patients to view, download or print their information. Turvey et al. found that 33% had used the Blue Button to download or print their EHR. Of those, 21% said they shared their VA health information with a non-VA provider. Thereby, with the Blue Button, the VA has met the Stage 2 Meaningful Use, objective to download or transmit their electronic health record.
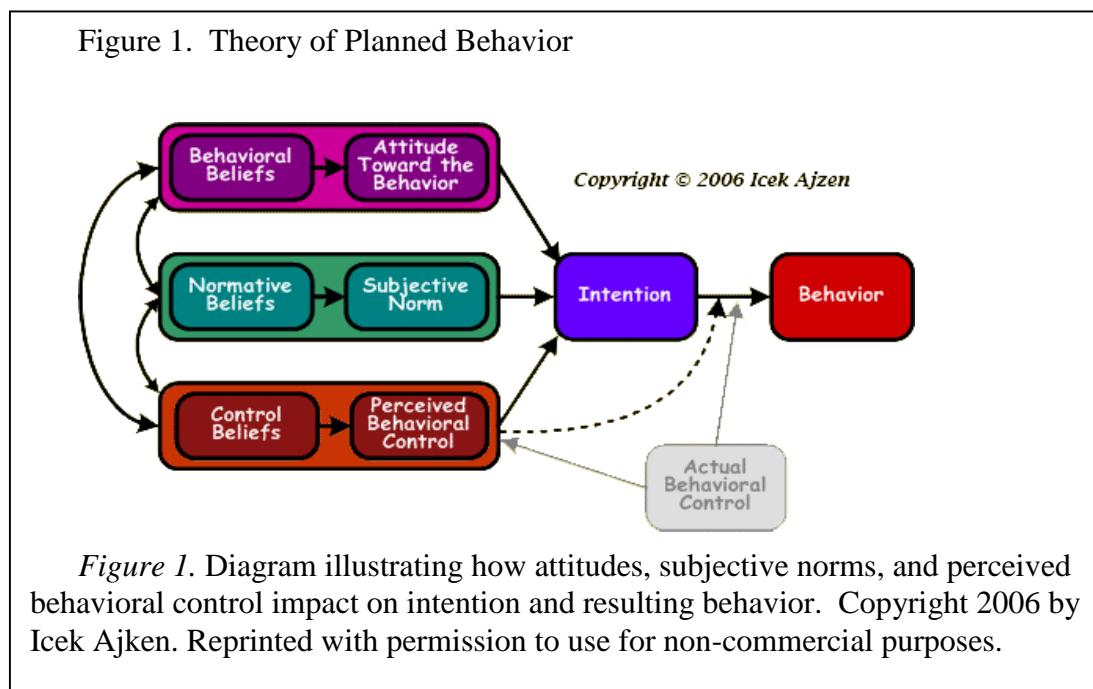
Ronda, Dijkhorst-Oei, & Rutten (2015) conducted a survey to gather the opinions of primary care patients with diabetes to identify barriers to using the patient portal. Surveys were mailed to 4500 patients (1500 with a portal login, 3000 without a portal login) from 62 primary care clinics and one outpatient hospital clinic in the Netherlands. Surveys included questions about patient characteristics, opinions about reasons for use or nonuse, and portal content. The response rate was 66.6%.

Significant differences between users and non-users of the patient portal were found. Users were more likely to have been made aware of the portal by their provider (p<0.001) and to consider portal features to be more useful (p<0.001). They found that most patients without a portal login (72.4%) were unaware of the existence of the portal. Other barriers included lack of interest in using the portal to manage their diabetes (28.5%), and lack of confidence in computer and Internet abilities (11.6%). They

concluded that in the population of primary care patients with diabetes, non-users could be made aware of the existence and usefulness of the portal by their provider to increase adoption and usage of the portal.

Theoretical Framework

The theory of planned behavior (TPB) was used as the framework for the research study. Icek Ajzen (1991) designed this theory to predict and explain behavior. Previous research had found that general attitudes and beliefs could not predict behavior, but Ajzen found that a person's attitudes and beliefs toward a specific action could predict that specific behavior. These attitudes and beliefs form a person's intention to perform the behavior. There are three independent components of intention, a) attitude toward the behavior (positive or negative), b) subjective norm or social pressure to perform the behavior, and c) perceived behavioral control or perceived ability to perform the behavior. Behavioral action is directly related to intention; the stronger the intention, the more likely the individual will perform the behavior. Figure 1 illustrates this process.

Figure 1. Theory of Planned Behavior

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Figure 1. Diagram illustrating how attitudes, subjective norms, and perceived behavioral control impact on intention and resulting behavior. Copyright 2006 by Icek Ajken. Reprinted with permission to use for non-commercial purposes.

Few studies have used TPB to explain and predict use of EHR and patient portals. In a 2015 study, Hsieh confirmed that attitude, subjective norms and perceived behavioral

control strongly predicted physician use of an EHR exchange system. In the model of TPB used by Hsieh, institutional trust, which has been found to be relevant to online behaviors, was added as a fourth component of intention and was also highly correlated to use.

Emani et al. (2016) used TPB to examine beliefs of patients using patient portals to access an after-visit summary (AVS) of appointments with health care providers. The results showed that patients who accessed the AVS had stronger beliefs about timely and efficient access of information, and less belief about engaging in their health care. Significant differences between patients who did or did not access the AVS existed; patients who accessed AVS had fewer college degrees, more years with a patient portal account, more satisfaction with patient portals, and had sent more messages through the patient portal. Of several normative beliefs tested, the most significant result showed that patients believe their health care provider thinks they should access the AVS and they wish to do what their provider wants. Thus, engagement of providers in encouraging patients to use the patient portal may be one of the most important factors to increase patient portal use.

Method

Purpose

The purpose of this study was to identify and describe adult, female, primary care patients' attitudes toward characteristics (typical features) of the patient portal using a descriptive, non-experimental quantitative design. The study also aimed to describe attitudes toward characteristics of the patient portal that may affect their use of the portal while receiving services from a women's medical practice group.

The primary aims of the study:

1. Quantify patients' attitudes toward characteristics of the patient portal, and to rank order the characteristics by perceived usefulness.

2. Quantify patients' beliefs in subjective norms, in consideration of their effect on patient portal usage.

3. Analyze group differences between user and non-users of the patient portal.

Research Question

What are the attitudes of adult primary care patients toward characteristics of the patient portal which may affect use of the patient portal?

Site and Sample

The research was conducted in the Primary Care clinic at the Women's Medicine Collaborative, a large women's medical practice group in Providence, Rhode Island, where there are approximately 800 patient encounters each month. All adult patients of the primary care clinic were eligible to complete the survey, including both users and non-users of the patient portal. The survey was able to accommodate caregivers of

patients, in case the patient preferred to defer matters of medical appointments to their caregiver. Since it is the clinic's policy to provide certified medical translators for all patients who do not speak English, the English survey could be administered by translator to the patient's preferred language.

Based on the population (about 5,000 patients) of the primary care clinic, a sample size equal to 357 was calculated to achieve 95% confidence level ± 5 using an online calculator (https://www.surveysystem.com/sscalc.htm, Maltby, Day, & Williams, 2014, pp.245-249). A secondary sample size equal to 253 was calculated to achieve 95% confidence level ± 6.

Procedures

Data collection took place over the course of five weeks at the primary care clinic during the fall of 2017. This allowed sufficient time for surveys to be completed, but was still a brief enough period so that there was less likelihood of multiple surveys being completed by the same patient. During these weeks, the research survey was offered to every adult patient as part of the primary care appointment by the front desk personnel of the clinic. Front desk staff was trained on the purpose of the survey and what to say when offering the survey to patients. A second brief training was held for the medical assistants so they would be familiar with the survey if they were asked questions by patients. If the patient agreed to complete the survey, she was instructed to complete it while waiting to be seen by the provider or after the appointment was finished so the provider's schedule would not be impacted.

Consent was obtained from the patients via non-signature consent document containing all elements of informed consent, including that this is a voluntary and

anonymous survey which will have no impact on their care with their primary care provider. (See Appendix A, Non-signature consent letter). The survey was printed on colored paper, so it could easily be identified as the research survey by clinic staff.

Patients placed completed surveys into hanging receptacles labeled with signage to remind patients to leave their completed surveys. The receptacles were located at each of the clinic's check-out desks, in constant view of the clinic staff. Completed surveys were collected by the researcher at the end of each day.

Measures

No validated survey was found during the review of literature, and therefore, a survey was created for the purposes of this research study to collect data on descriptive, behavior and preferences of users and non-users of the patient portal. The review of literature informed questions to find potential differences in demographic (age, social economic status, health status) and computer use and access. The review of literature also informed questions on typical patient portal characteristics. Finally, review of Ajzen's TPB (1991) was used to inform questions on subjective norms of portal use behavior. Feedback was obtained on iterative versions of the survey, until no additional changes were necessary for clarity or reliability.

The survey started with a brief description of a patient portal. (See Appendix B, Patient Survey). Questions to obtain a description of the sample included: a) demographic variables (sex, age, education), b) questions on potential confounding factors such as computer ownership and Internet usage, and c) proxy questions for the acuity of the patient such as number of medications taken daily. Additional questions asked about

current portal usage, such as frequency of use and how the patient learned to navigate the portal.

The survey quantified patient attitudes about various characteristics of the patient portal via a 5-point Likert scale, anchored by "Very Useful (5)" to "Not at all Useful (1)." Participants were asked to indicate how positively or negatively they feel about each characteristic. If the participant did not use a particular characteristic, the survey asked the participant to rate how she might feel about it if she were to use it. Finally, participants were asked to rate their agreement with statements of patient portal usage on a 7-point Likert scale anchored by Strongly Agree (7) to Strongly Disagree (1), which assessed intention, attitude, subjective norms, and perceived control beliefs about portal use in consideration of TPB framework.

Data Analysis

The survey results were entered into a password-protected Excel file, stored on a password-protected cloud-based drive. Data were analyzed with Excel 2013 at Rhode Island College. Means and standard deviations were calculated for each portal characteristic and each subscale of the TPB. Group differences between users and non-users of the portal were analyzed for each portal characteristic and each subscale of the TPB using student's t-test (2-tail). Predictors of intention to use the patient portal were examined within the construct of the TPB.

Ethical Concerns, Diversity, IRB Review

Approval for conducting this study was obtained from the IRBs at Lifespan and Rhode Island College, including waiver of signed consent. Consent was obtained from adult participants with a letter attached to the survey containing all elements of informed

consent. The study had no intervention, and completion of a survey had a low risk of harm to study participants. No identifying or personal health information was collected on participants. Children were excluded, and the targeted exclusion of other vulnerable adult populations (e.g., prisoners or pregnant women), was not considered given the low risk of harm. No compensation or incentives were offered.

It was expected that the sample would capture and represent the racial, ethnic and social-economic diversity of the primary care population at the Women's Medicine Collaborative. It is standard practice at the Women's Medicine Collaborative for non-English speaking patients to be provided a medical interpreter for their appointments and therefore, they were not excluded from the sample.

Results

Participant characteristics

A total number of 257 female patients participated in the study. Although the survey

accommodated female or male caregivers, only patients completed the survey. Of those

that participated, most were non-Hispanic white (88%), aged 35-54 years (47%), with at

least 2 years of college education (72%). More women (30%) reported taking "2-3" daily

medications than "None", "One" or "more than 3." Only 4% reported using supplemental

nutrition assistance program (SNAP) benefits. More than 94% reported owning a

computer, and 87% reported using the Internet frequently ("more than 7 times per

week"). See Table 1 for additional details on study sample.

Table 1

Patient Sample Characteristics

Variable	Choices	N (%)
Age	18-34 years	49 (19%)
	35-54 years	119 (47%)
	55-74 years	82 (32%)
	75+ years	2 (1%)
Race/ethnicity	Non-Hispanic white	219 (88%)
	Hispanic	16 (6%)
	African American	4 (2%)
	Other	10 (4%)
Education	<h.s. / GED	3 (1%)
	High school	28 (11%)
	2 yr. college	41 (16%)
	>2 yr. college	180 (72%)
Daily medications	None	64 (25%)
	One	65 (26%)
	2-3	77 (30%)
	>3	47 (19%)
Supplemental Nutrition Assistant Program (SNAP)	Yes	10 (4%)
	No	241 (95%)
	Not Sure	1 (1%)
Own computer	Yes	239 (94%)
	No	14 (6%)
Internet	≥7 times/week	221 (87%)
	<7 times/week	31 (13%)

A total of 78% of participants reported signing up for the patient portal associated with the primary care clinic, while 18% reported they had not. If a patient responded, "not sure," an attempt was made to assign the survey to either "yes" or "no" categories. The survey was added to the "no" group if there was a reason given for not signing up for the patient portal. Similarly, the survey was added to the "yes" group if there was an affirmative answer to how often the patient portal is used. After re-assignment of unsure answers as above, less than 4% surveys could not be categorized. More than 83% of those who signed up for the portal taught themselves how to use it, 14% had help from a clinic person, and 2% had family or friends help. In addition, their frequency of portal use was reported to be 9% = never, 26% = rarely, 31% = infrequently, 20% = occasionally, and 14% = frequently. Of those who did not sign up for the portal, 46% said they had no need, 15% cited privacy concerns, 13% reported limited access, 9% said site was too difficult, and 13% reported they already had too many portals.

Descriptive statistics

Choices for patient characteristics (Table 1) were assigned numeric values, and means were calculated for sign-up group and non-sign-up group. Table 2 summarizes the means and standard deviations for the characteristics of the patient sample. There were significant differences (p<0.05) in means found for level of education and frequency of Internet use between those patients who signed up for the portal compared to those patients who did not sign up. Further analysis of the data showed those patients who signed up for the portal had a higher percent of "greater than two years of college" (74.5%) and less "high school" (8.2%) than those who did not sign up (58.7%, 26.1% respectively). Additionally, patients who signed up were more likely to report using the

Internet frequently (90.4%) compared to patients who did not sign up (77.8%). No differences were found for age, race/ethnicity, daily medications, SNAP benefits, or computer ownership.

Table 2

Means and Standard Deviations in Patient Characteristics by Portal Sign Up

Variable	Not signed up (mean ± SD)	Signed up (mean ± SD)	Significance
Age	2.1 ± 0.8	2.2 ± 0.7	n.s.
Race/Ethnicity	1.5 ± 1.0	1.2 ± 0.7	n.s.
Education	3.3 ± 0.9	3.7 ± 0.7	p< 0.05
No. of Medications Daily	2.5 ± 1.1	2.4 ± 1.1	n.s.
SNAP	2.0 ± 0.2	2.0 ± 0.2	n.s.
Computer Ownership	1.1 ± 0.3	1.0 ± 0.2	n.s.
Internet Use Frequency	3.6 ± 0.8	3.9 ± 0.3	p< 0.05
Note: n.s. is no significant differences			

Table 3 summarizes the means and standard deviations for the subscales for the TPB: attitude, injunctive and descriptive norms, perceived control of portal use, and intention to use the patient portal. Each subscale is based on two questions for a possible score of 2-14 points, with 14 being the highest positive score. Participants reported high positive agreement (>10) with all subscales except there was only moderate agreement (8-9) with descriptive norm subscale.

There were significant differences ($p<0.05$) in means found on both attitude toward portal (easy vs. difficult; useful vs. not useful) and intention to use the portal (I intend to use the portal; it is likely that I will use the portal) between those patients who signed up for the portal compared to those patients who did not sign up. No significant differences in means were found on injunctive norm (my doctor thinks I should use the portal; I want to do what my doctor thinks), descriptive norm (people I respect and value

think I should use the portal; I want to do what people I respect and value think) and

perceived control (I am confident I can use the portal; I am able to use the portal).

Table 3

Means and Standard Deviations for Scores of Subscales of TPB by Portal Sign Up

Construct	Not signed up (mean ± SD)	Signed up (mean ± SD)	Significance
Attitude	10.1 ± 4.3	12.1 ± 2.5	$p < 0.05$
Norm (injunctive)	10.8 ± 2.5	10.8 ± 2.5	n.s.
Norm (descriptive)	9.2 ± 4.0	8.6 ± 3.3	n.s
Control	12.0 ± 3.1	12.7 ± 2.1	n.s.
Intention	10.3 ± 4.3	12.3 ± 2.3	$p < 0.05$
Note: n.s. is no significant differences			

Table 4 summarizes the means and standard deviations on the usefulness of 10

actions or characteristics of the patient portal. Participants who did not use the patient

portal were asked to answer based on what they thought might be useful to them. Each

item has a possible score of 1-5 points, with 5 being most useful. Participants reported

overall positive usefulness of each characteristic. Three characteristics were found to be

significantly higher in the group who signed up for the patient portal: view medications

($p<0.05$), reading visit notes ($p<0.01$) and viewing lab results ($p<0.05$). Viewing

appointment schedule, sending email to doctor, refill requests, appointment requests,

printing medical record, viewing bills or payments and ability to access on cell phone

were all not significant. The group that signed up for the portal reported the ability to

view lab results was most useful (4.5 ± 0.8), while the group that did not sign up reported

the ability to email the doctor as most useful (4.1 ± 1.1). Overall, the group that signed up

for the portal reported the 10 characteristics were significantly more useful ($p<0.01$) than

the group that did not sign up.

Table 4

Means and Standard Deviations for Scores of Usefulness of Portal Characteristics by Portal Sign Up

Characteristic	Not Signed Up (mean ± SD)	Signed Up (mean ± SD)	Significance
View appt. schedule	3.8 ± 1.3	4.1 ± 1.0	n.s.
View medications	3.2 ± 1.4	3.7 ± 1.3	$p < 0.05$
Send email to MD	4.1 ± 1.1	4.2 ± 1.0	n.s.
Refill request	3.8 ± 1.3	4.0 ± 1.2	n.s.
Request appointment	3.8 ± 1.3	3.9 ± 1.2	n.s.
Read visit notes	3.7 ± 1.3	4.2 ± 0.8	$p < 0.01$
View lab results	4.0 ± 1.2	4.5 ± 0.8	$p < 0.05$
Print medical record	4.0 ± 1.1	4.0 ± 1.1	n.s.
View bill/payment	3.8 ± 1.2	3.6 ± 1.3	n.s.
Access on cell	3.6 ± 1.4	3.9 ± 1.2	n.s.
Total of all	3.8 ± 1.3	4.0 ± 1.1	$p < 0.01$

Note: n.s. is no significant differences

Summary and Conclusions

Patients in an adult women's primary care clinic were surveyed during an appointment to see their health care provider to examine their attitudes toward patient portal characteristics and beliefs about using the patient portal to access their health records. The obtained sample was mostly non-Hispanic white (88%), college-educated (72%), and 35-54 years old (47%). Of those that responded, 78% reported having signed up for the patient portal and most figured out how to use it on their own without help from clinic staff or friends. For those who reported having not signed up for portal access, nearly half (46%) said they had no need for portal access. Unexpectedly few participants cited privacy concerns (15%), or reported problems with limited access (13%). Differences were found between the group of patients who signed up for the portal and the group that did not sign up. Patients who signed up had more education and reported using the Internet more frequently than those not signed up.

Both users and non-users were asked to score the usefulness or potential usefulness of the 10 actions or characteristics of the patient portal. As a whole, participants reported positive usefulness (score >3) of each characteristic, but patients that signed up for the portal reported the characteristics in total were significantly more useful ($p<0.01$) than the group that did not sign up. Further analysis showed that three specific characteristics were found to be significantly higher in this group: view medications ($p<0.05$), reading visit notes ($p<0.01$) and viewing lab results ($p<0.05$). Ranking the survey's 10 portal characteristics found that the ability to view lab results was most useful to users, while the ability to email the doctor was most useful to non-users.

The TPB was found to adequately describe patient use of patient portals. As stated earlier, the stronger the intention, the more likely the person will perform the behavior (Ajzen, 1991). Patients who performed the behavior of signing up for the portal scored significantly ($p<0.05$) higher on the intention subscale compared to those patients who did not sign up. Furthermore, one's beliefs (attitude, subjective norms, and perceived control) form one's intention. Patients who signed up for the portal also had scored significantly ($p<0.05$) higher on the attitude subscale that the portal is easy to use and useful.

One identified limitation was probable selection bias. Since patients could choose whether to complete the survey, those who did not like or use the patient portal may have declined to participate. Given that nearly 80% of the participants reported signing up for the portal, it is likely that non-users are under-represented in the sample. It is also possible, though not probable, that the demographic characteristics of the sample would have been less homogeneous if there were more non-user participants.

A second related limitation was this was a sample of only female patients. This primary care clinic is part of a women's health organization, and so the findings may not be generalizable to other primary care clinics. Additionally, no caregivers responded to the survey. It is unclear whether no caregivers accompanied patients to their visits during the data collection period, or if they chose not to participate. Again, this limits the generalizability to populations other than female patients.

A third limitation was a poorer than expected data collection rate. This was the result of two factors. Several providers in the primary care clinic did not have a typical schedule, resulting in fewer patients being seen. More importantly, there was a poorer

than expected response rate. It was estimated that 50% of patients would complete the survey, but the actual response rate was approximately 35%. This may be reflective of the self-selection described above. The confidence level was adjusted, and the sample size was decreased.

Although the results of this study are supported by the TPB framework and explain why some patients have signed up for the patient portal, the findings provided few avenues to increase patient's use of portals in this population. There was no difference in their beliefs that their provider wants them to use the portal, so encouragement by primary care providers would not likely increase intention or behavior. Nor was there any effect from the patient's perceived ability to use the portal, so providing instruction on how to use the portal would likely have little effect as well.

Nonetheless, patients who used the portal did rate it significantly easier to use and more useful than non-users. Furthermore, nearly half of patients who did not use the portal reported that they had no need for it. Based on these findings, the clinic may wish to provide targeted education to their patients which address these two aspects; promoting the portal as easy to use, and illustrating how the portal functions could fulfill health care needs may be a means to increase portal sign up and use.

These results may be relevant only for this sample population of mostly white, well-educated, relatively young to middle-aged adult women who have already signed up for the patient portal. Populations which are much less educated or are socio-economically disadvantaged may have different results. More research is needed to better understand patients' attitudes and beliefs toward patient portals and to identify potential means to increase portal use in primary care patient populations.

Recommendations and Implications for Advanced Nursing Practice

The federal government's ongoing policy to improve health care quality through electronic health records (EHR) relies not only on the health care provider, but also the patient, to be successful. Indeed, one goal of quality improvement for health care is to have patients take a more active role in their health through increased access to and use of their own EHR, often via patient portals. Therefore, it is essential that advanced practice public health nurses (APHN) complete training and be knowledgeable of patient and provider components of EHR to be able to fulfill their role of working with both public and clinical health care systems to improve population health and health care quality in this era of electronic records and patient portals.

The APHN is prepared to consider the ecological perspective, which focuses on both population-level and individual-level determinants of health and interventions, and can practice this perspective within both the public and clinical systems to effect change. Within clinical health care systems, the APHN should assume administrative leadership roles and lead change by enacting policies that could improve individual patient outcomes through nurse-led clinical and care management practices. Innovative health care policies could encourage nurses to use the patient's EHR to accomplish that goal. One example of a policy recommendation is for the nursing assessment to always include assessment of the patient's use of the patient portal. With assessment, the nurse would know how to best incorporate the portal into the care plan to improve the patient's clinical outcomes. The increasing use of EHR requires that nurses be competent in these systems, including the ability to access and use data to inform decisions about evidenced-

based care. Another policy recommendation is that nursing education include informatics to confer these skills to the nursing workforce.

Within the public health care systems, the APHN should ensure that high standards for EHR are developed and/or maintained through federal and state rules and regulations. Moreover, patient portals linked to those EHRs can only effect change in population health outcomes if they are secure and accessible, and viewed as such by patients. Accordingly, the APHN should work collaboratively with legislators and stakeholders to promulgate effective rules and regulations regarding electronic records. These should include, a) keeping health information secure from breaches, b) improving interoperability between diverse EHR and public health reporting systems, and c) ensuring electronic health records are maintained and archived to prevent loss during a potential system failure.

In this research, patients who did not sign up for the patient portal had less education than those who did. Implications for practice calls for recognizing the role that socioeconomic factors play as determinants of health, including portal use. Previous research has shown that racial/ethnic minorities, economically disadvantaged, and patients with low health literacy are less likely to use the patient portal. The APHN must advocate for these disadvantaged populations, and ensure they are supported in adopting and using the patient portal. That disadvantaged populations may have less access to patient portals is an ethical concern. There is potential that unequal access may lead to poorer health outcomes, especially in patients with chronic health conditions.

This research also found that most patients who did not sign up for the patient portal felt they had no need for it. The APHN can implement program planning which

could educate patients and health care providers on the utility of the patient portal, and its role in health promotion and prevention. More research is needed to learn how to best to encourage the use of the patient portal to improve both the health and the quality of health care in varied populations of primary care patients.

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Appendix A

No signature consent letter

Study Title: Patient Attitudes about Patient Portals

I am Tamara A. Sequeira, RN, conducting a research study with Cynthia Padula, PhD, RN at Lifespan. We invite you to answer a short research survey today. This research is part of the requirements for a Master of Nursing from Rhode Island College.

You are being asked to take part in this study because you are a patient at the Primary Care Clinic at the Women's Medicine Collaborative. In this study, I am asking you to complete a survey to learn your feelings about using a Patient Portal to contact your doctor and look at your medical records through the internet. This may help me to understand which items in the patient portal are the most or least valuable to you. About 400 people will participate in this study.

What will happen if I take part in this study?

If you agree to be in this study, you will complete a survey during today's visit with your provider. The survey asks about your computer usage, how useful you find patient portals, and how much you agree or disagree with other people's thoughts about patient portals. It will take you about 10-15 minutes to complete the survey. You are free to skip any question.

Are there any risks to me or my privacy?

The survey will not include details that directly identify you, such as your name or address. Please do not put this information on your survey. The completed surveys will be anonymous and kept secure and separate from information that identifies you. Only I and my faculty advisor will have direct access to completed surveys. If this study is published or presented at scientific meetings, there will be no information that might identify you.

Are there benefits?

There is no benefit to you. The survey results will be used for research.

Can I say "No"?

Yes, you do not have to complete a survey. If you choose not to be in this study you will not lose any of your regular benefits, and you can still receive medical care from Women's Medicine Collaborative.

Are there any payments or costs?

You will not be paid for completing the survey. There are no costs to you.

Who can answer my questions about the study?

If you have any questions, concerns, or complaints about this study, you may contact me, the researcher, Tamara A. Sequeira, at 401-793-3883 or tsequeira_2909@email.ric.edu, or my faculty advisor and the chair of Rhode Island College's Institutional Review Board (IRB), Dr. Cindy Padula at 401-456-9720 or cpadula@ric.edu.

If you wish to ask questions about the study or your rights as a research participant to someone other than the researchers, please call Janice Muratori at Lifespan's Research Protections Office at 401-444-6897.

Please place your completed, anonymous survey into the plastic box at the check-out desk.

Appendix B

Patient Survey

What is a Patient Portal?

A patient portal is a secure online tool or website which allows you to access your electronic health record. A patient portal may offer different types of services, but it usually can be used to keep track of your health care provider visits, test results, billing, prescriptions, and so on.

At Lifespan, the patient portal is called MyLifespan. Information from all of your Lifespan health care providers is available in that record.

Circle the most correct answer for each question.

1. Who is completing this survey, patient or caregiver?
   a. patient being seen today
   b. primary caregiver for patient being seen today

2. What is your gender?
   a. male
   b. female

3. What is your age?
   a. 18-34 yrs
   b. 35-54 yrs
   c. 55-74 yrs
   d. 75+ yrs

4. What is your race/ethnicity?
   a. white
   b. black
   c. Hispanic
   d. multiracial

5. How much education have you completed?
   a. less than high school or have GED
   b. high school diploma
   c. 2 years of college / trade school
   d. more than 2 years of college

6. How many different medications do you typically take each day (not including vitamins)?
   a. none
   b. 1
   c. 2-3
   d. more than 3

7. Do you receive Supplemental Nutrition Assistance Program (SNAP) food benefits?
   a. yes
   b. no
   c. not sure

8. Do you own a computer?
   a. yes
   b. no

9. How often do you use the internet each week?
   a. never
   b. rarely (less than 1 time per week)
   c. occasionally (1-6 times per week)
   d. frequently (7 or more times per week)

10. Did you sign up for the patient portal at this medical office?
    a. yes
    b. no   (Skip to Question 13)
    c. not sure

11. Who showed you how to use the patient portal for this medical office?
    a. I figured it out on my own
    b. someone in my doctor's office
    c. friend or family member helped me

12. How often do you use the patient portal at this medical office?
    a. never (0 times each year)
    b. rarely (1-2 times each year)
    c. infrequently (3-5 times each year)
    d. occasionally (6-9 times each year)
    e. frequently (10 or more times each year)

13. If you answered "no" to question 10, why did you not sign up for the patient portal at this medical office?
    Check all that apply:
    ☐ I did not have a need to use it
    ☐ I have privacy or security concerns
    ☐ I could not access it electronically
    ☐ the website is difficult to use
    ☐ I already have more than one online record

Continue to questions on back

Please circle one number that best describes how useful each feature of the patient portal is to you. If you <u>don't</u> use the patient portal, please make your best guess on how useful you feel each feature would be to you.

		Extremely Useful	Very Useful	Moderately Useful	Not Very Useful	Not at all Useful
1.	View schedule of upcoming appointments	5	4	3	2	1
2.	View list of medications	5	4	3	2	1
3.	Send electronic (email) message to doctor	5	4	3	2	1
4.	Request refills	5	4	3	2	1
5.	Request an appointment or change appointment	5	4	3	2	1
6.	Rereading notes in medical record after appointment	5	4	3	2	1
7.	View lab results	5	4	3	2	1
8.	Print medical records, such as immunization history	5	4	3	2	1
9.	View bills or make payments	5	4	3	2	1
10.	Access to portal on mobile device such as cell phone	5	4	3	2	1

Please circle one number that best describes how positively or negatively you feel about using the patient portal.

1.	Using the patient portal to look at my health records is:	**Easy**	7	6	5	4	3	2	1	**Difficult**
2.	Using the patient portal to look at my health records is:	**Useful**	7	6	5	4	3	2	1	**Useless**

Please circle one number that best describes how much you agree or disagree with the following statements.

		Strongly Agree						Strongly Disagree
1.	My doctor thinks that I should use the patient portal to look at my health records.	7	6	5	4	3	2	1
2.	When it comes to matters of my health records, I want to do what my doctor thinks I should do.	7	6	5	4	3	2	1
3.	Most people I respect and value use a patient portal to look at their health records.	7	6	5	4	3	2	1
4.	When it comes to using a patient portal to look at my health records, I want to be like people I respect and value.	7	6	5	4	3	2	1
5.	I am confident that I am able to use the patient portal to look at my health records.	7	6	5	4	3	2	1
6.	If I really wanted to, I can use the patient portal to look at my health records.	7	6	5	4	3	2	1
7.	I intend to use the patient portal to look at my health records.	7	6	5	4	3	2	1
8.	It is likely that I will use the patient portal to look at my health records.	7	6	5	4	3	2	1

Thank you for your participation! The box for your completed survey is located at the check-out desk.