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by

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College of Engineering and Computing Nova Southeastern University

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We hereby certify that this dissertation, submitted by Kimberly Bartholomew, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirements for the degree of Doctor of Philosophy.

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As the bulk of medical health records shift from paper-based file systems to electronic formats, the promise of the transformation process called healthcare reform included adding efficiencies to medical practice workflows, lower costs, improved quality of care and most important, and the freeing of patient information from traditional propriety silos. With this incoming largess of protected health information data now viewable through online patient portals, patients can be empowered to become educated and active in their own health care decisions, but only if they have admission to their information. A digital divide currently exists in many medical practices where only a very few patients have access to their personal health information. The primary goal was to facilitate organizational change needed for physician-managed practices to increase patient adoption and meaningful use of patient portals for secure communication, wellness education, review of labs and other tests, and receipt of clinical summaries.

The methodology utilized the appreciative inquiry 4-D model as the underlying basis of three phases: Phase 1-fundamental study, Phase 2-strategic action plan, and Phase 3 supporting organizational change. The physicians or providers in independent medical practices are the key determinate of the organizational workflows.

The results have added significantly to the understanding of organizational change as related to patient engagement and the adoption and meaningful use of patient portals in independent physician-managed clinics. As medical practices and their physician leaders raise patient portal workflow processes to a higher level of importance, it is expected that patients will begin to adopt these procedures as their preferred methods and bring about a change in the patient-provider relationship.
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Chapter 1

Introduction

Problem Statement and Goal

Background

Medical organizations are striving to provide more patient-centered health care (eHealth Initiative, 2011). These efforts are extending beyond the examination room into patient’s homes and lives. One way providers in ambulatory (non-hospital) settings have been attempting to extend their outreach to patients is through online patient portals (Mori, Mazzeo, Mercurio & Verbicaro, 2013, p. e23). A patient portal is a software application that allows patients around the clock admittance to their Protected Health Information (PHI), health resources and targeted educational materials (Centers of Medicare & Medicaid, 2015). Access or registration into a patient portal, also known as a Patient Health Record (PHR), is usually precipitated by an email invitation or other solicitation from the provider, which is sent to and accepted by the patient.

When a patient’s medical record is kept digitally, the information is often entered, stored and managed in an Electronic Health Record (EHR) software application by the clinic or provider (Emont, 2011). If a patient is registered in an integrated patient portal, after healthcare visits, laboratory tests, and other medical procedures, the patient’s updated health information is sent from the EHR to the portal and their personal view of their health record is updated (Yau, Williams, & Brown, 2011).

Physician-managed medical practices are banding together to spread the economic and technical burden of purchasing and maintaining these complex computer
healthcare information systems (IS); often these separate physician groups are autonomous in their workflow and processes even while they share the same technology infrastructure for EHR and PHR (R. Lloyd., Chief Operating Officer, Revere Health, personal communication, July 31, 2013). The acceptability of such a personal tool like a PHR extends beyond the functionality or ease of use and depends upon how it is presented to patients and given relevance in their day to day interactions with their provider (Emont, 2011).

Since 2011, many healthcare organizations are consumed with the effort to meet Meaningful Use (MU) criteria for the EHR incentive program outlined by the Centers for Medicare and Medicaid Services (CMS) for eligible providers (EP) who adopt and meaningfully use certified EHR technology (Centers for Medicate and Medicaid Services [CMS], 2015). Three stages of MU have been identified with a stated final goal of achieving improved quality of care as outlined in Figure 1 (CMS, 2016).

![Figure 1. A conceptual approach to Meaningful Use](image)

An attestation process measures EP performance with associated incentive payments and future penalties. Some criteria for MU such as transmission of patient care summaries...
are met by PHR systems that can be integrated with a certified EHR to generate the data used for this attestation (CMS, 2015).

Problem Statement

Adoption rates at which patients are accessing their PHI through patient portals are abysmally low, usually below 10% of current active patients in a medical practice (Dixon, 2010). When physician/providers are passive or ambivalent about inviting their patients to participate in a patient portal they are creating a digital divide where some patients are connected to these educational and information resources and others are not (Yamin, et al., 2011). Either the patient will be oblivious to the possibility of joining the practice’s patient portal or they will not fully be able to incorporate portal use into their interactions with their provider (Dixon, 2010). Graham (2011) describes this problem for users as a knowledge divide because most have moved beyond access and connection issues. They are having trouble with interpreting information and ineffective use of the PHR system. Those most at risk of being outside this critical PHI information loop are those with chronic or ongoing conditions which compromise the majority of health care costs, and where an ongoing patient-provider interaction would increase quality of care (Yamin, et al., 2011).

Significant effort and monies are concentrated on adding features to patient portals in the hope that they will be favorably accepted by patients including the ability to communicate securely with a healthcare provider. But all the bells and whistles will be for naught if the portals do not become used as a preferred part of patient care processes (Wakefield et al., 2012). Beyond initial adoption, the continued meaningful use of an
online PHR by clinic patients will require its perceived usefulness and relevance. If the patient sees that the portal processes are shown to be an integral part of the practice’s workflow, then this feedback will promote continued use and strengthen the patient–physician relationship via the portal (Kerns et al., 2013). Eramo (2011) suggests that unless providers in key positions can adapt their practice workflows and management processes it will be problematic for them to deliver innovative care.

A physician can either be a champion of PHR by enlisting patients and promoting the benefits of the system, or they can let the system die by inattention (Archer, Fevrier-Thomas, Lokker, McKibbon, & Straus, 2011, p. 518). When senior executives advocate or champion an innovation, they can bring change to an organization in substantial ways (Hung, Hung, Tsai, & Jiang, 2010). Do practitioners advocate PHR usage? Many studies that have purported to examine provider attitudes toward patient portals observed instead the practitioner’s own patterns using technology, like EHRs (Zickmund et al., 2007).

In a patient portal usage survey conducted by Kerns et al. (2013), participants reported that their feelings as to the usefulness, dependability, and trustworthiness of the system would be stronger if it was recommended to them by their own personal physician. Holden and Karsh (2010) argued that additional studies are needed that can identify practitioner beliefs about the use of patient portals; beliefs that will either cause them to become barriers to PHR adoption or vocal advocates (p. 169).
Research Goal

The goal of this study was to design and test a strategy for independent, physician-managed practices that increased adoption rates and meaningful use of a patient portal used for education and patient relationship management.

Research Questions

These research questions provided a path that began with an investigation of strongly held provider beliefs and ended with a strategy that could be tested within the study organization to achieve vast improvements in patient portal adoption and meaningful use.

Research Question 1:

What attitudes and beliefs are held by physician/providers and medical staff related to the perceived usefulness of patient portals?

Research Question 2:

How do physician/provider and staff attitudes related to pressures from those in power and with social influence affect preferred methods for handling the patient portal within the clinic?

Research Question 3:

What gaps exist between an ideal patient portal implementation and the current patient portal as perceived by physician/providers and the medical staff?

Research Question 4:

What best practices and support strategies could be used by physician-managed clinics to increase patient adoption, and continued meaningful use of the patient portal?
Relevance and Significance

If medical practices can increase adoption rates and meaningful use of patient portals, healthcare provided will be more patient-centered, higher quality, and access to healthcare information will be more equitable.

*Patient-Centered Healthcare*

As patients become educated about their own healthcare through their PHR, they can become informed decision-makers and the sharing of medical information moves from being paternalistic and physician-centric to a partnership that is more patient-centered. The patient portal can become a tool of discovery and motivation as difficult to remember test results, medication histories, and wellness plans are available at a glance (Chou, Nagykaldi, Aspy, & Mold, 2010). Parents can become a patient portal proxy and managing their child’s healthcare decisions and adult children can assist elderly parents in navigating the interaction with the patient portal as proxies.

*Higher Quality Healthcare*

Providing ongoing and persistent access to protected health information is especially important to patients with chronic conditions who will benefit most from the educational reinforcement, secure communication, and monitoring supported by most patient portals (Dixon, 2010).

Health Information Exchange (HIE) allows for treatment and procedure information to be exchanged across healthcare institutions and into and out of information systems. As standards for transfer are being adopted, this will insure critical medical information is received and sent in secure and accurate manner.
dramatic improvement of prescription tracking and accuracy has been achieved from portal supported e-prescribing practices.

The Patient Portal Digital Divide

Currently, there exists a digital divide because the majority of active patients in ambulatory clinical practices are not enrolled in patient portals (Yamin, et al., 2011). The problem is compounded when from the patient’s perspective there is no coordinated, holistic view of their health information from other key providers, laboratories, and pharmacies (Mori, et al., 2013). The online services a patient portal offers need to be an intrinsic part of the clinical practice, not just something the technical organization wants done. Chou et al. (2010) showed that while patients benefited from using a portal to access wellness resources, clinicians were hesitant to adopt this technology because of worries over the potential time burden from communications and also security concerns (p. 90). The practice or corporate culture with regards to the patient-practice relationship needs to change and in a physician-managed medical practice, and the physician holds the key to this change (Nazi, 2013).

Limitations and Delimitations

Limitations

The following limitations may apply to the study to be undertaken:

The case study will involve only clinics and practices in a limited geographical location, in the Western United States. While over 70 medical practices and 20 specialties throughout this geographical local may be sampled, there may be some uniqueness to the group of clinics studied that may not accurately represent groups in
other states or regions of the country. The case study subject used in this study will be relevant in this given context, within the Western United States.

Medical practices that will participate in this research case study work group must meet the current governmental laws and regulations in order to receive Medicaid and Medicare reimbursement. These requirements such as Meaningful Use and Health Insurance Portability Accountability Act (HIPAA) may change in the near future, and exact strategies undertaken in this study may be less relevant if the political and legal winds change.

Because of patient privacy concerns, patients will not be specifically interviewed or asked about their first-hand opinions of the patient portal. Patient adoption, acceptance and meaningful use will be observed through their interaction with the patient portal and other audit trails of their behavior in the information system. Any data about actual patients will be de-identified as per legal requirements and aggregated so patient identity will be protected.

As employees of the specific physician-managed clinic group, permissions to interview and interact with clinic staff can be obtained from the staff and from their employer. Patient behaviors will be examined vicariously by viewing the results of their interactions with a patient portal, but the researcher will not have direct contact with the patients.

Delimitations

Motivational techniques used to build cohesion in organizations that are distributed may be applicable beyond the medical community. Meaningful Use, while a measure applied to electronic healthcare systems, has relevance in other domains. The
Community of Practice (CoP) that will be developed for this study will follow steps and processes that may be used as a vehicle for organizations outside the medical field. Other communities exist in medical organizations besides those dealing with patient portals that could make use of strategies used in the CoP. Quality assurance, customer service, IT, could all join their resources and voices to the patient portal CoP. While this may dilute efforts as an ongoing initiative for continued patient portal use, the overall organization would benefit from a shared community (Ranmuthugala, et al., 2011).

**Definition of Terms**

**Definitions**

To clarify the problem domain for the reader, the following terms are defined:

*Accountable Care:* The Affordable Care Act provides an incentive payment system for eligible medical providers, specialists, and hospitals to form Accountable Care Organizations where they can cross-coordinate patient care and receive bundled reimbursement for patient care (American Hospital Association, 2010a).

*Appreciative Inquiry:* Appreciative inquiry is an affirming method for social construction of organizational change based on stakeholder involvement in appreciative interviews, and usually an appreciative summit. The AI process makes use of the 4D model: discovery, dream, design and destiny (Cooperrider & Whitney, 2001).

*Business Intelligence:* Providing executives and managers with actionable information and knowledge from inside or outside the organization presented in friendly format like dashboards or scorecards that can inform the decision-making process (Sabherwal & Becerra-Fernandez, 2011).
Community of Practice: A community of practice is a social network where like-minded people can congregate and share access to resources, engage in knowledge building and collaborate in areas of common interest (Hara & Schwen, 2006).

Electronic Health Record/ Electronic Medical Record: A healthcare organization maintains all of a specific patient’s medical history, and current medical information in a digital format and which is stored securely for ease of retrieval and reference in an Electronic Medical Record (Sittig & Singh, 2011). The term electronic health record is also known as an electronic medical record (EMR).

Hermeneutic Analysis: Hermeneutic analysis sometimes referred to as the hermeneutic cycle is a technique that can be applied to qualitative data to uncover meaning. Any prejudice in the interpretation of meaning that might come into play begins with examining the parts and then returning to look at the whole. Hermeneutic analysis attempts to challenge the conventional norms of an organization and uncover potential power differentials in the group (Butler, 1998).

Meaningful Use: While may be a term loosely used in usability contexts, meaningful use is a set of measures created by the Centers for Medicare and Medicaid Services to promote adoption and usage of electronic medical systems by patients and providers (Centers for Medicare and Medicaid Services, 2015).

Organizational Learning: When an organization begins to adopt innovations to improve current practices in order to gain strategic advantage or to change direction it is known as organizational learning (Fiol & Lyles, 1985).

Patient-Centered Medical Home: The medical home also known as a patient-centered medical home provides a model for superior access to healthcare by a team of
coordinated providers where patients are an active participant in their own treatment options (Berenson, Devers & Burton, 2011).

**Patient Engagement:** Patient engagement is defined two ways by the Agency for the Healthcare and Research and Study (AHRQ). The first is a more personal, patient-centric definition: the active participation in their own care by patients or their representatives, enabling well-informed decision-making about their healthcare (Maurer et al., 2012, p. 24). The second definition includes the patient and their support system as “a set of behaviors by patients, family members, and health professionals and a set of organizational policies and procedures that foster both the inclusion of patients and family members as active members of the health care team and collaborative partnerships with providers and provider organizations” (Maurer et al., 2012, p. 14).

**Patient Portal:** Personal health information can be made available to an individual patient through an online computer resource known as a patient portal where healthcare information is sent once a visit, procedure, or lab test are completed in the EHR (Tang, Ash, Bates, Overhage, & Sands, 2006).

**Personal Health Record:** A physical or electronic copy of a person’s medical healthcare information, usually stored in a format available to the person without translation (Steele, Min, & Lo, 2012, p. 1079).

**Physician-Directed Medical Practice:** The physician leads a team of other providers and staff who jointly care for their patients (American Hospital Association, 2010b). In some cases, the physician must sign off for care given by second-level providers.

**Protected Health Information:** A person’s medical history, including past procedures and incidents, current conditions, allergies, wellness tracing, immunizations, clinical
summaries and other medical information delivered to the individual in a secure manner as outlined in the Health Insurance Portability and Accountability Act (104th Congress, 1996). Protected health information (PHI) is sometimes referred to as patient health information.

Technology Acceptance Model: The Technology Acceptance Model (TAM) is a theory applied to better understand information systems use and the important variables that play a role in acceptance of computer technology such as perceived use, perceived ease of use, and behavioral intention (Holden & Karch, 2010).

Technology Acceptance Model 2: This extended technology acceptance model (TAM2) shows the importance of the subjective norm (SN) as a determinate in a person’s perceived usefulness of performing a behavior in question (Ventatesh & Davies, 2000).

The Unified Theory of Acceptance and Use of Technology: The Unified Theory of Acceptance and Use of Technology examines a person’s intent to use or interact with a computer system and groups their motivation into four key components: performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC) and behavioral intention (BI) (Holden & Karch, 2010).

List of Acronyms

A list of acronyms used in this document is given next for clarification and as a reference.

ACO - accountable care organization
AI - appreciative inquiry
BI - behavioral intention from UTAUT
BI - business intelligence
CMS - Centers for Medicare and Medicaid Services

CoP - community of practice

EE - effort expectancy

EHR - electronic health record

EMR - electronic medical record

EP – eligible provider

FC - facilitating conditions

HIE - health information exchange

HIPAA - Health Insurance Portability and Accountability Act

MU - meaningful use

ONC - Office of the National Coordinator for Health IT

PCMH - patient-centered medical home

PE - performance expectancy

PEOU - perceived ease of use

PHI - protected health information

PHR - patient health record

PPACA - Patient Protection and Affordable Care Act

PU - perceived use

SI - social influence

SN - subjective norm

TAM - technology acceptance model

TAM2 - technology acceptance model 2 (extended)

TCO – total cost of ownership
UTAUT - unified theory of acceptance and use of technology

VDT – View, Download, Transmit (MU criteria)

**Summary**

As medical healthcare organizations are attempting to provide more patient-centered care, information systems that might aide in this process are becoming more critically important. Patient portals hold much promise in bringing together the patient and the provider especially outside of the traditional office visit. The goal of this study was to bring about organizational change in physician-led clinics through constructivist techniques that lead to increased adoption and meaningful use of PHR by patients. Research questions, study delimitations and limitations, a definition of terms and related acronyms were introduced. In the next chapter, a literature review of related to patient usability measures in PHRs, organizational change issues, theoretical information system acceptance, and research strategies will be presented.
Chapter 2
Literature Review

Introduction

The purpose of this chapter was to provide background information on key concepts related to patient usability measures of patient health records (PHRs), organizational change issues, a theoretical foundation for measuring information systems usefulness, and research strategies that were employed in chapter three.

Usability Measures for Patient Portals

This section of literature review includes an examination of issues related to the usability and efficacy of patient portals in a medical clinic setting: meaningful use, and patient-centered medical care.

Meaningful Use

A key application of PHRs is that when combined together with an existing practice EHR, long-term usability goals can be achieved with medical electronic systems. The Centers for Medicare and Medicaid Services (CMS) together with the Office of the National Coordinator for Health IT (ONC) have developed a set of meaningful use (MU) criteria used to determine incentive payments for each individual eligible provider (EP) (Eramo, 2011).

MU criteria, defined in stages over a number of years, attempt to measure patient acceptance, and use of electronic healthcare information, but do not specify exactly how...
system software, and processes must map to those measures (Eramo, 2011). MU stage 1 was designed to get providers using electronic healthcare systems appropriately. The goal of MU stage 2 as currently defined is to use the massive amounts of information that are being gathered to find problems that exist with quality of care and begin to solve them (Dimick, 2011; Butler, 2013). MU Stage 2 underwent its final revision in October of 2015, known as Modified Stage 2 (CMS, 2016). Requirements for secure messaging and the View, Download, Transmit (VDT) requirement were dramatically scaled back in order to allow more flexibility and validation of system capability at this stage (CMS, 2015).

Use of health information systems like electronic health records (EHRs), PHRs and related technologies fall under these MU guidelines (Butler, 2013). By choosing a certified EHR, an organization can make sure the MU capability exists in the system when they integrate a patient portal (HealthIT.gov, 2015). Even if the system has certification, it may still not provide the ease of use and utilization levels needed to quality for MU incentive payments (Eramo, 2011).

While medical providers or EPs as referred to by the CMS, have economic incentives to achieve MU, the driving factor behind purchasing decisions are often based on finding a PHR that integrates or is an extension of an existing EHR system. The feature set of the patient portal, when viewed in a stand-alone format, is usually not the key determinant when procurement decisions are made (Steele et al., 2012). The long-term motivation of medical providers who may complete attestation to MU, go beyond financial payments which usually fail to cover their total cost of ownership (TCO) (Dimirck, 2011). The goal of the MU process for most ambulatory practices is to
advance the practice workflow and IT processes that involve electronic health systems and leverage the data to improve quality of patient care.

*Patient-Centered Medical Care*

Traditionally medical care revolved around treating patients when they were ill and visits to a health provider were scheduled only when needed. This episodic nature of the patient-provider relationship tended to be physician-centric: when could the doctor fit the patient in, when could the procedure be done, and when could the bill be paid. Patients and their families were prevented access to their own medical history and records and those of their family members because of privacy and liability concerns. The specific care a patient received in one medical practice was often not shared with other practices. Medical errors and harm have resulted from repeated or unnecessary medical procedures, ignorance of allergies, and poor understanding of the whole view of the patient, their history and current status.

Many healthcare activists view Accountable Care Organizations (ACOs) and the Patient-Centered Medical Home (PCMH) movement as a necessary step toward having more cost-effective, higher quality healthcare (Detmer, Bloomrosen, Raymond, & Tang, 2008). ACOs are organizations that actively manage a group or panel of Medicare patients and receive fee-for-service in return for keeping them in good health. The PCMH model strives to provide continuity of care across a team of providers, and offers enhanced access to care while encouraging patient self-management (Berenson et al., 2011). Many of the techniques used by ACOs to keep their patients healthy are also key attributes of PCMH. Patient portals can provide the innovative platform in which coordinated care across medical practices empowers patients through self-education and
monitoring of their own health conditions allowing for more informed decision making (Flereau, Bohn, & Knoschak, 2011). In this way, healthcare can become more patient-centric.

The use of information systems like patient portals for sharing protected health information (PHI) with patients can be a critical tool in making the patient an integral part of their own healthcare team (Nutting et al., 2011). A major goal of healthcare reform is to reengineer existing medical workflows to match the new capabilities of information systems that are capturing and storing massive amounts of PHI (Mori et al., 2013). As the medical organization adapts its IT capabilities to meet ACO and PCMH quality measures, organization employees must also adapt their beliefs and attitudes or a functionally viable PHR may be ignored by patients who have their attempts at meaningful use ignored after an initial registration process (Archer et al., 2011).

**Organizational Change and Support**

The next section of this literature review will focus on issues related to information systems and organizational change within physician-managed clinics.

*Business Intelligence*

Many organizations are drowning in a sea of data (Sherman, 2015). Business can make use of business intelligence (BI) analysis and reporting to push the right information to the right people at the right time. Healthcare clinics take in patient data from EHRs, general practice systems and other systems. Leveraging this information through the use of BI tools and techniques can create actionable intelligence that can be critical to supporting the day to day decision-making related to meaningful use initiatives.
in healthcare organizations (Ferranti, Langman, Tanaka, McCall, & Ahmadm, 2010, p. 142).

Some organizations mistakenly try to solve all of their data analysis problems at once, usually resulting in failure (Laursen, & Thorlund, 2010). Instead the organization should focus on the most important problem first and find the tool or technique that will most closely address that issue. This way organizations can incrementally grow their BI capabilities. Carter (2014) suggests a modified SWAT process for what he calls “actionable intelligence” by which an organization can cut through the complexity and get right to the heart of matter: ask “S”trategic business questions, “W”rangle up the data, “A”nswer with the appropriate visualizations, and finally “T”ake action (pp. 21-22). Staff serving at the operational level of the healthcare organization need to be brought into the decision-making loop when it comes measuring their progress against targets by which they can examine their current processes and workflow for innovation and corrections.

Community of Practice

A community of practice (CoP) is a place, often with an online component, where like-minded people can congregate and share access to resources and collaborate in areas of common interest (Wenger, White, & Smith, 2009). In an organization that has many distributed locations, a CoP may be used to share an institutional knowledge base, best practices, standards and procedures, as well as share commonly beneficial information and communication. Individuals responsible for the community’s resources and also bringing the CoP to life can be referred to as the technology steward. Often, technology stewards are key stakeholders in the actual community in which they serve (Wenger, White, & Smith, 2009).
A CoP can serve as the avenue for organizational learning and the means to achieve diffusion of an innovation within an organization (Hislop, 2003; Nemanich & Keller, 2007). Wenger (1998) suggests that a community of forward thinking members can inspire innovative practices within an organization. Over time, others in the institution may begin to value membership in this pioneering group and seek to join and follow its influential practices (Wenger, 1998, p. 5).

A literature review into research related to CoP use in healthcare showed the following uses: knowledge management, support for trainees, removal of barriers of time and space, connecting community members, and supporting new technology and organizational processes (Ranmuthugala et al., 2011). In the healthcare domain, a CoP can be used to help transfer knowledge between novice and expert users (Li et al., 2009). Because of privacy regulations like the Health Insurance Portability and Accountability Act (HIPAA), special effort must be taken to protect patient identities and PHI when sharing best practices and training scenarios in a CoP or other online settings.

Organizational Learning

Many professionals involved in information systems development have become converts to end-user design practices. Gasson (2003) presents a case for a more human-centered design approach where users are viewed as integral participants rather than minor players in the systems development life cycle. The human-centered design practice places an emphasis on the organizational and cultural setting of the problem, interactions between and among group members, and examines the many roles played by social actors in the system. Limitations of traditional end-user design often include a too narrow focus on the individual and dealing with system tasks in isolation (Lamb & Kling,
2003). In contrast, the human-centered design technique tries to take a socio-technical view of systems design and balance the needs for human communication and collaboration with the more technology focused solutions (Gasson, 2003).

There are four dimensions of an organization that may determine if an innovation will be adopted: culture, strategy, structure, and environment (Fiol & Lyles, 1985). Efforts to increase adoption rates of PHRs will require clinicians, the office staff and their patients to make a cultural change. Medical practices must be willing to modify traditional processes that were originally more physician-centered and reframe them as more patient-centered (Weingart, Rind, Tofias, & Sands, 2006). Organizational learning should be an ongoing process that focuses on a community and fine-tunes their interactions and practices. A mechanism often used to support organizational learning is a CoP.

**Measuring Information System Usefulness**

In a medical organization, the PHR is usually tightly coupled with an EHR and becomes an integral part of the information system. This study will attempt to uncover clinician beliefs and expectations related to the usefulness of patient portals. The Technology Acceptance Model will be the foundational theory used to measure perceptions and beliefs of organizational sponsors related to PHR use and adoption in their practices.

*The Technology Acceptance Model and Related Models*

The Technology Acceptance Model (TAM) is a widely recognized information systems theory that examines the attitudes and beliefs of the user as they relate to how
and why they adopt a system. TAM identifies two variables that seem to play a key role in computer use: Perceived Usefulness (PU), and Perceived Ease of Use (PEOU) (Pai & Huang, 2011).

An extended variation of TAM, referred to as TAM2 was developed that added an additional variable, the Subjective Norm (SN), into the model. In situations where computer use is required, SN refers to the social pressure a user might feel to use a computer system from those in power or others with influence (Aggelidis & Chatzoglou, 2009). The Unified Theory of Acceptance and Use of Technology (UTAUT) attempts to divide the intention to use a computer system into four main categories: Performance Expectancy (PE), Effort Expectancy, Social Influence (SI), and Facilitating Conditions (FC) and Behavioral Intention (BI) (Holden & Karch, 2010). The key variables that look the most promising from TAM, TAM2 and UTAUT for the purposes of this study are PU, SN and SI as they apply to user adoption of PHRs and physician/provider endorsements.

**Qualitative Constructivist Interviews and Analysis**

The last literature review section will examine the Appreciative Inquiry interview technique used to elicit a positive, creative vision from stakeholders for achieving organizational change. Once the stories and narrative have been captured from the interview process, techniques suggested from Hermeneutic analysis can uncover shared meaning and patterns that can help guide an organizational change strategy.
Appreciative Inquiry

Appreciative Inquiry (AI) is a constructivist interview technique that can be used to guide the topic choice of the semi-structured interviews in a given context (Whitney & Trosten-Bloom, 2010). An appreciative inquiry is especially important to healthcare organizations who are seeking sustainable designs in organizational changes that yield a more hopeful future by moving beyond “what is” to “what might be”. (Carter, Ruhe, Weyer, Litaker, Fry, & Strange, 2007, p. 203).

Though the AI technique applied in this study will focus on a positive view of a proposed information system, the goal will not be to deny criticism and weaknesses. Instead, the interviewee will be asked to put aside negative thoughts and focus on building a positive change (Bushe, 2011). By framing interview questions in an affirmative manner, the questions become non-threatening to the subject, and provide an open and accepting entry point into the discovery process (Moore, 2007).

In AI, key stakeholders or “powerful people” in the organization are asked to follow a constructivist process usually made up of four phases called the 4D: discovery, dream, delivery and destiny (Bushe, 2011). In an interviewing process, the first set of questions can be framing with two viewpoints, a historical or retrospective view and then a futuristic or prospective view (Carter, 2006; Myers & Newman, 2007). The retrospective questions would ask the interviewee to look back on past experiences where they had an enriching, powerful interaction with an information system. Next the interviewee will be asked to look into the future at an implementation of a system that would be everything needed to support the goals of the organization. The discovery and dream phases of AI map to these two viewpoints (Bushe, 2011).
The heart of organizational change can be uncovered with the AI process during the design phase and destiny phases (Adams, Schiller, & Cooperrider, 2004). Design type questions might ask the subjects, “How can our organization create our own preferred solution?” And finally, the destiny phase would ask the subject to imagine, “How will we continue to sustain our plan?” Participation in the 4D process allows stakeholders to become “powerful” within the organization and provide a constructivist view to planning and guiding innovative change (Whitney & Trosten-Bloom, 2010).

The goal of AI technique is to generate a set of beliefs, attitudes, visions, plans and guides from stakeholder groups. As suggested by Stake (2010), after the interviewing process is completed, the researcher should begin to examine the narratives that have been captured to identify patterns, common views, meanings or other clues. One analysis technique that can be applied to the stories and narratives is hermeneutic analysis.

*Qualitative Hermeneutic Analysis*

Traditional approaches to systems development may be framed in closed systems where users and developers are disconnected, each interacting with the system in their own separate manner. An interpreter of textual narratives and other social artifacts that make use of a hermeneutic process focus on more practical forms of knowledge organization such as classification (Kinsalla, 2006). Knowledge construction should become a collaborative activity between users and analysts. The hermeneutic circle provides a method where the investigator moves from the whole to the parts and back to the whole in an effort to increase understanding (Butler, 1998).
Hermeneutic analysis will be used to assess the interview narratives of key physician/providers and staff members for beliefs and attitudes and their vision for meaningful PHR use. According to Butler (1998), in the systems development process, the “world-views” of the key players need to be captured and interpreted if the researcher is to grasp the interactions within the system accurately. The analyst will identify group-level characteristics in the interview narratives that map to TAM constructs. From a constructivist viewpoint, an information systems development process in an organization will involve stakeholders and actors as well as technologies and practices where understanding about the system will be socially constructed (Butler, 1998).

Summary

In this chapter, a literature review of meaningful use in PHRs, organizational learning toward change supported through actionable BI and a community-based CoP, theoretical information system acceptance of TAM and related models, and research strategies such as appreciative inquiry and qualitative hermeneutic analysis were examined. These topics play a significant role in the following chapter that will address the study methodology.
Chapter 3
Methodology

Research Goal

The goal of this investigation was to conduct an inquiry into a transformative organizational change strategy for independent, physician-led practices that would help to increase adoption rates and meaningful use of a patient portal used for patient education and patient-provider relationship management. The investigation consisted of three phases – a fundamental study phase, an organizational learning phase, and an organizational change phase which sought to answer the research questions related to understanding change in a healthcare, case study organization related to meaningful use of a patient portal.

The theoretical methodology used to guide the three phases of the organizational change process was Appreciative Inquiry (AI) and its 4D model: Discovery, Dream, Design and Destiny (Watkins, Mohr, & Kelly, 2011). The AI method asks participant stakeholders to envision an ideal, positive future for the information system, revise accepted norms and to socially construct a plan of action to move the organization in the desired direction (Cooperrider & Whitney, 2001). Bushe and Marshak (2009) suggest that the organizational development (OD) tool selected is not as important as matching the most appropriate theoretical premise behind the tool that best fits with the organizational philosophical and managerial orientation (p. 364). The altruistic healthcare organizational goals of striving to deliver a more accountable and patient-centered PHR experience provided a good fit for the AI research methodology which is
dedicated to supporting positive, transformational change (Bushe & Kassam, 2005; Moore, 2007).

The research methodology was submitted to the Nova Southeastern Institutional Review Board (IRB) and received initial approval on February 27, 2014 for this process and the associated interview questions, approval form and consent forms. Continuing approval by the Nova Southeastern IRB was also given on February 11, 2015. Both of these IRB approval forms can be found in Appendix A.

**Case Study Subject**

When performing constructivist research in an information systems development process, an exploratory, single instrumental case can be used to investigate an issue in a given context (Butler, 1998). A group of independent, physician-managed clinics in Utah and adjoining states organized as Revere Health was the bounding organization for this case study used to select medical professionals and staff subjects for interviews, examine workflow processes and data analysis related to the PHR system.

In July of 2015, the case study organization underwent a change of name from Central Utah Clinic to Revere Health (Revere Health, n.d.). Because of this change, some of the supporting documents, descriptive data, and interview content may still refer to the former name, Central Utah Clinic or CUC. An organizational chart placed in Appendix B shows the management structure of Revere Health which adds at the top level a Chief Executive Officer who answers to a Board of Directors comprised of key physician representatives. Ultimately this Board of Directors is the controlling entity for policy, change and long-term vision for Revere Health.
An approval to participate form completed by Chris Smith, the Chief Information Officer of Revere Health is shown in Appendix C. The challenges faced by this physician-led organization in relation to the organizational learning precipitated by adoption and meaningful use of the PHR were investigated. The case study sought to capture meanings and contexts from different perspectives and focused on application of the AI process to track and understand the organizational change over the course of two years (Crowe et al., 2011). The classification for the type of case study was a single case with two embedded units: physician/providers and clinical staff (Yin, 2014). These criteria made this a critical case that was predicted to yield good variance in the data gathered (Stake, 1995).

Much of information systems development focuses on the design of systems, but after a system is implemented, it should be tested for acceptance to users. The information system under investigation was the FollowMyHealth (FMH) patient portal provided by the vendor, Jardogs. This FMH patient portal is designed to help educate clinic patients, present an electronic view of their PHI and provide a vehicle for provider-patient relationship management, all components of patient engagement as required by the CMS EHR incentive program (CMS, 2016). Part way through the study, the PHR system became a more tightly integrated solution for Revere Health after the vendor, Jardogs, was acquired by Allscripts, the organizational EHR system.

Researcher Qualifications

The primary researcher for this study is a tenured faculty at Utah Valley University (UVU) in the Information Systems and Technology department and taught Information Systems courses, specifically those in a Healthcare Information Systems
emphasis in the four year IS bachelor’s degree. She has a bachelor’s and master’s degree in computer science and has been teaching at UVU for over 20 years. UVU rolled out a Healthcare Information Systems (HIS) emphasis in the bachelor of Information Systems degree in 2011 and she was tasked with program and course development, and participated in the studies needed for program approval. After completing a Faculty in Business (FIB) externship funded through a UVU Perkins Grant with Advanced MD, an EHR vendor in the summer of 2011, she began teaching HIS program courses in Healthcare Informatics Fundamental and Healthcare Information Systems Applications.

The researcher had an extended relationship with Revere Health from April 2013 through December 2015. In an effort to gain insight into patient portal application use, she completed a second FIB externship during the summer of 2013, this time with Revere Health, formerly CUC, as the hosting institution. Under the supervision of the CIO, she worked with IT staff, marketing, and the Application Director to provide an internal marketing strategy related to the patient portal and MU success to Revere Health. During winter semester of 2014, under the guidance of the researcher, the Healthcare Information System Applications class investigated the embedded form tool in the FMH patient portal to determine if it was sufficient to be used to create clinic intake forms for Revere Health. Additional interaction with Revere Health IT staff included video case studies, guest speaking engagements for HIS classes and college forums and serving on a Utah HIMSS board of directors with the organizational CIO.

These academic qualifications and a long-term relationship with the Revere Health organization, provide the researcher with an insightful and detailed understanding under which to conduct this research case study. The openness and access to the IT staff
and clinical staff/providers and management allowed the researcher to peel back the layers of bureaucracy in this organization as well as receive timely feedback and coordination in all aspects of the case study.

**Phase 1 – The Fundamental Study**

The goal of the fundamental study was to build evidence of the underlying organizational culture expressed through beliefs, opinions, and ideals for selected physician-managed clinics that have aligned with a central business organization. The research methodology applied to the semi-structured interviews was based upon the first three steps of Appreciative Inquiry: Discovery, Dream and Design (Bushe & Marshak, 2009). A listing of interview questions approved by the Nova Southeastern IRB is given in Appendix D.

Two embedded units, physician/providers and staff, were the main subjects of the fundamental study. Participants from these embedded units were chosen through multi-level purposeful sampling in conjunction with recommendations from clinical management and examination of practice patient portal adoption rates (Onwuegbuzie & Leech, 2007, p. 248). As all these adult subjects were invited to participate in 2014, the structure of the email contact followed the 2014 Nova Southeastern IRB approved Email Invitation provided in Appendix E.

At the time of the interview, each subject was asked to read and sign the 2014 Nova Southeastern IRB approved Adult Consent form as shown in Appendix F. No participant subjects chose at any time in the process to be removed from the study. A copy of the signed consent form was provided to each participant and a signed copy was also kept in a secure location.
Appreciative Inquiry: Discovery

The first step in the AI methodology is known as discovery (Bushe, 2011). The AI discovery process assumes that key stakeholders in the organization are a resource to be tapped for meaningful positive accounts about the past, and present of the phenomenon under study, in this case healthcare information systems, and patient portals specifically (Cooperrider & Whitney, 2001). The researcher formulated the discovery questions to set the tone for the interview and frame opinions expressed on PHRs by favorable experience(s) with information systems. The interview questions related to the discovery step are also shown in Appendix D in the first section.

Appreciative Inquiry Interviews: The Dream

The second of the 4D steps in AI, the dream, invites participants to look into the future and describe or imagine the perfect implementation of an information system and the benefits to be valued or “appreciated” (Cooperrider & Whitney, 2001). These interview questions related to the dream step are also shown in Appendix D in the second section.

The dream questions were framed to elicit positive descriptions and features that both physician/providers and staff felt contribute to ideal PHRs (Adams et al., 2004). TAM2 terminology was used in order to formulate interview questions in both the discovery and dream section of the interview. The TAM2 term perceived usefulness (PU) is related to Research Question 1 as previously given in Chapter 1.
Appreciative Inquiry Interviews: Design

The final section of the physician/provider and staff interview questions moved the inquiry into the third AI step, design. The AI design questions can be found in the third question set in Appendix D in the third section. Adams et al. (2004) suggest that a key component in a transformative cycle is asking questions that help an organization envision innovative practices that move toward the preferred future.

Questions in the design section were targeted to address key acceptance measures such as the subjective norm (SN) and social influence (SI) determinates from the TAM2 and UTAUT models (Moores, 2012). Additional follow up questions asked participants to conduct a gap analysis between an ideal PHR information system under study and current work practices (Melas, Zampetakis, Dimopoulou, & Moustakis, 2011). These opinions, stories and comparisons vocalized by the interview participants in the AI design responses would be used to inform Research Question 2 related to power and influence within the organization and Research Question 3 which asked about gaps in current clinical workflow and processes.

Phase 2- Organizational Learning

The goal of the organizational learning phase was to leverage insight into the beliefs, attitudes and expectations held by physician/providers and their staff related to the meaningful use of patient portals gained from the foundational study and provide a positive direction for informing organizational change at Revere Health.

The first task in this phase was to conduct a Hermeneutic analysis of the AI discovery, dream and design interview responses provided by physician/providers and clinical staff. In an effort to better understand the organizational culture, workflow and
data management and reporting structure of Revere Health related to the meaningful use of patient portals, the organizational change phase also examined current organizational PHR training and marketing materials, and an scrutinized artifacts related to MU reporting. The interview qualitative analysis and data collection techniques helped provide collaborative support, or multiple realities to the case study by a triangulation of sources (Stake, 2010; Bowen, 2005). These multiple realities provided knowledge needed to address the first three research questions:

Research Question 1:

What attitudes and beliefs are held by physician/providers and medical staff related to the perceived usefulness of patient portals?

Research Question 2:

How do physician/provider and staff attitudes related to pressures from those in power and with social influence affect preferred methods for handling the patient portal within the clinic?

Research Question 3:

What gaps exist between an ideal patient portal implementation and the current patient portal as perceived by physician/providers and the medical staff?

Hermeneutic Analysis of Interview Reponses

Stake (2010) states that, “interpretation is an act of composition.” In the analysis process, the researcher is the composer (p. 55). Taking a constructivist view of the data analysis, community SN or aspects of SI as seen in UTAUT model are of specific interest as they play an important role in more fruitful organizational learning (Willis, El-Gayar, & Bennett, 2008). Reviewing the transcription text for stories or examples where power irregularities come into play within the organization is an
example of critical analysis that will be related to the TAM group-level characteristics of interest (Butler, 1998). The TAM2 variable that seems to play a key role in computer use, Perceived Usefulness (PU), was also the focus of the categorization and grouping during the analysis process (Pai & Huang, 2011). This analysis provided knowledge needed to understand provider and staff attitudes related avocation of patient portal adoption and integration within the case study organization.

Current PHR Clinical Practices

Revere Health made available read-only access to the data warehouse maintained collaboratively by the EHR and the PHR systems. Permission to review marketing materials, and examine statistics and data visualizations gathered in the FMH administrative dashboard, consultation access to clinic data analysts was obtained from the CIO acting as the site representative as outlined in the Case Study Site Approval shown in Appendix B.

The following items were collected and reviewed:

- Marketing materials from 2013-2014 available in the clinic or lab related to PHR use and adoption by patients as shown in Appendix G
- Schema of relevant patient portal tables found in the EHR/PHR data warehouse as shown in Appendix H
- Data statistics and visualizations for patient portal available through the FMH Administrative Dashboard shown in Appendix I
**PHR Gap Analysis**

Capturing current explicit and tacit knowledge about how a clinical practice works is necessary before change can be undertaken (Pionke, 2006). When a disruptive technology like a PHR is introduced into a system, i.e. a healthcare clinic, the organization must adjust and reorganize (Wenger, 1998). There is often a gap between standardized best practices for online systems and current organizational practices related to PHRs (Collins, Vawdrey, Kukafka, & Kuperman, 2011).

The organization learning phase of this study leveraged the constructivist AI model by allowing the researcher to help stakeholder groups at Revere Health discover the gap between existing practices and the dream of patient engagement with a fully realized PHR system able to support the provider-patient relationship outside the traditional episodic office visit. The researcher gathered opinions and stories based upon the interview design questions related to the gap that exists between an idealized PHR and the current implementation of FMH. The focus of the design questions was related to workflow and processes rather than technical implementation issues.

**Phase 3 –Organizational Change**

As stakeholders begin to implement action strategies for change, the role of management becomes one of tracking progress and fanning the flame of innovation (Bushe, 2011). Revere Health had several challenges related to their organizational change efforts to increase patient portal adoption and meaningful use: lack of an online community to support super users, no steering committee existed for patient portal stewarding, and MU reporting was only completed at the end of attestation time period.
and was not widely available to influence actionable intelligence at the practice level (C. Smith, personal communication, May 2, 2013).

The goal of the organizational change phase was to provide a support system for the case study organization providers and clinical staff in their efforts to achieve innovative use of their PHR system. Without the necessary support of these two key stakeholder communities, adoption and meaningful use goals would not be sustainable. As Revere Health implemented their action plan to meet their attestation objectives under MU requirements, the third phase of this study provided some guidance related to tracking and supporting organizational change related to patient portal implementation. Completion of the organizational change third phase would provide the best practices and strategies needed to inform Research Question 4.

Research Question 4:

What best practices and support strategies could be used by physician-managed clinics to increase patient adoption, and continued meaningful use of the patient portal?

Community of Practice for Super Users

Super users are a group or community of domain specialists within an organization who serve as essential advisors and “problem-fixers” (Pionke, 2006). While the Revere Health super user group serves as a powerful agent of change throughout the organization, they were a community with no online community support system in place at the beginning of this study.

The communication and resource sharing needed to support organizational change across separate physician-managed clinics could be sustained by a CoP (Ranmuthugala, et al., 2011). Workers who need to improve their practices can make
use of a CoP so that learning can become “embedded” within organizational structures (Hara & Schwen, 2006). One support system necessary for putting the community into the Revere Health super users was a CoP. As action plans are implemented and progress is tracked, best practices and lessons learned can be shared within the CoP by medical providers and staff (Hara & Schwen, 2006). The researcher worked with Revere Health IT to plan and implement a CoP to support the super user group with communication, sharing of resources and long-term archiving of meetings, marketing materials and best practices.

Delphi Group: Informing Dashboard Design

A motivational element to include in the CoP for Revere Health would be a performance dashboard that could track trends in PHR adoption rates, and MU performance criteria measurements across the whole organization and also allow staff users to drill down and view clinic or provider specific progress. A question arose in discussions with Revere Health IT staff, what MU measures and criteria should be shown in a performance dashboard for MU stakeholders (J. Verdoorn, personal communication, January 22, 2015)?

Carter (2014) suggests a modified SWAT process for what he calls “actionable intelligence” by which an organization can cut through the complexity and get right to the heart of matter: ask “S”trategic business questions, “W”rangle up the data, “A”nswer with the appropriate visualizations, and finally “T”ake action (pp. 21-22). The researcher began the actionable intelligence SWAT process as outlined by Carter (2014) by obtaining expert feedback by asking “S”trategic questions of a group of key stakeholders related to the most suitable dashboard options, date ranges, and preferred views.
The Delphi technique, named after the Greek temple where an all seeing oracle could be consulted, was used to answer the dashboard content question (Dalkey, 1969). The purpose of this key stakeholder panel was to provide a framework of options to be used to create a super user dashboard that would inform clinic staff with actionable business intelligence related to patient use of the FMH portal. In series of rounds, members of the Delphi group were asked to help isolate key measures and dimensions used to organize charts for a performance dashboard.

*Dashboard Visualization Prototype*

Eckerson (2006) stated that a performance dashboard can be a powerful agent for change within an organization. A dashboard can focus the attention of an organization like a magnifying glass by conveying relevant, motivating and timely progress toward shared strategic objectives (Eckerson, 2006). When choosing the focus of a performance dashboard, the organization should try to follow the strategic view and choose highest priority issues and then select the most appropriate analysis or reporting method to support decision making with actionable intelligence (Ferranti et al., 2010).

The second step of the actionable intelligence SWAT process as presented by Carter (2014) is to “W”rangle the data. The researcher worked in conjunction with the Revere Health data analysts to identify tables and queries that might assist in the creation of a performance dashboard for key stakeholders. The actionable intelligence SWAT third step is to “A”nswer with appropriate visualizations. This capability was served by the creation of a prototype performance dashboard by the researcher to supply the clinic super users and other stakeholders with actionable intelligence related the MU targets and other related measures.
Appreciative Inquiry Summit

An AI summit is a stakeholder group exercise where participants socially construct the seeds of change within an organization (Whitney & Trosten-Bloom, 2010). While large organizations may hold an AI summit with hundreds or even a thousand participants, a smaller AI mini-summit could be used to address more specific organizational needs (Cooperrider & Whitney, 2001; Watkins, et al., 2011). The researcher with the assistance of the FMH committee chair, invited key stakeholders to a mini-AI summit to review findings from the foundational study and examine the clinic organizational learning related to the gap analysis, and organizational structure change related to MU processes and reporting. Organizational support techniques including a CoP and the use of actionable BI in the form of a performance dashboard were also explored as part of the strategic action plan for Revere Health patient portal adoption and MU attestation.

Appreciative Inquiry: Destiny

The last step in the AI 4D methodology is the destiny step (Cooperrider & Whitney, 2001). Participants in an AI summit should bring their innovations and ideals back to the whole organization, but their actions while striving for an idealized future are grounded in the realities of the organization (Ludema, et al., 2003). Several support tools to enable super users, office managers, and key providers in their PHR adoption and MU included a CoP and a prototype performance dashboard. These knowledge-based technologies allow Revere Health to generate actionable intelligence to inform their change efforts related to meaningful use of patient portals.
Resources

Most of the resources needed for each of the three phases of the study were human resources. Revere Health gave approval to approach needed stakeholder resources for interviews, a Delphi group, and a stakeholder group to participate in an AI summit. Also Revere Health has agreed to Information Technology (IT) patient portal administrative support and consultation of IT resources for creation of a dashboard and CoP. The researcher worked in conjunction with Revere Health IT personnel to develop these organizational resources.

The study also included some non-human resources needed to complete the three phases. The list of resources and an expected budget is shown in Table 1. The researcher committed to the funds needed which provided hardware and software needs, AI summit luncheon budget and Delphi Group incentives for this study.

Table 1: Estimated Budget

<table>
<thead>
<tr>
<th></th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware and Software</strong></td>
<td></td>
</tr>
<tr>
<td>Dragon Software (used to transcribe interviews)</td>
<td>$ 99.00</td>
</tr>
<tr>
<td>Digital Voice Recorder</td>
<td>$ 90.00</td>
</tr>
<tr>
<td>Atlas Ti (Hermeneutic Research Software)</td>
<td>$ 90.00</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$ 279.00</td>
</tr>
<tr>
<td><strong>Appreciative Inquiry Activities</strong></td>
<td></td>
</tr>
<tr>
<td>Delphi Group Participation Incentives</td>
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</tr>
<tr>
<td>AI Summit Food Budget</td>
<td>$ 250.00</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$ 500.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$ 779.00</td>
</tr>
</tbody>
</table>

Summary

The organization that is the bounding unit for this case study is a group of physician-managed medical clinics. The framework for this research case study took the
form of three phases: a fundamental phase, a strategic action plan phase and finally a supporting organizational change phase. The research methodology applied to these phases was Appreciative Inquiry and the 4D steps of: discovery, dream, design and destiny. By applying the framework outlined in this section, strategies and a plan of implementation should help the case study organization to increase PHR adoption rates and increase meaningful use of the PHR system with the support of a CoP including a performance dashboard, cohesive revised marketing materials, and oversight from a steering committee.
Chapter 4
Results

Introduction

This chapter reports the results of the methodology that was described in Chapter 3. Revere Health, a physician-managed collective of clinics, served as the case study organization for this research. Providers and clinic staff as well as IT professionals served as stakeholders who worked to increase meaningful use of patient portals over a two year period of the study.

The Foundational Study phase sought to elicit sources of meaning through semi-structured interviews of providers and super users of the case study organization. The Organizational Learning phase analyzed the interview responses from phase one using a Hermeneutic analysis process and also examined descriptive data related to PHR meaningful use, workflow and reporting. The Organizational Change phase included building a super user CoP, and a performance dashboard prototype was reviewed by key stakeholders in an AI mini-summit. These tools could provide Revere Health IT staff and super users with actionable intelligence for their PHR implementation and decision making.

The AI process was infused throughout the case study three phases. The results of the discovery, dream and design AI steps helped inform research questions related to attitudes on patient portal usefulness, gaps between an ideal and current patient portal, and provider attitudes that may affect workflows related to patient portals in their practices. The AI step of destiny is ongoing. As with most information systems, change is an everyday reality. Participation in the 4D process provided a constructivist view to
planning and guided innovative change related to PHR workflows and reporting strategies at Revere Health.

**Phase 1: Foundational Study Results**

The AI interview process was used to build an understanding of beliefs, practices and processes used by Revere Health providers and staff related to the patient portal usage and meaningful use. Questions for the semi-structured interviews were formulated based on the first three of the AI 4D process: discovery, dream, and design.

A list of possible interview subjects was provided by a representative of Revere Health. These included providers, medical assistants, office managers, nurses and other staff of the clinic. Participants from two embedded units were chosen through purposeful sampling in conjunction with their active participation in the clinic PHR workflow. As all these subjects were adults, their email invitation as well as adult consent forms were approved by the Nova Southeastern IRB.

As agreed upon, the requirements of the Nova Southeastern University IRB for conducting this research required the anonymization of participant information such as names, locations and other identifying attributes. A list of all interview participants, their clinic role and clinic type are found in Table 2. The participant names were replaced with pseudonyms for reference purposes and to protect their privacy.
Table 2: Interview Participant Reference List

<table>
<thead>
<tr>
<th>Participant</th>
<th>Clinic Role</th>
<th>Organization Role</th>
<th>Clinic Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI-1</td>
<td>Receptionist</td>
<td>super user</td>
<td>Cardiology</td>
</tr>
<tr>
<td>AI-2</td>
<td>Office Manager</td>
<td>super user</td>
<td>Family Medicine</td>
</tr>
<tr>
<td>AI-3</td>
<td>Office Manager</td>
<td>super user</td>
<td>Family Medicine</td>
</tr>
<tr>
<td>AI-4</td>
<td>Family Nurse Practitioner</td>
<td>Provider</td>
<td>Women's Center</td>
</tr>
<tr>
<td>AI-5</td>
<td>Medical Doctor</td>
<td>Provider</td>
<td>Cardiology</td>
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<td>AI-6</td>
<td>Physician Assistant</td>
<td>Provider</td>
<td>Nephrology</td>
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<td>Receptionist</td>
<td>super user</td>
<td>General Medical Practice</td>
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<td>Registered Nurse</td>
<td>super user</td>
<td>Women's Center</td>
</tr>
<tr>
<td>AI-9</td>
<td>Medical Assistant</td>
<td>super user</td>
<td>Nephrology</td>
</tr>
</tbody>
</table>

Semi-structured interviews using the AI question process were conducted to gather physician/provider attitudes and beliefs related to patient portals. The researcher met with the interview participants at their place of work. The interviews were recorded to help ensure correct transcription at a later time. Because the format of the interviews was semi-structured, the approved questions served as a guide for the interaction, but each interview had some variance. These opinions, stories and comparisons expressed by the interview participants were used to help inform the organizational learning phase of the study.

Upon completion of the interview process the researcher copied the audio files of each interview to a computer and used transcription software and a detailed correction process to transcribe each staff and provider interview. As shown in Table 2, the identities of the participants were replaced with an alias code by which they will be referred to in this report.

Phase 2: Hermeneutic Analysis Results

The semi-structured interview discovery, dream and design narratives from physician/providers and staff were recorded and transcribed by the researcher. These
transcription files were then used as source documents for the Atlas.ti, software used for qualitative data analysis that supports a circular Hermeneutic analytical process (Butler, 1998). Key stories and themes were categorized and grouped looking specifically for TAM descriptors related to PU, SN, and SI. Upon completion of the foundational study discovery, dream, and design AI steps, relevant narratives, stories and patterns were organized in the form of charts and tables to inform the first three research questions.

Appreciative Inquiry Discovery Analysis

The purpose of the discovery questions was to get participants thinking in a positive light about the traits they appreciated in healthcare systems. As the researcher processed each interview transcription, these codes were associated with related quotes or partial quotes. In Figure 2, the Discovery Code Network output by Atlas.ti shows the categories used to tag or code transcription quotes related to discovery questions in the AI interview.

![Figure 2: The Discovery Code Network](image)
A sampling of grouped interview quotes related to a previous favorable experience with an information system are shown in Table 3. The favorable system comments reflected criteria from a previous information system used by the participant. Some of the appreciated attributes from previously used systems held up as valued measures included: user-friendly, easy to learn, comprehensive, intuitive, adaptable, flexible, easy to access, and standardized.

Table 3: Past Information System favorable features

<table>
<thead>
<tr>
<th>Person</th>
<th>Past Information Systems: Favorable Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-3</td>
<td>It was very user-friendly and it was very intuitive. It was easy to figure out where you needed to go and what you needed to do.</td>
</tr>
<tr>
<td>A-3</td>
<td>It didn’t take much training.</td>
</tr>
<tr>
<td>A-3</td>
<td>It actually made a lot of our processes easier. A really good system … for us to do our work quickly and efficiently. I mean really heavy workloads without having to hire more personnel. And then we could focus on the patients.</td>
</tr>
<tr>
<td>A-3</td>
<td>It was pretty comprehensive. It allowed us to do a lot. Took care of a lot of things.</td>
</tr>
<tr>
<td>A-5</td>
<td>The system was intuitive. So without having the manual on how each little radio button and every little function works. You can figure it out.</td>
</tr>
<tr>
<td>A-5</td>
<td>Adaptable. So if one doctor does a note a certain way and another doctor does it a different way that if flexible enough that you can create their type of workflow.</td>
</tr>
<tr>
<td>A-5</td>
<td>It is fairly complete. Meaning you can get everything you from there and you don’t have to have a separate hybrid thing to go to.</td>
</tr>
<tr>
<td>A-5</td>
<td>You can get to it from different locations. If I can access it without being in my office at my computer, you know at a certain time of day. Those are features that I think are important.</td>
</tr>
<tr>
<td>A-9</td>
<td>Very standardized. If you go from one office to another office down the hall and have exactly the same approach, which is nice you don’t have to learn a new system.</td>
</tr>
</tbody>
</table>
Appreciative Inquiry Dream Analysis

The interview AI dream questions asked participants to share their ideas of what a “wildly successful” patient portal might look like. Some of the interviewees kept reverting back to discussion of the current PHR used at Revere Health rather than an idealized PHR. The Dream Coding Network as generated by Atlas.ti is shown in Figure 3. These categories were used to group participant remarks from the dream sequence of questions. Categories of particular interest to the researcher were: Patient Care, Workflow, MU, Communication, Patient Education, and Marketing, Training and Support.

![Figure 3: The Dream Code Network](image)

Both staff and physician/providers had high ideals for patient portal usage among their patients. A summary of quotes taken from the dream sequence of questions is shown in Table 4.
<table>
<thead>
<tr>
<th>Person</th>
<th>Ideal Portal Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-2</td>
<td>Probably to correspond with your doctor, instead of having to call and talk to someone. So probably if you could have something that corresponds directly with the doctor and they actually look at it and answer those back.</td>
</tr>
<tr>
<td>A3</td>
<td>To be a really good communication tool it would need to have some ability to be a little flexible or broader based.</td>
</tr>
<tr>
<td>A-3</td>
<td>Just a way to always stay connected and communicate but also know if you're kind of out there where they’re seeing your name and seeing stuff about you. You're also in their mind somewhat more than just only when they're sick or only when they have a problem.</td>
</tr>
<tr>
<td>A-5</td>
<td>It improves the quality and the timeliness of communications between the healthcare professionals and the patient.</td>
</tr>
<tr>
<td>A-5</td>
<td>It would provide reminders for patients. And then it would have an easy way to communicate. It would facilitate communication from the patient to the doctor.</td>
</tr>
<tr>
<td>A-6</td>
<td>I would like to completely end phone calls to my patients. I mean they would love it.</td>
</tr>
<tr>
<td>A-8</td>
<td>Even if they wait in a queue for five minutes, then it’s faster than when they call in and its hours before we return their call.</td>
</tr>
<tr>
<td>A-9</td>
<td>Just better connection to their doctors.</td>
</tr>
</tbody>
</table>

The majority of the comments shown in the summary were related to an idealized PHR that would facilitate patient-provider communication without the lag time experienced with current phone centered communication. One staff super user envisioned a synchronous or almost immediate feedback/communication loop with providers.

*Appreciative Inquiry Design Analysis*

While the case study organization has implemented the FMH patient portal throughout most of its clinics, there are gaps in the patient experience as well as workflow of staff and providers. The Design Code Network, as shown in Figure 4, shows the code categories created in Atlas.ti to group interviewee design question responses and generate relevant quotes.
Categories of interest for the design analysis were: Gap Workflow, Gap Communication, Gap Patient Changes Needed, Gap IT System Improvements, Gap Staff Improvements, and Gap Provider Improvements. The actual participant opinions, stories and comments related to the design analysis will be discussed in the Research Question 3 results.

**Research Question 1: Results**

*Research Question 1:*

What attitudes and beliefs are held by physician/providers and medical staff related to the perceived usefulness of patient portals?

Physician managed clinics at Revere Health have implemented a common PHR tool known as Follow My Health (FMH). While staff and providers alike are obligated under the EHR incentives program to provide patients meaningful use of electronic systems including patient portals, it is not just the responsibility of the IT department to shape the strategies and processes related to these systems. The question of PU of patient portals was asked to the AI interviewees to try to understand the level of commitment and buy-in for these two stakeholder groups when considering the role of PHRs in their medical practice.
Informed by the discovery, dream and design AI interview, providers and their staff were vocal about the perceived usefulness of patient portals, the PU TAM attribute. A summary of some interview responses related to PU are included in Table 5. Because there was some commonality in the participant responses, the researcher chose a representative selection of quotes related to PU of PHRs.
<table>
<thead>
<tr>
<th>Person</th>
<th>Perceived Usefulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-3</td>
<td>It was pretty comprehensive. It allowed us to do a lot. Took care of a lot of things.</td>
</tr>
<tr>
<td>A-3</td>
<td>Accessibility, get orders and labs and such. Easy access to patient information</td>
</tr>
<tr>
<td>A-4</td>
<td>I keep going back to the labs because that is what most patients go by, I think that knowing, especially for a pregnant person, … and being able to get in there easily and readily to get her information or get labs it a peace of mind for them.</td>
</tr>
<tr>
<td>A-4</td>
<td>Sometimes we give a patient information or instructions and failure to comply a lot of times is because they don’t remember. A lot of times I have to write my instructions down for patients and that helps them but if they get into the portal and actually see what the plan was and why I think that they’re more able to comply the regimen or suggestions that we’re giving them.</td>
</tr>
<tr>
<td>A-7</td>
<td>Send information and get information back. Just if it would make it easier for you to make an appointment or ask a question or request a medication refill. If they could make it so it was easier to that than calling in and trying to get through all the staff when it’s busy.</td>
</tr>
<tr>
<td>A-7</td>
<td>If they have a question about something that was said to them during an appointment. I would hope that all that information is in their note, so that they can just go right to it, rather than having to hassle with calling us. Not that we mind them calling us, cause that’s what our job is. But if it would be easier them to just go into their note and read through it again. That would be something I think would be helpful.</td>
</tr>
<tr>
<td>A-7</td>
<td>And use that as a resource to look up and remind themselves of things that were said during their appointments, or if they need a copy of their lab work, or to take to a specialist, they can get on and copy that off. Just maybe being more proactive in their own health. Maybe encourage them that way.</td>
</tr>
<tr>
<td>A-9</td>
<td>The patients that have gone through the extra effort to get into the portal and actually make it work for them are getting more information. They have places that they can go for more information on diabetes, more information on kidney disease. Because the portal offers them those things.</td>
</tr>
<tr>
<td>A-9</td>
<td>We have pushed the portal dramatically. Our patients, especially our transplant patients, are at need to know immediately what your labs are. Because we change their meds constantly. So if I need to tweak your prescription, and I can’t reach you by phone, and you don’t use the portal, you could be in trouble two days from now. Because I couldn’t reach you. So it needs to be easier.</td>
</tr>
<tr>
<td>A-9</td>
<td>Well they would be able to stay more in tuned to their doctor.</td>
</tr>
<tr>
<td>A-9</td>
<td>If we could communicate with you all the time in an ongoing way. Well I love that I can send out a reminder you have an appointment with us next week. Please go and do your labs. I can see whether your labs have been done or not. I can go back the day before, your labs haven’t been done yet. Will you please get over to the clinic and they can have labs drawn. I can get back to them the next day. I got you labs in.</td>
</tr>
</tbody>
</table>

One provider stated their patients would be, “more able to comply the regimen or suggestions that we’re giving them.” Several providers referred to patient empowerment, for example, patients could “use that as a resource to look up and remind themselves of things that were said during their appointments.”, “maybe being more proactive in their
own health.” Again communication plays a major role in PU of the patient portal as described by a super user, “we could communicate with you all the time in an ongoing way.” Another super user specified possible productivity gains with appointments, “I love that I can send out a reminder you have an appointment with us next week.”, and with lab reporting, “I can see whether your labs have been done or not. .”

Both providers and staff alike seemed to be converts when it came to the potential of a PHR information system for increasing patient-provider communication, empowering and engaging patients, and delivering educational resources. The leverage of governmental MU requirements from the CMS may have induced Revere Health to implement a patient portal, but politics aside, both stakeholder groups involved in the study were glowing in their praise for the capabilities an ideal PHR could provide.

**Research Question 2: Results**

*Research Question 2:*

How do physician/provider and staff attitudes related to pressures from those in power and with social influence affect preferred methods for handling the patient portal within the clinic?

Some of the TAM studies have addressed SN and SI in relation to two different situations, voluntary and involuntary adoption of technology. In regard to governmental regulations and incentives/disincentives, the providers and staff at Revere Health have applied to attest their separate physician practices to the MU attestation process as defined by the CMS. The organization IT department under the direction of the CIO and the physician-led Board of Directors has provided training and support for the PHR portion of this program. This research question attempted to address the social influences on providers and staff that affect behavior to engage in the PHR technology or
not to engage. The summary of responses related to power and social influence are shown in Table 6.

<table>
<thead>
<tr>
<th>Person</th>
<th>Subjective Norm and Social Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-3</td>
<td>They were sold on it and they were basically selling us on it.</td>
</tr>
<tr>
<td>A-3</td>
<td>They have just done most of their complaining to the doctor and he has come and told me that</td>
</tr>
<tr>
<td>A-3</td>
<td>We’ve talked to IT a few times, maybe we need to talk to someone a little higher up. Make them aware of the kind of complaints we’ve had. And how many we’ve had.</td>
</tr>
<tr>
<td>A3</td>
<td>All the top administration had been trained first. So they were really instrumental in us switching over to the system</td>
</tr>
<tr>
<td>A-3</td>
<td>They were all just all really on board with it. Very enthusiastic.</td>
</tr>
<tr>
<td>A-3</td>
<td>So the more I think of patients would use it the more it would require the staff to stay on top of it.</td>
</tr>
<tr>
<td>A-5</td>
<td>But one of the hindrances with, at least for me, and some of my partners, I believe, using the patient portal more than we currently have has been with all the excessive changes we’ve had to implement because of meaningful use, we don’t have time for one more.</td>
</tr>
<tr>
<td>A-5</td>
<td>There’s been no validation at all. They come up with the legislation; everybody is going to start doing this. Who bears the cost? Who pays for it?</td>
</tr>
<tr>
<td>A-6</td>
<td>I’ve had one patient who said he was in another provider’s office and on his tablet he was able to pull to show his FMH and show his doctor his labs from our clinic and my notes. And the doctor, he said he sat there and went wow this is great. But it’s a PR thing for CUC at other places.</td>
</tr>
<tr>
<td>A-6</td>
<td>When I’m following up one of their patients, I try to get them on, get them onto the portal.</td>
</tr>
<tr>
<td>A-6</td>
<td>But if only a couple of people in the practice are excited and doing it, it’s hard to get those numbers.</td>
</tr>
<tr>
<td>A-7</td>
<td>And I’m part of the super user group that meets every month. And so they kind of go over with us some of the updates and it’s our job to kind of come back and show the staff.</td>
</tr>
<tr>
<td>A-7</td>
<td>You reach a point where after so many patients have complained. Do I have to ask everyone to join the portal? Cause they’re going to just be mad two weeks from now they can’t remember their login.</td>
</tr>
<tr>
<td>A-7</td>
<td>And then on the other end of it, the clinic pushes so hard for the doctor’s numbers to come up to show that this percentage of their patients are in the portal. You’re pushing it and pushing it. Pushing something that needs to be tweaked.</td>
</tr>
<tr>
<td>A-8</td>
<td>We can’t get the staff on board when they are having such a hard time getting the patients on board.</td>
</tr>
<tr>
<td>A-9</td>
<td>The clinic pushes so hard for the doctor’s numbers to come up to show that this percentage of their patients are in the portal.</td>
</tr>
<tr>
<td>A-9</td>
<td>They try, but they’re like the staff. Once you have heard so many, I can’t get ins. Then the doctors become just as negative.</td>
</tr>
</tbody>
</table>
This one research question could have been many questions: How much does the organizational focus on MU and the attestation process influence providers and their staff? Who and what are the influencers of the providers and medical staff at the case study organization that might affect their behaviors and their intention to advocate portal usage among their patients? Did providers strongly affect staff attitudes and behaviors? What role did patients play in provider or staff attitudes? A likely list of social influencers might be care givers, department management, peers and colleagues, IT staff, regulatory agencies, and the medical profession at large. The researcher wanted to understand from the interviewees at Revere Health who or what was influencing support or lack of support for the PHR system.

Both providers and staff seem heavily influenced by the pressure they receive from IT management to push adoption and usage of the PHR with their patients. An office manager was referring to “they” as management when saying, “They were sold on it and they were basically selling us on it.” From another office manager again referring to the collective “they” when saying, “They were all just all really on board with it. Very enthusiastic.” A receptionist referring also to pressures from the “clinic” management, “the clinic pushes so hard for the doctor’s numbers to come up to show that this percentage of their patients are in the portal.”

A provider expressed frustration with MU regulations and the impact this has on provider processes, “But one of the hindrances with, at least for me, and some of my partners, I believe, using the patient portal more than we currently have has been with all the excessive changes we’ve had to implement because of meaningful use, we don’t have time for one more.” In addition, the provider commented, “There’s been no validation at
all. They come up with the legislation; everybody is going to start doing this. Who bears the cost? Who pays for it?”

Patients seem to have both a positive and negative influence on staff and provider support for the PHR. From a medical assistant referring to the influence of patient frustration on providers, “Once you have heard so many, I can’t get ins. Then the doctors become just as negative.” An office manager reflected on the positive pressure patients might exert on staff, “So the more I think of patients would use it the more it would require the staff to stay on top of it.” The same office manager also, “They have just done most of their complaining to the doctor and he has come and told me that.”

Staff-to-staff influence and peer pressure is inherent in the role of super users at Revere Health that promotes the train-the-trainer philosophy. From a super user, “I’m part of the super user group that meets every month. And so they kind of go over with us some of the updates and it’s our job to kind of come back and show the staff.” Provider-to-provider lack of support for the portal has a great impact on other providers in the practice as explained by, “if only a couple of people in the practice are excited and doing it, it’s hard to get those numbers.”

Influences from colleagues outside the organization sometimes come through word of mouth as shown by this provider comment, “I’ve had one patient who said he was in another provider’s office and on his tablet he was able to pull to show his FMH and show his doctor his labs from our clinic and my notes. And the doctor, he sat there and went wow this is great. But it’s a PR thing for CUC at other places.”
The analysis of SN and SI on providers and staff is complicated. There are many negative and positive influencers on behavior of these key stakeholders. Providers rely upon each other, their staff and IT to support their efforts related to patient portal adoption and MU. Complexities within clinics arise when some providers are proactive in their backing of PHRs and others are less supportive. Revere Health has leveraged the use of super user staff members to support and train their colleagues. These employees are the champions of IT strategies like the PHR at the operational level.

**Research Question 3: Results**

*Research Question 3:*

What gaps exist between an ideal patient portal implementation and the current patient portal as perceived by physician/providers and the medical staff?

The clinic workflow related to the PHR and clinic marketing practices were documented through interaction with the Application Director, IT staff, Department Managers and clinic super users. At the beginning of the case study, the dissemination tool for clinic marketing materials, training, and best practices came from the super user group.

A combination of questions related to the dream and design questions led the researcher to organize responses from interview participants to reflect a gap between the existing PHR of Revere Health and an idealized patient portal. A summary of statements related to the patient portal gap is shown in Table 7.
## Table 7: Design Response for Gap Analysis of Patient Portal

<table>
<thead>
<tr>
<th>Person</th>
<th>Design: Gap Analysis of FMH Portal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-3</td>
<td>They probably like to see better communication. Where they can ask questions and get answers. Where they can make requests and get responses back, probably in a more timely manner.</td>
</tr>
<tr>
<td>A-4</td>
<td>I am not familiar, I have not been on the patient’s side to see what they see. I just know that this is available to them. I don’t know the other side of what they see, problems they encounter as they try to access the portal. So I am not sure what would be beneficial for them. On their end. I have not accessed the portal as a patient.</td>
</tr>
<tr>
<td>A-6</td>
<td>And say look, this is how you’re going to be able to send me a message. This is how you’re going to be receiving them from me. To reply, let me send you a message right now. You reply back to me. Let’s have the little demonstration.</td>
</tr>
<tr>
<td>A-2</td>
<td>Kind of encourage them to correspond back and forth with them directly.</td>
</tr>
<tr>
<td>A-3</td>
<td>I think patient education would be one thing that needs to be probably addressed more. When they can see the benefits of it. Trying to get our patients on board more. So that they are using it more.</td>
</tr>
<tr>
<td>A-3</td>
<td>Making sure that things are being done in a timely manner</td>
</tr>
<tr>
<td>A-3</td>
<td>It would be helpful to have some kind of handout that could list bullet points all the advantages of being on it. Like make an appointment, or refill request. I bet a lot of our patients aren’t even aware of that. So if we had a list saying these are all the advantages of getting on Follow My Health and that they could look at and say okay it’s more than just this one little thing.</td>
</tr>
<tr>
<td>A-3</td>
<td>Well, keeping an eye on it, making sure that things are being done in a timely manner. We want that to always be the case. And then kind of watching the processes of how things were done and seeing if there’s ways it could be improved and making suggestions. That kind of thing.</td>
</tr>
<tr>
<td>A-5</td>
<td>The second thing would be, that they go so well versed on it so when patients are using it they give positive feedback experiences so that the patients are more inclined to use it in the future. The patients try the portal and they don’t get response.</td>
</tr>
<tr>
<td>A-8</td>
<td>We can’t get the staff on board when they are having such a hard time getting the patients on board. I think it is because of the difficulty of signing up.</td>
</tr>
<tr>
<td>A-9</td>
<td>Better attitude. You reach a point where after so many patients have complained. Do I have to ask everyone to join the portal. Cause they’re going to just be mad two weeks from now they can’t remember their login. And then on the other end of it, the clinic pushes so hard for the doctor’s numbers to come up to show that this percentage of their patients are in the portal. You’re pushing it and pushing it. Pushing something that needs to be tweaked. The gaps in the portal need to have been fixed before they were rolled out, not after.</td>
</tr>
</tbody>
</table>

Gaps seem to exist between ideal patient-provider communication and the current use of FMH for messaging. An office manager felt communication between providers and patients was key and needed faster response, “They probably like to see better communication. Where they can ask questions and get answers. Where they can make
requests and get responses back, probably in a more timely manner.” Another office manager felt patient driven communication should be encouraged, “Kind of encourage them to correspond back and forth with them directly.” One provider felt that an ideal system would present PHI in a more understandable manner to patients. Both providers and staff thought patient engagement with the patient portal could be boosted by demonstrating and validating valued behaviors. A mid-level provider suggested, “… you’re going to be able to send me a message. This is how you’re going to be receiving them from me. To reply, let me send you a message right now. You reply back to me. Let’s have the little demonstration.” Another provider promoted, “just talk more to patients; take time to go over it with them before or after their visits.”

An office manager categorized a gap that exists in patient education, “I think patient education would be one thing that needs to be probably addressed more. When they can see the benefits of it. Trying to get our patients on board more. So that they are using it more.” A provider echoed the need to,” provide(ed) information to the patient that helped them manage their problem better and avoided events then that would be meaningful.” According to this same provider, these targeted patient education efforts would, “recruit(led) the patient as their own care provider on many of the issues.”

Participants expressed frustration in the gaps that exist between the implementation of the current PHR and an ideal implementation. While this study does not deal with the technical vendor specific implementation, the frustration of these stakeholders is very real. A registered nurse super user shared the dilemma, “We can’t get the staff on board when they are having such a hard time getting the patients on board. I think it is because of the difficulty of signing up.” A medical assistant on the
front line addressed the implementation gap, “You reach a point where after so many patients have complained. Do I have to ask everyone to join the portal? Cause they’re going to just be mad two weeks from now they can’t remember their login.”, “the clinic pushes so hard for the doctor’s numbers to come up to show that this percentage of their patients are in the portal. ... The gaps in the portal need to have been fixed before they were rolled out, not after.”

The most significant issues related to gaps uncovered in the AI design questioning were related to provider and staff workflow and the need for these stakeholders to champion the PHR with patients. FMH implementation issues related to a cumbersome and frustrating login process and delays in labs or PHI updates were concerns that have been addressed with the application vendor and continue to be issues on their maintenance and policy product evolution.

Gathering PHR Data and Reports

The MU measures related to the PHR that were of particular interest to Revere Health included patient registration rates, PHR tasks such as appointment requests and prescription renewal requests, secure messaging, and record of view, download and transmit actions (VDT) by patients (FollowMyHealth, “Meaningful Use Reports”, n.d.). Before the foundational study began, the FMH patient portal administrative dashboard provided MU reports and visualization tools on the PHR adoption rates and MU data. These administrative reports and visualizations gave a gross estimation as to the adoption rates and patient usage, but these administrative views were not provider specific.

The CMS set MU performance measures in stages that take into account a numerator (patients)/ denominator (patients seen by EP) during the attestation period
(CMS, 2015). The performance metrics available through the FMH administrative dashboard only provided the numerator value which came from the pool of all the patients of Revere Health. Whereas MU required targets only measure patients seen by the EP during the attestation period. The denominator value can only be calculated from patient encounters recorded in the EHR. Some of the patient PHR metrics tracked by FMH in the third quarter of 2013 are shown in Appendix I1, including registrations, logins, views, downloads, transmits and updates. Patient metrics for the FMH patient portal for the fourth quarter of 2015 are given in Appendix I2, and besides the other previously shown metrics, show the registration numerator as about 27% of all Revere health patients.

For MU Stage 1, the attestation time period was a rolling 90 days. Revere Health eligible providers were informed about their targets at the end of the first calendar year. This delayed reporting did not allow staff or providers to adjust clinic procedures incrementally to meet expectations. The researcher was not given access to final Revere Health MU provider attestation reports because of security and privacy concerns and because these are submitted online directly to the CMS.

Revised Marketing Materials

The PHR vendor provided some standardized marketing materials for Revere Health that were in distribution at the time this case study began. Some of the materials available to the then CUC included a double-sided brochure, and a note card. The FMH administrative dashboard also contained resources for administrators that were not used by the organization such as videos for waiting rooms and staff talking point scripts.
The double-sided brochure is shown in Appendix G4. Not all organizations who have adopted the FMH patient portal implemented the same functionality. Because of this disparate capability, the Revere Health clinics PHR functionality did not match all the features listed in the marketing brochure, for example, online forms were not available to the clinic patients. Another discrepancy in the brochure was in the login information which listed a Windows Live ID account was needed before login could be attempted, but patients could have logged in with a Facebook, Gmail, Yahoo or Windows Live ID at that time. After the renaming of the case study organization, a rebranding of PHR marketing materials was also needed.

The notecard distributed to clinics through the super user group is shown in Appendix G1. While this card provided a brief listing of PHR features, there were no login instructions or place to record username or password available on the notecard. In the interview responses, several super users mentioned patient frustrations with the login process. In an effort to keep medical assistants and other staff from writing patient usernames and passwords on the back of the card, the clinic redesigned the notecard as shown in Appendix G3. The redesigned card now contains a location for the patient username and password to be recorded and also a help phone number. This change adds a professional, branded tone to the notecard as well as a revised process to guide staff to maintain the privacy of patient login information by having the patient enter their values on their own.

The original FMH login screen as seen in Appendix N1 shows a Facebook, Google, Yahoo login as well as the Windows Live ID. A revised login option was added by the PHR vendor to also include a generic login besides the social media logins
as seen in Appendix N2. Providing an alternative login method besides the social media options allows patients to create and manage their own authentication mechanism. Unfortunately, this redesign added one more choice for patients to make when initially signing up for the patient portal. The researcher personally uses this system and experienced issues with forgetting which social media was used to create the account and being denied because the login format did not match the original choice. Login difficulties still remain a problem for Revere Health IT.

Ongoing branded marketing materials that have the stamp of approval and standardized force will be distributed through super users in the various clinics. These revised materials now include a slideshow, included in Appendix M1, targeted toward staff and patients. A comprehensive, 25 page training manual was also created for Revere Health patients, providers and office staff sharing cohesive marketing materials and processes. This new training brochure was not included in this report for brevity. Clinic PHR processes that were inherently risky and unprofessional are being replaced with corporate approved materials and strategies.

**Phase 3: Organizational Change Results**

The goal of the previous phases of the case study was to take the temperature of key stakeholders related to technical acceptance of PHRs and to begin to identify an action plan that might allow Revere Health to meet their attestation objectives under MU requirements. When this case study began, marketing materials and workflow practices were inconsistent at best. Each clinic functioned independently in their implementation of the collective goal of increasing patient portal adoption and tracking and supporting portal tasks. Important factors related to supporting organizational change and advocacy
of PHR technology arose. The staff and providers interviewed both felt there was room for improvement in the current patient portal and workflow surrounding its integration into the clinics.

Revere Health had several challenges related to their efforts to increase patient portal adoption and meaningful use: no steering committee existed for patient portal stewarding, lack of an online community to support clinic super users, and MU reporting was only completed at the end of attestation time period and not widely available to influence actionable intelligence at the practice level.

Organizational Structural and Reporting Changes

Revere Health is at the forefront of accountable care in the state of Utah and the promise of patient portals as a means to communicate and support patient engagement is a cornerstone in the organizational strategic plan. Besides the Board of Directors, the case study clinic initially did not have a governing body to provide strategic guidance for the PHR implementation, workflow and process support. The CIO and IT Application Director had organized the super user team of clinic staff who served as trainers and experts bringing skills, processes and best practices to their own clinics. Beginning in 2015, Revere Health organized a FMH portal steering committee mostly comprised of office managers with responsibility overseeing MU tracking and reporting as it related to the patient portal.

The MU Stage 2 attestation time period began as a year-to-date (YTD) time period, and was changed in October 2015 to be a rolling 90 days period (CMS, 2016). Revere Health shifted their reporting process to leverage office managers as the target of the MU reporting. Each EP was assigned an office manager and their MU results were
grouped by manager to enable a more direct chain of reporting. A monthly scorecard was
developed and emailed to office managers and IT administrators starting in July 2015.
The FMH YTD scorecard is shown in Appendix P1 with the department office manager
names hidden. The totals at the bottom of the scorecard show the percentage of
providers for the entire Revere Health organization. The revised FMH scorecard with
rolling 90-day time period is seen in Appendix P2 also provides the entire organization
totals.

The YTD scorecard by Provider report, as shown in Appendix P3, contained
worksheets organized by department and provider detail. The stoplight colors of green,
yellow and red were used to signal which providers had yet to reach their targets by MU
criteria. The office manager name and provider names were blacked out to provide
anonymity. A revised score card for rolling 90-day time period by department and
provider detail is given in Appendix P4.

While Revere Health has evolved their ability to share MU reporting with office
managers and IT administrators, the aggregated numbers for providers still do not give
actionable intelligence to the front-line staff and providers. A performance dashboard
was proposed by the researcher to the CIO and Applications Director as a mechanism to
assist the organization in their efforts to share progress toward MU measures. The
process followed to design and prototype this dashboard will be given as part of these
results.

Super User Community of Practice

While the Revere Health super user group serves as a powerful agent of change
throughout the organization, they had no community support system in place at the
beginning of the case study. The super user group is made up of key front-line clinic staff including: office managers, triage nurses, medical assistants and registration staff and led by the Applications Director. Super user staff held monthly meetings and training for new system features, but they had no permanent communication channel to provide support, system feature documentation and resources, or even meeting minutes. As described by the Application Director, after a super user meeting was conducted, minutes would be distributed through email; if a staff member wanted to reference meeting by-products after the fact, they had to search their email or archive the minutes (R. Phillips, personal communication, January 30, 2015).

In light of recommendations made by the gap analysis, review of marketing materials, and workflow practices, the researcher worked in conjunction with the IT staff and the Application Director to plan and implement a CoP. The framework for the CoP is a content management system that is hosted on an internal Revere Health web server.

The CoP Home page, shown in Appendix L1, provides a definition of super users and their responsibilities. A main navigation menu provides access to events, a get to know the super users page. A right-hand link menu to group resources provides easy access to group minutes, topical resources and Tips and Tricks. The group minutes page shown in Appendix L2 allows browsing of the super user minutes archive. Best practices related not only to patient portal usage act as the knowledge base for the organization. An example of some Tips and Tricks content is shown in Appendix L3.

The IT staff will continue to maintain the CoP, but the responsibility for the current content of the CoP falls with the Applications Director who acts as the site moderator and curator. Future support resources and possibly an interactive blog feature
will be added to allow operational staff to participate in an ongoing dialog related to best practices and innovations.

**Delphi Group Feedback on Dashboard Options**

Based on the analysis from the participant AI interviews and data collection, a Delphi group was organized with representatives from clinic super users, support staff, and office managers. The proposition given to the Delphi group was to assist in ranking measures and dimensions to be used in a performance dashboard.

As suggested by Hsu and Sanford (2007), Delphi participants should be well trained and knowledgeable in the specialized domain area. A subset of the Revere Health super users, six members with clinic operational management or who had FMH tasking expertise, were invited through an Nova Southeastern IRB approved email invitation, as shown in Appendix J, to participate in a Delphi group. Before participating in a series of rounds to narrow key factors needed to structure a performance dashboard, the Delphi group members signed an adult consent form, also approved by the Nova Southeastern IRB, shown in Appendix K.

As recommended by Grisham (2009), the invited Delphi group members were not informed who the other members of the panel were during the process (p. 114). Anonymity of participants can help to elicit more honest feedback and eliminate the pressure that might arise from more dominant group members (Hsu & Sanford, 2007, p. 2).

Three rounds or iterations are often adequate to generate a consensus with a Delphi Group (Custer, Scarcella, & Stewart, 1999). In Round 1, participants were asked to show preference based on their own experience by placing a check mark next to a list
of attributes from the AllScripts FMH tables (see Appendix H) related to these three MU measures: Patient Portal Registration, FMH Tasks, and types of Patient Education provided. In Round 2, the Delphi group was asked to review the options for each category of FMH measures and place them in rank-order as suggested by (Hsu & Sanford, 2007). Finally, in Round 3, the Delphi group reviewed options for date ranges and organizational unit groupings and placed them in rank-order.

In Round 1, a list of the possible values for each MU group were drawn from possible values that appear in the EHR data warehouse tables that track patient’s registration interactions with the patient portal: the portal registration, the tasks, and patient education. One Delphi member added a side note that the registration rejected option should not be included in the dashboard because invitations were not being sent to patients. But all other members felt that three options: registration accepted, registration refused, and registration rejected should be included. Of the 12 possible options in the Task table, six tasks were most selected by the Delphi group for inclusion. The Education table tracks six types of education materials both for the EHR and the patient portal. The Delphi group chose to include all of these educational options in the dashboard tracking.

In Round 2 and Round 3, the Delphi group was asked to provide a ranking on FMH information that might be placed on a dashboard for super users to measure their progress. The Delphi group was asked to provide a ranking with the range of 1 – 5, 1 being very important and 5 being very unimportant. Group members were allowed to give multiple options the same rankings. The mean was used as the method to
determine the central tendency of responses to the group rankings (Hasson, Keeney, & McKenna, 2000).

The Delphi group Round 2 ranking results are given in Table 10. In the portal registration status group, the “Patient Accepted” value was ranked the highest importance with consensus value of 1 from the group. The “Patient Refused” option was also ranked very high at 1.40. For FMH Tasks, the “Secure Messaging” was most important with a value of 1.50 and then the “Prescription Renewal” at 1.67.

Table 8: Round 2 Delphi Group Rankings

<table>
<thead>
<tr>
<th>Portal Registration Status Ranking</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Accepted</td>
<td>1</td>
</tr>
<tr>
<td>Patient Refused</td>
<td>1.4</td>
</tr>
<tr>
<td>Registration Rejected</td>
<td>2.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FMH Task Tracking</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescription Renewal</td>
<td>1.67</td>
</tr>
<tr>
<td>Secure Messaging</td>
<td>1.5</td>
</tr>
<tr>
<td>Appointment Requests</td>
<td>2.33</td>
</tr>
<tr>
<td>Appointment Rescheduled</td>
<td>3.17</td>
</tr>
<tr>
<td>Appointment Cancelled</td>
<td>2.83</td>
</tr>
<tr>
<td>Follow Up Reminders</td>
<td>2.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Education through FMH or Printed</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Guide Monograph</td>
<td>3.2</td>
</tr>
<tr>
<td>Patient Instruction, precautions, orders</td>
<td>2.2</td>
</tr>
<tr>
<td>Patient Education Orders</td>
<td>2</td>
</tr>
<tr>
<td>Drug Education (Medication Handout)</td>
<td>2.6</td>
</tr>
<tr>
<td>Info Button Education</td>
<td>2.8</td>
</tr>
<tr>
<td>Vaccine Information Statement</td>
<td>3</td>
</tr>
</tbody>
</table>

The Appointment values were all around medium ranking. For the Patient Education values, the group ranked “Patient Education Orders” high with a value of 2.0 and “Patient
Instruction” with a value of 2.20. The other education values were of medium ranking to the group.

Panelists were asked to provide a rank-order for their preferred date ranges and unit groupings in Round 3. The date range and view option feedback was organized in Table 11 showing the mean calculation of rankings from each group member. The most favored date range was given as “User selected range” with an average of 1.17. The next favored date range was “Last 90 days”, also referred to a rolling 90-days, had an average of 1.83. The least favored date range was “From the beginning of the year, also known as year-to-date or YTD with a value of 3. On a scale of 1-5 with 1 being most preferred, a score of 3 could be still be considered favored. This date range feedback showed the researcher that all these options should be provided in the dashboard options. The most favored view for the dashboard was “By Provider” with a mean of 1.33 and the other views received a medium ranking of 2.5. All these views seemed important to the panel so they were included in the dashboard as filtering options for the visualizations.

<table>
<thead>
<tr>
<th>Date Ranges Preferred</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>From beginning of year</td>
<td>3</td>
</tr>
<tr>
<td>Last 90 days</td>
<td>1.83</td>
</tr>
<tr>
<td>Last 30 days</td>
<td>2</td>
</tr>
<tr>
<td>User selected range</td>
<td>1.17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Views of the FMH Data</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>By Primary Provider</td>
<td>2.5</td>
</tr>
<tr>
<td>By Provider</td>
<td>1.33</td>
</tr>
<tr>
<td>By Clinic</td>
<td>2.5</td>
</tr>
<tr>
<td>By Department</td>
<td>2.5</td>
</tr>
</tbody>
</table>
Results of the Delphi Group feedback were used to inform the researcher as to the criteria options, date time frames, and unit groupings for visualizations to be created for a prototype performance dashboard undertaken in the next phase.

**Performance Dashboard Prototype**

Staff at the front lines of the healthcare organization need to be brought into the loop when it comes measuring their progress against targets by which they can examine their current processes and workflow for innovation and corrections.

The researcher began the actionable intelligence SWAT process as outlined by Carter (2014). Strategic questions were answered as the Delphi Group provided expert feedback on most suitable dashboard options, date ranges, preferred views. Wrangling the data proved challenging. The IT staff and business analysts at Revere Health assisted the researcher with access identifying tables and queries that might assist in the creation of a performance dashboard. Obtaining access to live or extracted data from the EHR/PHR data warehouse was not possible due to other organizational priorities. A decision to create a prototype dashboard was made, rather than stall the study indefinitely.

The next SWAT step was to answer with appropriate visualizations (Carter, 2014). Informed with guidance from the Delphi group and the data warehouse schema, a series dashboard visualizations was created using a JQuery library and other web development techniques. The dashboard visualizations were organized and hosted through the use of an online web site. The provider names, date specific values, and any patient data were fictionalized in the dashboard. Screenshots of the prototype dashboard
and active links were added to a presentation created for an AI summit of Revere Health stakeholders as discussed in the next section.

Appreciative Inquiry Mini-Summit

In the physician-managed clinics that are part of the case study organization are under regulatory pressures and incentive windows for achieving MU within a limited timeframe. The chair of the FMH steering committee invited key PHR stakeholders to attend AI mini-summit meeting (K. Zeyer, personal communication, October 23, 2015). A luncheon was provided for the 13 attendees of the summit who included: the Applications Director, the chair of the FMH Steering Committee, a representative of the CIO, members of the FMH Steering Committee, and several super users.

Findings from the foundational study and clinic organizational learning related to the CoP and Delphi group recommendations were presented to the group. A review of the organizational change related to MU tracking and reporting was also demonstrated. While there had been great strides by Revere Health to provide a monthly MU status report to office manager and other key stakeholders, the targets presented in these scorecard reports did not provide business intelligence that was geared toward staff and managers at the operational level in the clinics.

The researcher led a discussion on possible methods to provide actionable business intelligence to the organization. A working interactive prototype for a super user dashboard was demonstrated. Attendees gave verbal as well as written feedback on the usability and perceived usefulness of the performance dashboard. Screen captures of the dashboard are given in Appendix Q. AI mini-summit attendee answers to discussion questions are provided in Appendix R.
A screen capture of the dashboard showing gauges for MU Stage 2 Progress by Provider for Access, Clinical Summaries and VDT in shown in Appendix Q1. The date range given on this dashboard screen was YTD. Recent changes by the CMS in the MU attestation time period from YTD to rolling 90-days was discussed. Some feedback on this screen included: “Puts it simple for a provider/admin quick view”, and “I like the simplicity of the page that shows the FMH aspects of Meaningful Use by provider.”

The Patient Education dashboard controls screen capture is shown in Appendix Q2. Some comments related to the education screen were, “Really like the pie chart”, “Easy to view, especially the percentages.” Another attendee stated, “I like this. I think it will be beneficial in helping us focus on specific areas of education.”

FMH Tasks commonly addressed in the clinics are shown in the FMH Task dashboard screen in Appendix Q3. Several time periods are available on these charts including daily, weekly and monthly tasks in the bar chart and YTD by provider in the pie chart and trendline chart. The tasks included in this screen were organized based upon the recommendations of the Delphi group. Feedback on these charts included, “Don’t love the bar graph”, “I felt the dashboard showed the types of tasks being utilized would be helpful”, and “secure message’ was a little vague.”

The researcher provided a dashboard screen showing a master-detail form that would enable daily appointment tracking of the various MU registration and use targets as shown in Appendix Q4. Just in-time, actionable information could be provided to the clinic staff for each patient scheduled for the given day. This screen was designed to contrast the target information currently provided through the monthly MU reports. Some feedback on this appointment screen was, “Like the idea of it – a lot. Just
depends on where it is located”, and “...like the ease of knowing who’s a portal member! Great!”

Some follow up questions to the summit attendees asked for suggestions on where the performance dashboard might be most visible and tightly woven into the clinic workflow. One person suggested, “The closer you can link it to the EHR the better. If it can be integrated with a button within the EHR, it would be more successful. Most users gripe about an additional program or login.” Another attendee wanted to see the dashboard, “Linked on Intranet.”

Other key takeaways from the summit included discussion related to the role that the provider should play in encouraging patient use of the PHR. One attendee suggested, “Provider buy-in is critical. If they speak to patients about the portal its so much more effective.” The FMH stakeholders also felt that patient engagement would be supported by the PHR by these comments, “I think it is a struggle so the more we can engage the better”, and “Easier steps for patient to verify their information, demographics, medications, etc.”

The FMH steering committee and super users are charged with championing the PHR at the clinic-level. The organizational structural changes and support tools provided by a CoP and a performance dashboard could help to inform these stakeholders and help them to more effectively promote patient engagement as they respond to FMH tasks and register new patients.
Research Question 4: Results

Research Question 4:
What best practices and support strategies could be used by physician-managed clinics to increase patient adoption, and continued meaningful use of the patient portal?

Revere Health as the subject of the case study allowed the researcher to uncover practices and support materials used to assist and track patient usage of the PHR. Interactions with support personnel and IT management also provided a window into the organization’s change process. Some key best practices and tools used by Revere Health to manage and advocate PHR usage across the organization are given next:

Role of Super Users: Since the beginning of the case study, Revere Health has made use of super user staff within the clinic to help with FMH peer training, dissemination of marketing materials, and serving as technical champions in the clinic setting. As suggested by Moore (2007), super users received first-person training with the PHR as these experiences helped them become proficient in the tool when they encourage patient adoption. IT may implement the PHR, and patients are the target audience of the PHR, but the super users act as a collaborating bridge with both IT and patients to find and resolve issues (McNeive, 2009). Super users are the change agents when referring to the PHR and other clinical information systems.

Targeted Marketing Materials: Marketing materials such as handouts and signage can provide support to face-to-face discussions between staff and patients and act as a resource when the patient goes home (Wald, 2010). Originally the PHR vendor supplied generic marketing materials to Revere Health. Because of mismatches in implemented features lack of buy-in, Revere Health redesigned the brochure placed in clinics and laboratories to better map to patient values and workflow practices as shown in Appendix
G. The PHR redesigned notecard was made available to patients at check-in to provide a more control and privacy for the authentication process. A comprehensive PHR user manual was also created by the organization to guide support staff and patients alike.

**PHR Steering Committee:** In the summer of 2015, a FMH steering committee was formed to help manage FMH tracking and best practice throughout the organization (R. Phillips, personal communication, June, 17, 2015). This committee mostly comprised of clinic office managers, serve as the direct link between the CIO and IT staff, and clinic healthcare providers. Office managers on the committee are responsible for assisting their group of clinics and providers in achieving the targeted MU measures.

**Super User CoP:** Besides face-to-face training and monthly meetings, email served as the communication and archival mechanism for Revere Health. After recommendations by the researcher, and with the direction of the Applications Director who manages the super user team, a CoP was created. This CoP serves as a repository for policies and best practices, archived meeting minutes, and a long-term anchor of knowledge base for clinic super users. If a blog capability is implemented on the CoP in the future, an active dialog between team members could help with just-in-time questions and issues.

**Business Intelligence and Reporting:** At the beginning of the case study, MU related reporting and tracking were conducted as a post mortem at the end of the stage attestation period. This practice did not allow operational-level clinical staff and providers to adjust their processes and efforts to better meet MU targets. A monthly detailed monthly scorecard was implemented in conjunction with IT analysts to provide a traffic light progress visual that informs at a glance specific departmental and provider
status as shown in Appendix M. Now these scorecards serve as calls to action as they are delivered to office managers and other key FMH stakeholders.

*Performance Dashboard:* While monthly reporting has helped Revere Health gain greater adoption and MU of the PHR, a timelier tool like a performance dashboard would allow super users and other healthcare professionals with actionable intelligence for day to day patient encounters (Ferranti et al., 2010). The researcher created a prototype of a dashboard with a screen for VDT and access measures, educational resource tracking, task-based view, and finally an appointment view that allowed detailed drill down to planned patient encounters. As strategic action plans are refined at Revere Health and MU progress is tracked, best practices and lessons learned should be shared within a CoP for decision making and support of medical providers and staff (Hara & Schwen, 2006).

Revere Health has strategically adapted their structure and practices to respond to governmental regulations. Organizational support techniques including a CoP and the use of BI in the form of a performance dashboard were also explored as part of the strategic action plan.

**Summary**

The three phases completed during the case study with Revere Health resulted in organizational learning and change to better support the adoption and meaningful use of the patient portal. The foundational study interviews served as a discovery technique to inform the researcher and clinic IT management when proposing support mechanisms to meet organizational targets and goals. Organizational learning is critical for healthcare clinics to recognize and address the gaps that exist between a dream implementation and
the current system. Finally, organizational change is an ongoing process for healthcare clinics. Leveraging business intelligence for idea generation can empower daily decision-making needed to meet strategic goals for PHR meaningful use, patient engagement and ultimately the goal of improved quality of care.
Chapter 5
Conclusions, Implications, Recommendations, and Summary

Appreciative Inquiry Destiny Results

Review of current and planned patient portal processes and workflow was presented. The participants in the AI summit provided verbal and written feedback on a prototype super user dashboard to be suggested for addition to the CoP or other embedded clinic system. As stakeholders implement action strategies, the role of management becomes one of tracking progress and fanning the flame of innovation (Bushe, 2011).

The quest to create a pervasive IS organization requires networking and communication between those with mostly operational knowledge like medical staff and providers, and those responsible for information management and IT services (Ferguson, Mathur, & Shah, 2005). The MU target like other healthcare related regulations is ever changing. Developing an organizational strategy to support altruistic goals of accountable care, improving the patient-provider communication and patient engagement require exploiting information and knowledge to inform physician/providers and other medical staff about their MU progress. The last of the SWAT steps to achieve actionable intelligence is to take action (Carter, 2014). The AI destiny step is an ongoing one for healthcare organizations striving to integrate disruptive technologies like PHRs in a meaningful way.
Conclusions

A case study of Revere Health, a group of independent, physician-led clinics, was undertaken to better understand the organizational change processes involved in the efforts to increase adoption and meaningful use of patient portals. The methodology outlined in Chapter 3 included three phases and leveraged the AI 4D design process: discovery, dream, design, and destiny. A summary of the case study strengths, weaknesses and limitations will be presented next.

Strengths

One of the strengths of this case study research was that answers were provided to the four research questions related to PHRs gleaned from AI interviews and Hermeneutic analysis:

Research Question 1: Characterization of positive beliefs and attitudes held by providers and clinical staff about the perceived usefulness of patient portals. The foundational study phase discovery and dream interview responses from providers and staff showed beliefs that a PHR could be used to empower patients to be more proactive in their own health. The portal could also serve as a mechanism for secure communication between providers and patients. While there is more than one method that could be used to disseminate educational resources to patients, an online portal could provide just the right educational materials in context to the patient’s specific conditions, labs or medication management.

Research Question 2: Identification of pressures and issues related to social influences that affect PHR workflow and support within the clinic. Providers interviewed expressed
frustration with governmental requirement for MU that placed an undue burden on record keeping. Pressures and issues related to social influences that affect PHR workflow and support within the clinic were identified. Providers and staff were heavily influenced by pressures from IT Management. Governmental requirements for MU attestation in order to receive incentives and later to prevent Medicare and Medicaid reimbursement deductions was a weight on providers.

Some of the providers expressed burdensome regulations of which MU was just one more straw breaking the camel’s back. Patients had both a positive and negative influence on staff and provider engagement with the PHR. Patient complaining was a deterrent and expressions of patient satisfaction or interest were rewarding. Colleagues both inside and outside the organization had an impact on provider support for the PHR. Within a practice, complexities arose when some providers supported and encouraged portal usage and others gave little or no support.

Research Question 3: Recognition of the gaps that existed between an idealized PHR implementation and the actual implementation helped drive organizational change initiatives. Both providers and staff felt that communication between patients and providers needed to be faster. One provider suggested a demonstration with the patient to champion benefits. Another provider stated targeted education efforts would help patients to better manage their problems. Frustration with the login or sign up process was keeping staff and providers from advocating portal usage.

Research Question 4: Sharing a set of best practices and strategies that could be used by physician-managed clinics to increase patient portal adoption and meaningful use. The AI destiny step encourages the organization to share best practices, inspire innovation and
broadcast successes related to the transformation or change (Carter et al., 2007). The final organizational change phase included creation of a steering committee, revised marketing materials, and support tools that included a super user CoP and a prototype for a performance dashboard. As Revere Health examined their current practices related to patient adoption and tracking of results, the organization was very successful in dramatically increasing their adoption rates and meeting MU measures for their patient portal.

Weaknesses

Identifying weaknesses in the methodology, case study or implementation of the process followed for the study could improve the success of future researchers who may wish to build upon these results or follow a similar process. This section will examine possible holes, or inadequacies in the case study.

Foundational Study Interview Too Few Subjects: When first organizing the foundational study, the researcher wanted to interview at least 15 providers and 10 clinical staff. As employees of the specific physician-managed clinic group were needed as interview subjects, permissions to interview and interact with clinic staff could only be obtained from the appropriate Revere Health administrators.

A purposeful sampling of both providers and staff was to be provided by a representative from Revere Health. The original list provided by the Applications Director included nine super user staff and five providers. Rejections because of lack of interest, refusal of administrator, or personal objections were given. Follow up for additional subjects was requested, and some additional possible names and emails were
provided. Even with the extra efforts of the researcher, a total of six super users and three providers were interviewed.

How many interviews are enough? As suggested by Barker and Edwards (2012), methodological considerations should play the major role in determining ‘how many’ subjects are interviewed, more often factors outside the control of the researcher determine the numbers as was the result in this case study. The total focus of the research was not based upon interview results. The mixed qualitative methods such as document analysis, use of a Delphi group, prototype creation and the use of the AI 4D process strengthened the study even with a small number of interviews (Baker, & Edwards, 2012).

Lack of Access and Buy-In from Providers: In a related issue, the goal of the case study was to gain insight into beliefs and practices of providers related to their engagement with a PHR. Clinic providers have tight schedules and their time is valuable. These professionals are under pressure to provide quality patient care and also to meet measures like MU that may decrease their effectiveness and efficiency because of governmental regulation (American Medical Association [AMA], 2014). The dilemma this case study uncovered related to physician/providers was that some providers refused to engage with the PHR because of objections to MU requirements and this lack of provider support makes it more difficult to motivate patients to meaningfully use a PHR. Within a specific practice there could be some providers who are champions of a PHR and other providers who undo these efforts with lack of support and even overt protest. Would this study have benefited from more access to providers who fall on both sides of this issue? Yes. But it was these very providers who opted out or refused to participate.
External Case Study: While the researcher had the support of Revere Health IT management throughout this process, when it came down to prioritization of tasks and requests needed to further the research study, the clinic IT priorities held sway. Often needed requests for information, access to resources, scheduled meeting, problem-solving support were delayed or eventually unrealistic because the researcher was not an employee of Revere Health. When the study began the researcher had an idealistic plan without the constraints of an IT budget, and pressures of day to day IT operations. For example, the researcher would have liked to provide the clinic with a fully functional performance dashboard build on live data and available to clinical staff with the click of a button. Instead, after months of delay and frustration, a prototype was eventually created with placeholder data.

The overall goal to help increase adoption and MU of the PHR was a shared goal between Revere Health and the researcher. But the benefits that were gained from bringing insight as an outside observer into the organizational change process were compromised because the researcher’s priorities were often not the organization’s priorities.

Limitations

Limitations of the study methodology that may negatively affect its further application, recreation, or acceptance by peers will be addressed in this section. The following limitations may apply to this study:

Single Case Study: The case study only involved clinics and practices in a restricted geographical location, in the Western United States. Over 70 medical practices and 20 specialties affiliated with Revere Health but providers and staff from only a few of these
practices were interviewed. While representatives from the super user group organized by Revere Health had a broader coverage across the clinics, there may be some uniqueness to this group of clinics studied that may not accurately represent groups in other states or regions of the country. The case study subject used in this research will be relevant in this given context, other physician-managed healthcare clinics within the Western United States.

*Governmental Regulation Restrictions:* Medical practices that participated in this research case study work group must meet the current governmental laws and regulations in order to receive Medicaid and Medicare reimbursement. These requirements such as Meaningful Use and Health Insurance Portability Accountability Act (HIPAA) may change in the near future, and exact strategies undertaken in this study may be less relevant if the political and legal winds change.

*Patients Not Consulted:* Because of patient privacy concerns, patients were not specifically interviewed or asked about their first-hand opinions of the FMH patient portal. Patient adoption, acceptance and meaningful use were observed through their interaction with the patient portal and other audit trails of their behavior in the information system. Any data about actual patients were de-identified as per legal requirements and aggregated so patient identity was protected. Patient behaviors were examined vicariously by viewing the results of their interactions with a patient portal, but the researcher did not have direct contact with the patients.

**Implications**

This case study examined organizational learning and change related to adoption and meaningful use of PHRs in a group of physician-managed clinics in the Western U.S.
While this healthcare group developed strategies specific to their own staff and infrastructure, some lessons learned can apply to other institutions facing the same challenges.

The current principal driver of patient portal development is the CMS EHR incentive program and its related MU criteria (CMS, 2015). But many healthcare professionals are also seeking to increase patient satisfaction and engagement through the use of a PHR. Patient portals have the potential to build the patient-provider relationship even outside of the traditional episodic visits.

Like many other governmental healthcare initiatives, the MU stages are in flux (CMS, 2016). Organizations striving to attest to these requirements not only face challenges related to the technology, but organizational change management is needed to address the shifting targets. Presently there is no clear definition of patient portal adoption beyond the minimum targets outlined in the MU criteria (Irizarry, Dabbs, & Curran, 2015). In order for healthcare institutions to track the success of patient portals in terms of patient engagement, the goal for portal adoption should include both initial registration and then meaningful use of the portal features over time. A definition of this kind would inform a set of universal quality and efficiency reporting measures beyond the current minimal MU criteria to include more relevant patient engagement data.

According to Peppard (2013) by utilizing the super users and other support mechanisms like the FMH steering committee as the mechanism to disseminate technical knowledge and generating value from that knowledge across the institution, Revere Health is functioning like a pervasive IS organization. It is no longer the task of IT to advocate, manage and exploit IT technology and recognize its worth. Once the AI mini-
summit action plan is shared with the organization, stakeholders who choose to champion portions of the plan can begin to track progress and report successes through a shared environment like a CoP (Ranmuthugala, et al., 2011).

Motivational techniques used to build cohesion and manage change in distributed organizations may be applicable beyond medical clinics. Meaningful Use, while a very specific measure applied to electronic healthcare systems, can have relevance in other domains. The Community of Practice (CoP) that was developed for this study followed steps and processes that may be used as a vehicle for organization change outside the medical field. Other communities also exist in medical organizations besides those dealing with patient portals. Quality assurance, customer service, and IT, could all join their resources and voices to the patient portal CoP. While expanding the umbrella of communities served by the CoP may dilute efforts related to continued patient portal use, the overall organization would benefit from having a shared community (Ranmuthugala, et al., 2011).

Practicing physicians who are part of the Board of Directors, the governing body for Revere Health, have shown they support the efforts of the super user staff, office manager, and IT staff who are bearing the weight of the attestation process, tracking, and reporting. Barriers to acceptance of PHR usage by providers include: physician time pressures and changes in practice patterns, no evidence of benefits, lack of reimbursement for online secure messaging, and lack of compelling evidence that PHR usage increases quality of care (AMA, 2014; Yarbrough & Smith, 2007).

Physician/provider buy-in at the clinic level may be lukewarm at best (Collins et al., p. i6, 2011). One provider in the AI interview expressed concerns about
uncompensated patient interaction because possible secure messaging increased workload. These concerns have also been expressed by providers outside of Revere Health (Irizarry et al., 2015). The dilemma remains that patients are more likely to use patient portals if their use is recommended or endorsed by their provider (HealthIT.gov, 2013; Irizarry et al., 2015). At least at Revere Health, these key stakeholders are not hindering the process undertaken by staff and super users to advocate PHR usage.

One of the main goals of the EHR incentive program was to increase interoperability across silos (CMS, 2013). The purpose of the EHR incentive program was to encourage organizations to build the information technology infrastructure necessary to support the exchange of medical healthcare information from one location to another in a secure manner. Providers would then be able to see beyond their own recorded interactions with their own patients to make better care decisions. According to the letter submitted jointly to the CMS and ONC in protest by the AMA (2014), the MU vision of healthcare system interoperability has not been realized and provided an increased burden on providers that is hindering quality of care rather than improving care (AMA, 2014).

Revere Health has been successful in their organizational change management related to PHR use and MU as seen by the target measure on their November 2015 scorecard report. While organizations are increasingly able to gather and process information from a variety of new sources, competitive advantage will still belong to those who know how to use it (Ferguson et al. 2005). An overwhelming amount of data gathered by healthcare information systems can and should be leveraged to help the organization in their decision-making tasks. If Revere Health is to truly become a Pervasive IS organization,
business intelligence related to MU criteria needs to be available to operational-level staff not just accessed by IT for reporting (Peppard, 2013).

**Recommendations**

The examination of Revere Health and their culture, PHR workflow, marketing practices and support systems was the focus of this case study. Follow up research efforts that build on this case study at Revere Health might include:

- Patient-focused studies of patient satisfaction and first-person accounts of patient engagement. Special IRB consideration would need to be followed working with patients directly.

- Identification of specific patient populations at Revere Health that might benefit more from patient portal engagement: youth, older patients, economically divergent groups, groups with different technical skills, different ethnic or cultural groups. Patients could also be grouped by their conditions, or co-morbidities.

- Explorations into patient acceptance and knowledge of secure messaging. The researcher feels that patients are much too cavalier with their own PHI, although recent healthcare identity theft may have heightened patient-related security practices.

- Follow up TAM related study looking into Perceived Ease of Use (PEOU) of the patient portal technology (Pai & Huang, 2011). Both providers and staff were negative about the authentication process their patients experience, especially older patients.
A compare and contrast study with Revere Health and a physician-managed clinic group in another geographic region or country might yield helpful organizational learning and change measures.

Summary

This study resulted in a set of support structures and best practices that would allow physician led medical practices to increase adoption and meaningful use of patient portals. By creating a unified vision and supporting new workflow practices, physician-managed clinics can move from local practice-based learning to enterprise-wide innovative and collaborative learning (Pionke, 2006). As PHR stakeholders implement action strategies, the role of management becomes one of tracking progress and fanning the flame of innovation (Bushe, 2011).

The AI interviews during the foundational phase of the study indicated that clinical staff and providers at the case study organization agree with the perceived usefulness of patient portals, especially when it comes to the benefits of increased patient-provider communication. Although there have been increases in capacity and capability of technology, IT is most often positioned in organizations for its ability to handle the surge of information (Peppard, 2013, p 27). Independent clinics in Utah and even surrounding states are continuing to join with Revere Health to leverage their IT capacity and expertise. These physician-managed clinics have an expectation that the Revere Health IT staff will handle their systems services.

AI interviewing also brought to light gaps that existed between ideal patient portal implementation and current FMH patient portal in use at Revere Health. Most information systems have some issues that limit their usefulness to their intended audience. Revere
Health in conjunction with their super user team and the IT staff are identifying problems and addressing these issues. A revised more cohesive marketing message was developed by Revere Health and distributed through the clinic super users.

Organizations that are able to leverage actionable intelligence are able to incorporate the “what-if” culture in local goals and measures related to MU criteria (Ferguson et al., 2005). Each patient seen becomes an opportunity to measure goals and targets. Monthly reports sent to office managers provide the big picture; a performance dashboard accessible by the front-line staff can make intelligence more actionable. Revere Health has strategically adapted their structure and practices to respond to governmental regulations. Organizational support techniques including a CoP and the use of BI in the form of a performance dashboard were also explored as part of the strategic action plan.

Many physician-managed clinics are working to develop an organizational strategy that supports altruistic goals of achieving accountable care, improved patient-provider communication and patient engagement and satisfaction. When a PHR has both provider and patient engagement, these nebulous goals can be actualized (Eramo, 2013).
Appendix A

Nova Southeastern University IRB Approvals
Appendix A1
Initial IRB Approval: February 27, 2014

Tc: Kimberly Bartholomew, M.S.
Graduate School of Humanities and Social Sciences

From: David Thomas, M.D., J.D. Chair, Institutional Review Board

Date: March 3, 2014


I have reviewed the revisions to the above-referenced research protocol by an expedited procedure. On behalf of the Institutional Review Board of Nova Southeastern University, Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices is approved in keeping with expedited review category #6, 7. Your study is approved on February 27, 2014 and is approved until February 26, 2015. You are required to submit for continuing review by January 26, 2015. As principal investigator, you must adhere to the following requirements:

1) CONSENT: You must use the stamped (dated consent forms) attached when consenting subjects. The consent forms must indicate the approval and its date. The forms must be administered in such a manner that they are clearly understood by the subjects. The subjects must be given a copy of the signed consent document, and a copy must be placed with the subjects’ confidential chart/file.

2) ADVERSE EVENTS/UNANTICIPATED PROBLEMS: The principal investigator is required to notify the IRB chair of any adverse reactions that may develop as a result of this study. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, consent forms, investigators, etc.) must be approved by the IRB prior to implementation.

4) CONTINUING REVIEWS: A continuing review (progress report) must be submitted by the continuing review date noted above. Please see the IRB web site for continuing review information.

5) FINAL REPORT: You are required to notify the IRB Office within 30 days of the conclusion of the research that the study has ended via the IRB Closing Report form.


Cc: Dr. Ling Wang
Dr. Gertrude Abramson
Ms. Jennifer Dillon
Appendix A2
Continuing IRB Approval: February 11, 2015

MEMORANDUM

To: Kimberly Bartholomew, M.S.
Graduate School of Humanities and Social Sciences

From: Matthew Neaman, Pharm.D., JD
Chair, Institutional Review Board

Date: February 12, 2015


I have reviewed the above-referenced research protocol in keeping with Continuing Review requirements by an expedited procedure. On behalf of the Institutional Review Board of Nova Southeastern University, Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices is approved. Your study is approved on February 11, 2015 and is approved until February 10, 2016. You are required to submit for continuing review by January 10, 2016. As principal investigator, you must adhere to the following requirements:

1) CONSENT: You must use the stamped (dated consent forms) attached when consenting subjects. The consent forms must indicate the approval and its date. The forms must be administered in such a manner that they are clearly understood by the subjects. The subjects must be given a copy of the signed consent document, and a copy must be placed with the subjects’ confidential chart/file.

2) ADVERSE EVENTS/UNANTICIPATED PROBLEMS: The principal investigator is required to notify the IRB chair of any adverse reactions that may develop as a result of this study. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, consent forms, investigators, etc.) must be approved by the IRB prior to implementation.

4) CONTINUING REVIEWS: A continuing review (progress report) must be submitted by the continuing review date noted above. Please see the IRB website for continuing review information.

5) FINAL REPORT: You are required to notify the IRB Office within 30 days of the conclusion of the research that the study has ended via the IRB Closing Report form.


Cc: Dr. Gertrude Abramson
Dr. Ling Wang
Mr. William Smith
Appendix B

Revere Health Organizational Chart
Appendix C

Case Study Research Approval

To: Nova Southeastern University IRB
CC: Dr. Gertrude Abramson, Dissertation Chair
From: Chris Smith, CIO, Central Utah Clinic, Provo, Utah, 84604
Date: 11/25/2013
Re: Approval for research study to be conducted at the Central Utah Clinic:
Patient Portals: Achieving Technology Acceptance and Meaningful Use
in Independent Physician-Managed Practices
Case Study Site Approval – Central Utah Clinic

Kimberly Bartholomew, who will act as the Principal Investigator (PI) for this study, has obtained permission and approval to conduct the research study proposed related to the use of patient portals, technology acceptance and meaningful use. The Central Utah Clinic will be act as the Case Study organization for this study.

As CIO of the Central Utah Clinic, Chris Smith will act as the clinic representative and receive ongoing updates from the PI as the study progresses. The PI and Chris Smith will follow the Nova Southeastern University IRB process for reporting and handling any unanticipated problems or adverse effects related to the study subjects. Chris Smith will be informed through electronic mail within 24 hours and will advise the PI on a course of action to address the problem. If a serious adverse effect arises, the Nova Southeastern University IRB and the dissertation chair will also be notified within 24 hours.
As the Case Study organization, the PI will be interviewing selected physician/providers, super users, and staff members of the Central Utah Clinic. These study subjects will be informed and give their consent before participating in interviewing. They will be given a copy of their signed consent form with contact information for the PI. If study subjects have any concerns or wish to be removed from the study, they can contact the PI or Chris Smith.

An additional requirement of the study will be ongoing access to the patient portal, FollowMyHealth, used by the clinic in order to examine meaningful use reporting for the clinic providers. Professor Bartholomew has received training in the FollowMyHealth application and has been given access to the administrative dashboard of this patient portal. The study PI will work directly with Chris Smith, or his designated representatives, will manage access requirements and facilitate communication with providers and the FollowMyHealth vendor.

Any reports or data gathered from the FollowMyHealth patient portal that are used in this study will be de-identified following the HIPAA Privacy Rule requirements for de-identification. Chris Smith, or his designated representatives will act as advisors and help oversee the gathering, use and storage of any patient portal meaningful use report information and visualizations.

Professor Bartholomew has completed HIPAA training conducted by our Quality Assurance Officer and has signed non-disclosure and confidentiality documents
required by the Central Utah Clinic. These documents are on file at the Central Utah Clinic.

Please direct any follow up questions to Chris Smith,
csmith@centralutahclinic.com or Kimberly Bartholomew, barthoki@uvu.edu.

Chris Smith
Central Utah Clinic
Chief Information Officer
Appendix D

Appreciative Inquiry Interview Questions

Semi-Structured Interview Questions


Principal Investigator: Kimberly Bartholomew

Subjects: Physicians, super users, and key staff who have leadership positions or interact with the patient portal at the Case Study clinic.

Interview technique employed is Affirmative Inquiry.

Part 1 of the Interview: Discovery

Positivist review of past favorable experiences with Healthcare Information Technology (HIT) systems.

1. Looking into the past, place in your mind a favorable experience you have had using and implementing a healthcare IT system in your practice?
   a. What details can you provide about this favorable healthcare system?
   b. What impressed you most about this healthcare IT system?
   c. Did you find this system had a user-friendly interface at first or over time? In what way?
   d. In what positive ways did other staff/providers interact with this system?
   e. Were you and other staff/providers able to successfully adapt your workflow to the system?
   f. What was the learning curve for use of this healthcare system for you, and other staff/providers?
   g. What benefits did your patients receive as a result of this healthcare IT system? Was there a positive impact on quality of patient care as a result of this system?
   h. Was there a Return on Investment (ROI) that was obvious for your practice? Were there financial and/or productivity gains from use of this system?
   i. What role did internal marketing, training and technical support, play in the favorable outcomes of this healthcare IT system? Was there a champion of the system in your practice?
   j. What role did you personally play in the successful adoption and use of this favorable system, in your practice?
k. What **three or four words** best describe your attitude or beliefs about the “goodness” or “benefit” of this healthcare system? i.e. simple, time-saving, accurate

2. Is there another favorable experience with a healthcare IT system you would like to share?  
(repeat questions a-k from above as needed)

3. If the subject wants to add other instances of favorable healthcare IT systems, allow this discussion to continue.

**Part 2 of the Interview: The Dream**

Positivist review of favorable adoption and meaningful use of a patient portal healthcare system.

1. In the future, place in your mind a hugely successful or wildly favorable implementation of a patient portal system for the patients of your own clinic.
   a. How might this wildly successful patient portal benefit communication between providers/staff and your patients?
   b. How might this wildly successful patient portal increase productivity of workflow in your practice?
   c. How might this wildly successful patient portal help achieve more accountable care with your patients?
   d. How might this wildly successful patient portal increase a patient’s understanding and responsibility for their own health?
   e. What would be the most important ROI that could be gained from a close to 100% adoption of a patient portal in your practice? i.e. quality of patient care, productivity gains, financial gains
   f. Beyond Meaningful Use regulations and stages 1, 2 or 3, what would you define as truly meaningful use of a patient portal?
   g. In two-three years, what is the most exciting contribution you think patient portals might make to patient healthcare?
   h. What role would **internal** marketing, training and technical support play in the favorable outcomes of a wildly successful patient portal system?
   i. What would you see your role might be in ensuring the wildly successful adoption and truly meaningful use of a patient portal in your practice?
   j. What **three or four words** best describe your attitude or beliefs about the “goodness” or “benefit” of a successfully implemented patient portal? i.e. comprehensive, widely-used, two-directional

**Part 3 of the Interview: Design**

Closing the Gap between the now and future use of patient portals.

1. There currently exists a gap between the current adoption and use of the patient portal in your practice and a wildly successful implementation.
a. What might be the two biggest changes you could make to help achieve your future idealized patient portal?

b. What might be the two biggest changes could be made to the system itself that could move it closer to your future idealized patient portal?

c. What might be the two biggest changes your fellow staff/providers could make to move closer to your future idealized patient portal?

d. What internal campaign or incentives would be the most impactful in motivating your role in your future idealized patient portal?

e. Finally, what might be the two biggest changes your patients could make to move toward truly meaningful use of your future idealized patient portal?
Appendix E

IRB Approved Participant Email Invitations
Appendix E1
Participant Email Invitation:
Initial IRB Approval, February 27, 2014

Sample Email Invitation Letter for Physician/Provider, Staff and Super-User Members:

Study Title: Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices

Dear ____

My name is Kimberly Bartholomew. I am a doctoral student in the Computer Information Sciences Department at Nova Southeastern University.

I am conducting a research study as part of the requirements of my Doctorate of Computer Technology in Education, and I would like to invite you to participate. This study is coordinated with the Central Utah Clinic as the case study organization.

I am studying meaningful use of patient portals in physician-managed clinics. If you decide to participate in this study, you will be asked to meet with me for an interview about your views and experiences with medical information systems, specifically patient portals, and clinic workflows.

The meeting will take place at a mutually agreed upon time and place, and should last about 45 minutes. A follow-up 30 minute interview may be needed and will also take place at a time and location of your convenience.

The interviews will be audio taped so that I can accurately reflect on what is discussed. The audio tapes will only be reviewed by me. I will transcribe and analyze the recordings. They will then be destroyed when the study is completed.

Opinions and ideas shared during these interviews will be used to help generate an implementation plan for increasing adoption rates and meaningful use of the patient portal at the Central Utah Clinic. Lessons learned from this study will also benefit others in the medical community and society in general. You may feel uncomfortable answering some of the questions. You do not have to answer any questions that you do not wish to.

Your participation in this study is confidential. Study information including notes, and recordings will be kept in a secure location in my private office. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Your participation in this study will be anonymous, which means that no one outside of myself will know what your answers are. Your participation is also under your own control. If at any time you wish to withdraw from the study prior to the conclusion, you may.

Before we begin the interview, you will be asked to review and sign a consent form. You will be given a copy of your signed form.

I will be happy to answer any questions you have about the study. You may contact me at (801) 756-1528 or at Bartholomew@uvu.edu or my faculty advisor, Dr. Gertrude Abramson, at Abramson@Nova.edu. If you have study related questions or problems.
If you have any questions about your rights as a research participant, you may contact the Human Research Oversight Board at Nova Southeastern University at (954) 262-6369/Toll Free: (866) 499-0790.

Thank you for your consideration.
I will call you within the next week to see whether you are willing to participate in this study.
With kind regards,

Kimberly Bartholomew
Phone: (801) 755-1526
Email: bartholomew@uvu.edu

NOVA
Institutional Review Board
Approval Date: FEB 7 2014
Continuing Review Date: FEB 26 2015
Sample Email Invitation Letter for Physician/Provider, Staff and Super-User Members:

Study Title: Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices

Dear ____,

My name is Kimberly Bartholomew. I am a doctoral student in the Computer Information Sciences Department at Nova Southeastern University.

I am conducting a research study as part of the requirements of my Doctorate of Computer Technology in Education, and I would like to invite you to participate. This study is coordinated with the Central Utah Clinic as the case study organization.

I am studying meaningful use of patient portals in physician-managed clinics. If you decide to participate in this study, you will be asked to meet with me for an interview about your views and experiences with medical information systems, specifically patient portals, and clinic workflows.

The meeting will take place at a mutually agreed upon time and place, and should last about 45 minutes. A follow-up 30 minute interview may be needed and will also take place at a time and location of your convenience.

The interviews will be audio taped so that I can accurately reflect on what is discussed. The audio tapes will only be reviewed by me. I will transcribe and analyze the recordings. They will then be destroyed when the study is completed.

Opinions and ideas shared during these interviews will be used to help generate an implementation plan for increasing adoption rates and meaningful use of the patient portal at the Central Utah Clinic. Lessons learned from this study will also benefit others in the medical community and society in general. You may feel uncomfortable answering some of the questions. You do not have to answer any questions that you do not wish to.

Your participation in this study is confidential. Study information including notes, and recordings will be kept in a secure location in my private office. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Your participation in this study will be anonymous, which means that no one outside of myself will know what your answers are. Your participation is also under your own control. If at any time you wish to withdraw from the study prior to the conclusion, you may.

Before we begin the interview, you will be asked to review and sign a consent form. You will be given a copy of your signed form.

I will be happy to answer any questions you have about the study. You may contact me at (801) 756-1526 or at barthoki@uvu.edu or my faculty advisor, Dr. Gertrude Abramson, at abramson@nova.edu if you have study related questions or problems.
If you have any questions about your rights as a research participant, you may contact the Human Research Oversight Board at Nova Southeastern University at (954) 262-6369/ Toll Free: (866) 499-0790.

Thank you for your consideration.
I will call you within the next week to see whether you are willing to participate in this study.
With kind regards,

Kimberly Bartholomew
Phone: (801) 794-1528
Email: Bartholi@uvu.edu

Institutional Review Board
Approval Date: FEB 11 2015
Continuing Review Date: FEB 10 2016
Appendix F

IRB Approved Participant Adult Consent Forms
Appendix F1
Participant Adult Consent Form:
Initial IRB Approval February 27, 2014

NOVA SOUTHEASTERN UNIVERSITY
Graduate School of Computer and Information Sciences

Consent Form for Participation in the Research Study Entitled
Patient Portals: Achieving Technology Acceptance and Meaningful Use in
Independent Physician-Managed Practices

Funding Source: None
IRB protocol #: 01071401Exp

Principal Investigator
Kimberly Bartholomew, M.S.
5524 West 10030 North
Highland, UT 84003
(801) 759-1526
bartholm@uvu.edu

Co-investigator
Gertrude Abramson, Ph.D.
3301 College Avenue
Fort Lauderdale, FL 33314
(954) 262-2070
abramson@nova.edu

For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Site Information
Central Utah Clinic
Provo Main Campus
1065 North 500 West
Provo, UT 84604
(801) 429-8000

What is the study about?
You are invited to participate in a research study. The goal of this study will be to design
and test a strategy for independent, physician-managed practices that will increase
adoption rates and meaningful use of a patient portal.

Why are you asking me?
We are inviting you to participate because you are a physician/provider, super user, or
staff member of the case study site. There will be between 27 and 38 participants in this
research study.
What will I be doing if I agree to be in the study?
You will be interviewed by the researcher, Ms. Bartholomew. Ms. Bartholomew will ask you questions about your role at the case study site. Interview questions will also seek your experience and views related to successful medical information systems, specifically patient portals. You will be asked about practice workflow related to patient portals. The interview will last no more than 45 minutes. If during the interview you have any objections to the interview questions, Ms. Bartholomew will end the interview.

As part of the final step of the study, a follow-up interview may be conducted with physician/providers to assess acceptance of the implementation plan. This follow-up interview will take about 30 minutes.

Is there any audio or video recording?
This research project will include audio recording of the interview. This audio recording will be available to be heard by the researcher, Ms. Kimberly Bartholomew, personnel from the IRB, and the dissertation chair, Dr. Abramson. The recording will be transcribed by Ms. Kimberly Bartholomew. Ms. Bartholomew will use earphones while transcribing the interviews to guard your privacy. The recording will be kept securely in Ms. Bartholomew’s office in a locked cabinet. The recording will be kept for 36 months from the end of the study. The recording will be destroyed after that time by shredding the tape. Because your voice will be potentially identifiable by anyone who hears the recording, your confidentiality for things you say on the recording cannot be guaranteed although the researcher will try to limit access to the tape as described in this paragraph.

What are the dangers to me?
Risks to you are minimal, meaning they are not thought to be greater than other risks you experience in your everyday job. Being recorded means that confidentiality cannot be promised. If this happens Ms. Bartholomew will try to take steps to undo any compromise in confidentiality.

There is also a minimal risk of loss of privacy. Any transcription of your interview will remove your name and any other identifiable information. All recordings and transcriptions will be kept in a locked cabinet during the study and destroyed when the study has been completed.

If you have questions about the research, your research rights, or if you experience an injury because of the research please contact Ms. Bartholomew at (801) 755-1526. You may also contact the IRB at the numbers indicated above with questions about your research rights.

Are there any benefits to me for taking part in this research study?
By participating in this study, your insight and ideas may assist the case study site in their efforts to increase patient adoption rates and meaningful use of their patient portal system.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

Initials: _______ Date: _______ Page 2 of 3
How will you keep my information private?
The transcripts of the tapes will not have any information that could be linked to you. As mentioned, the tapes will be destroyed 36 months after the study ends. All information obtained in this study is strictly confidential unless disclosure is required by law. The IRB, regulatory agencies, or Dr. Abramson may review research records.

What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

Voluntary Consent by Participant:
By signing below, you indicate that

• this study has been explained to you
• you have read this document or it has been read to you
• your questions about this research study have been answered you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
• you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
• you will receive a copy of this form after you have read and signed it
• you voluntarily agree to participate in the study entitled Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices

Participant’s Signature: ____________________________ Date: ________________

Participant’s Name: ______________________________ Date: ________________

Signature of Person Obtaining Consent: ____________________________

Date: ________________

Institutional Review Board
Approval Date: FEB 7 2014
Continuing Review Date: FEB 2 2015

Initials: _______ Date: _______ Page 3 of 3
Appendix F2
Participant Adult Consent Form:
Continuing IRB Approval February 11, 2015

NOVA SOUTHEASTERN UNIVERSITY
Graduate School of Computer and Information Sciences

NSU

Institutional Review Board
Approval Date: FEB 11 2015
Continuing Review Date: FEB 10 2016

Consent Form for Participation in the Research Study Entitled

Funding Source: None
IRB protocol #

Principal Investigator
Kimberly Bartholomew, M.S.
5524 West 10030 North
Highland, UT 84003
(801) 756-1526
bartholomew@email.com

Co-investigator
Gertrude Abramson, Ed.D.
3301 College Avenue
Fort Lauderdale, FL 33314
(954) 262-2070
abramson@nova.edu

For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Site Information
Central Utah Clinic
Provo Main Campus
1055 North 500 West
Provo, UT 84604
(801) 429-8000

What is the study about?
You are invited to participate in a research study. The goal of this study will be to design and test a strategy for independent, physician-managed practices that will increase adoption rates and meaningful use of a patient portal.

Why are you asking me?
We are inviting you to participate because you are a physician/provider, super user, or staff member of the case study site. There will be between 27 and 35 participants in this research study.

Initials: ______ Date: ______ Page 1 of 3
What will I be doing if I agree to be in the study?
You will be interviewed by the researcher, Ms. Bartholomew. Ms. Bartholomew will ask you questions about your role at the case study site. Interview questions will also seek your experience and views related to successful medical information systems, specifically patent portals. You will be asked about practice workflow related to patient portals. The interview will last no more than 45 minutes. If during the interview you have any objections to the interview questions, Ms. Bartholomew will end the interview.

As part of the final step of the study, a follow-up interview may be conducted with physician/providers to assess acceptance of the implementation plan. This follow-up interview will take about 30 minutes.

Is there any audio or video recording?
This research project will include audio recording of the interview. This audio recording will be available to be heard by the researcher, Ms. Kimberly Bartholomew, personnel from the IRB, and the dissertation chair, Dr. Abramson. The recording will be transcribed by Ms. Kimberly Bartholomew. Ms. Bartholomew will use earphones while transcribing the interviews to guard your privacy. The recording will be kept securely in Ms. Bartholomew's office in a locked cabinet. The recording will be kept for 36 months from the end of the study. The recording will be destroyed after that time by shredding the tape. Because your voice will be potentially identifiable by anyone who hears the recording, your confidentiality for things you say on the recording cannot be guaranteed although the researcher will try to limit access to the tape as described in this paragraph.

What are the dangers to me?
Risks to you are minimal, meaning they are not thought to be greater than other risks you experience in your everyday job. Being recorded means that confidentiality cannot be promised. If this happens Ms. Bartholomew will try to take steps to undo any compromise in confidentiality.

There is also a minimal risk of loss of privacy. Any transcription of your interview will remove your name and any other identifiable information. All recordings and transcriptions will be kept in a locked cabinet during the study and destroyed when the study has been completed.

If you have questions about the research, your research rights, or if you experience an injury because of the research please contact Ms. Bartholomew at (801) 756-1526. You may also contact the IRB at the numbers indicated above with questions about your research rights.

Are there any benefits to me for taking part in this research study?
By participating in this study, your insight and ideas may assist the case study site in their efforts to increase patient adoption rates and meaningful use of their patient portal system.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

Initials: _______ Date: _______ Page 2 of 3
How will you keep my information private?
The transcripts of the tapes will not have any information that could be linked to you. As mentioned, the tapes will be destroyed 36 months after the study ends. All information obtained in this study is strictly confidential unless disclosure is required by law. The IRB, regulatory agencies, or Dr. Abramson may review research records.

What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

Voluntary Consent by Participant:
By signing below, you indicate that
- this study has been explained to you
- you have read this document or it has been read to you
- your questions about this research study have been answered you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
- you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
- you will receive a copy of this form after you have read and signed it
- you voluntarily agree to participate in the study entitled Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices

Participant's Signature: _______________________________ Date: ______________

Participant's Name: _______________________________ Date: ______________

Signature of Person Obtaining Consent: _______________________________

Date: _______________________________

Institutional Review Board
Approval Date: FEB 11 2015
Continuing Review Date: FEB 10 2016

Initials: ________ Date: ________ Page 3 of 3
Appendix G

Central Utah Clinic
Original FMH Marketing Materials
Appendix G1
FMH Patient Portal Easy Start Guide,
Distributed 2013-2014

Appendix G3
Revised FMH Patient Portal Notecard
Look at your health in a whole new way.

Online PERSONAL HEALTHCARE MANAGEMENT

Now you can manage your healthcare online with Follow My Health™, the latest advance in personal health care management.

Follow My Health™ is a secure, convenient way to manage your personal health care and communicate directly with your doctor’s office online. This FREE self-service health management tool can improve interactions with your doctor’s office, document important health care information and ultimately give you the ability to make more informed decisions about your health!

Features

ONLINE ACCESS – ANYWHERE, ANYTIME
View your health information electronically via a web browser.

THE COMFORT OF A SECURE ENVIRONMENT
Your health information is posted to a highly secure data repository.

YOUR INFORMATION – AND YOU MANAGE IT
Review and update your health history and personal health record online.
Expedite appointment check-ins by completing and submitting forms online.
Download, fax, and email select health information – immunizations history, school exam forms, and more.
View personal health information from other participating organizations.
Review your personal medical record, including office visits, physician notes, conditions, and medications.
View test and lab results.

It’s your health.
Get the access you deserve.

FollowMyHealth™

The next generation universal health record, Follow My Health™, combines patient-provider communication with a patient-managed personal health record.

One of the most prestigious features of this technology is the seamless combination of information from multiple health care organizations which creates the potential for all of your health care information in one easy place.
CONNECT WITH YOUR DOCTOR’S OFFICE
Request appointments at your convenience
Request a prescription refill
Send and receive messages from your Doctor’s office
Receive convenient reminders for preventative and follow-up care

How to enroll

STEP ONE: Sign up for Follow My Health at your visit today. A receptionist will verify your identity and will notify the Follow My Health team that you’ve signed up.

STEP TWO: You will receive an invitation via email to activate your Follow My Health account.

STEP THREE: Your email invitation will include two links: the first to create a Windows Live ID and a second to populate your online health record. You will be required to enter an invitation code, which is the last four digits of your Social Security Number.

WHAT IS WINDOWS LIVE ID? In order to use Follow My Health, all users must have a Windows Live ID account. These accounts are free of charge and provide necessary authentication technology in the application. Any existing email address for any email provider can be used when creating credentials for Windows Live ID. In fact, if you already have a Hotmail account, those accounts are compatible and can be used with Follow My Health.

STEP FOUR: After you have received your email to activate your Follow My Health account you will have 7 days to use the valid link.

TECHNICAL REQUIREMENTS:
Compatible Browsers: Internet Explorer 7.0 or higher, Mozilla Firefox 2 & 3, Google Chrome 4, Safari 1 & 2
Operating Systems: Windows or MAC Microsoft Silverlight 4.0 is required (will be prompted if not installed).
Must have a Windows Live ID (or Hotmail)

SUPPORT:
For support by email, please contact portal.support@centralutahclinic.com
Online Consult: Billable online consults with physicians are not available at this time. The messaging feature may be used to ask simple, non-urgent questions.

AVERAGE TURNAROUND TIMES:
- View medical record after initial sign up – up to 2 weeks
- Please allow the following intervals for interactions with your health care providers:
  - Message request for a call back or follow up – 1 business day
  - Appointment request – 1 business day
  - Request for Rx refill – 2 business days
  - View test results – 7 business days
  - View notes from office visit – within 15 days of the visit

Central Utah Clinic
Your Health. Your Choice.

Sign up today
Talk to a receptionist or visit us online and get started using these convenient and informative tools.
centralutahclinic.followmyhealth.com
Appendix H
AllScripts EHR Data Warehouse Tables
Appendix I

FMH Administrative Dashboard
Data and Visualizations
Appendix I1
FMH Patient Logins September 2013
Administrative Dashboard

Appendix I2
FMH Patient Logins December 2015
Administrative Dashboard
Appendix I3
FMH Appointments from April 2013
Administrative Dashboard

Appendix I4
FMH Appointments from December 2015
Administrative Dashboard
Appendix I5

FMH Administrative Portal: Family Considerations

Values from November, 6, 2016

As of 11/6/2016 8:36 AM,

Patient Portal has:
117,991 allergies,
940,389 health conditions,
36,310 immunizations,
64,925 medications,
43,065 procedures,
899,790 prescriptions,
5,366,104 results,
2,672,339 vitals,
1,486,304 documents,
502,413 scanned documents,
113,997 personal health considerations,
69,150 family health considerations
Appendix J

IRB Approvals: Delphi Group Email Invitation
Appendix J1
Delphi Group Email Invitation:
Initial IRB Approval February 27, 2014

Sample Email Invitation Letter for Delphi Group members
(physician/providers, staff and super users):

*Study Title:* Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices

*Dear [Name],*

My name is Kimberly Bartholomew. I am a doctoral student in the Computer Information Sciences Department at Nova Southeastern University.

I am conducting a research study as part of the requirements of my Doctorate of Computer Technology in Education, and I would like to invite you to participate. This study is coordinated with the Central Utah Clinic as the case study organization.

I am studying meaningful use of patient portals in physician-managed clinics. If you decide to participate, you will be asked to meet with me to review and provide feedback on an implementation plan for clinic internal marketing of patient portals.

The meeting will take place at a mutually agreed upon time and place, and should last about 45 minutes.

The interview will be audio taped so that I can accurately reflect on what is discussed. The audio tapes will only be reviewed by me. I will transcribe and analyze the recordings. They will then be destroyed when the study is completed.

Opinions and ideas shared during these interviews will be used to help validate an implementation plan for increasing adoption rates and meaningful use of the patient portal at the Central Utah Clinic. Lessons learned from this study will also benefit others in the medical community and society in general.

Your participation in this study is confidential. Study information including notes, and recordings will be kept in a secure location in my private office. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Your participation in this study will be anonymous, which means that no one outside of myself will know what your answers are. Your participation is also under your own control. If at any time you wish to withdraw from the study prior to the conclusion, you may.

Before we begin the interview, you will be asked to review and sign a consent form. You will be given a copy of your signed form.

I will be happy to answer any questions you have about the study. You may contact me at (801) 756-1526 or at bartholomew@nvu.edu or my faculty advisor, Dr. Gertrude Abramson, at abramson@nvu.edu. If you have study related questions or problems.
If you have any questions about your rights as a research participant, you may contact the Human Research Oversight Board at Nova Southeastern University at (954) 262-5369/ Toll Free: (866) 490-0700.

Thank you for your consideration. I will call you within the next week to see whether you are willing to participate in this study. With kind regards,

Kimberly Bartholomew  
Phone: (801) 756-1526  
Email: barthoki@uvu.edu
Appendix J2
Delphi Group Email Invitation:
Continuing IRB Approval February 11, 2015

Sample Email Invitation Letter for Delphi Group members
(physician/providers, staff and super users):

**Study Title:** Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices

**Dear [Name],**

My name is Kimberly Bartholomew. I am a doctoral student in the Computer Information Sciences Department at Nova Southeastern University.

I am conducting a research study as part of the requirements of my Doctorate of Computer Technology in Education, and I would like to invite you to participate. This study is coordinated with the Central Utah Clinic as the case study organization.

I am studying meaningful use of patient portals in physician-managed clinics. If you decide to participate, you will be asked to meet with me to review and provide feedback on an implementation plan for clinic internal marketing of patient portals.

The meeting will take place at a mutually agreed upon time and place, and should last about 45 minutes.

The interview will be audio taped so that I can accurately reflect on what is discussed. The audio tapes will only be reviewed by me. I will transcribe and analyze the recordings. They will then be destroyed when the study is completed.

Opinions and ideas shared during these interviews will be used to help validate an implementation plan for increasing adoption rates and meaningful use of the patient portal at the Central Utah Clinic. Lessons learned from this study will also benefit others in the medical community and society in general.

Your participation in this study is confidential. Study information including notes, and recordings will be kept in a secure location in my private office. The results of the study may be published or presented at professional meetings, but your identity will not be revealed.

Your participation in this study will be anonymous, which means that no one outside of myself will know what your answers are. Your participation is also under your own control. If at any time you wish to withdraw from the study prior to the conclusion, you may.

Before we begin the interview, you will be asked to review and sign a consent form. You will be given a copy of your signed form.

I will be happy to answer any questions you have about the study. You may contact me at (801) 756-1526 or at bartholomey@usu.edu or my faculty advisor, Dr. Gertrude Abramson, at abramson@nova.edu if you have study related questions or problems.
If you have any questions about your rights as a research participant, you may contact the Human Research Oversight Board at Nova Southeastern University at (954) 262-5369/ Toll Free: (866) 499-0790.

Thank you for your consideration.
I will call you within the next week to see whether you are willing to participate in this study.
With kind regards,

Kimberly Bartholomew
Phone: (801) 756-1526
Email: barthok@uvu.edu
Appendix K

IRB Approval: Delphi Group Consent Form
Continuing Approval, February 11, 2015

Delphi Group Consent Form for Participation
In the Research Study Entitled
Patient Portals: Achieving Technology Acceptance and Meaningful Use in
Independent Physician-Managed Practices

Funding Source: None
IRB protocol #

Principal Investigator
Kimberly Bartholomew, M.S.
5524 West 10030 North
Highland, UT 84003
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bartholomewk@uvu.edu

Co-Investigator
Gertrude Abramson, Ed.D.
3301 College Avenue
Fort Lauderdale, FL 33314
(954) 262-2070
abramson@nova.edu

For questions/concerns about your research rights, contact:
Human Research Oversight Board (Institutional Review Board or IRB)
Nova Southeastern University
(954) 262-5369/Toll Free: 866-499-0790
IRB@nsu.nova.edu

Site Information
Central Utah Clinic
Provo Main Campus
1055 North 500 West
Provo, UT 84604
(801) 429-8000

What is the study about?
You are invited to participate in a research study. The goal of this study will be to design and test a strategy for independent, physician-managed practices that will increase adoption rates and meaningful use of a patient portal.

Why are you asking me?
We are inviting you to participate because you are a physician/provider, super user, or staff member of the case study site. There will be between 27 and 35 participants in this research study.

You are being asked to be a member of a Delphi group. The Delphi group is often used in a research study to provide validation and feedback of study results and practices.

Initials: __________ Date: __________ Page 1 of 3
What will I be doing if I agree to be in the study?
The researcher, Ms. Bartholomew, will ask you to review and provide feedback on an implementation plan and internal marketing strategy to improve clinic patient portal adoption rates and meaningful use of patient portals. This session will be audio recorded so the researcher may review your feedback more correctly at a later time. The review session will last no more than 45 minutes. If during the review you have any objections, Ms. Bartholomew will end the review session.

Is there any audio or video recording?
This research project will include audio recording of the interview. This audio recording will be available to be heard by the researcher, Ms. Kimberly Bartholomew, personnel from the IRB, and the dissertation chair, Dr. Abramson. The recording will be transcribed by Ms. Kimberly Bartholomew. Ms. Bartholomew will use earphones while transcribing the interviews to guard your privacy. The recording will be kept securely in Ms. Bartholomew’s office in a locked cabinet. The recording will be kept for 36 months from the end of the study. The recording will be destroyed after that time by shredding the tape. Because your voice will be potentially identifiable by anyone who hears the recording, your confidentiality for things you say on the recording cannot be guaranteed although the researcher will try to limit access to the tape as described in this paragraph.

What are the dangers to me?
Risks to you are minimal, meaning they are not thought to be greater than other risks you experience in your everyday job. Being recorded means that confidentiality cannot be promised. If this happens Ms. Bartholomew will try to take steps to undo any compromise in confidentiality.

There is also a minimal risk of loss of privacy. Any transcription of your interview will remove your name and any other identifiable information. All recordings and transcriptions will be kept in a locked cabinet during the study and destroyed when the study has been completed.

If you have questions about the research, your research rights, or if you experience an injury because of the research please contact Ms. Bartholomew at (801) 756-1526. You may also contact the IRB at the numbers indicated above with questions about your research rights.

Are there any benefits to me for taking part in this research study?
By participating in this study, your insight and ideas may assist the case study site in their efforts to increase patient adoption rates and meaningful use of their patient portal system.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

How will you keep my information private?
The transcripts of the tapes will not have any information that could be linked to you. As mentioned, the tapes will be destroyed 36 months after the study ends. All information obtained in this study is strictly confidential unless disclosure is required by law. The IRB, regulatory agencies, or Dr. Abramson may review research records.

Initials: ________ Date: ________ Page 2 of 3
What if I do not want to participate or I want to leave the study?
You have the right to leave this study at any time or refuse to participate. If you do decide to leave or you decide not to participate, you will not experience any penalty or loss of services you have a right to receive. If you choose to withdraw, any information collected about you before the date you leave the study will be kept in the research records for 36 months from the conclusion of the study and may be used as a part of the research.

Other Considerations:
If the researchers learn anything which might change your mind about being involved, you will be told of this information.

Voluntary Consent by Participant:
By signing below, you indicate that
- this study has been explained to you
- you have read this document or it has been read to you
- your questions about this research study have been answered you have been told that you may ask the researchers any study related questions in the future or contact them in the event of a research-related injury
- you have been told that you may ask Institutional Review Board (IRB) personnel questions about your study rights
- you will be provided a copy of this form after you have read and signed it
- you voluntarily agree to participate in the study entitled Patient Portals: Achieving Technology Acceptance and Meaningful Use in Independent Physician-Managed Practices

Participant's Signature: __________________________ Date: ______________
Participant's Name: __________________________ Date: ______________
Signature of Person Obtaining Consent: __________________________
Date: ______________

Institutional Review Board
Approval Date: FEB 11 2015
Continuing Review Date: FEB 10 2016

Initials: _______ Date: _______ Page 3 of 3
Appendix L

Revere Health Super User Community of Practice/Blog
Appendix L1

Allscripts Super Users CoP Home Page
Appendix L2

Super User Blog Meeting Minutes

01/15/2015
Super User Meeting 01/15/2015

For users that are on site:

- Please raise your hand if you have a question. That way the question can be clearly heard by those on the phone.
- Please do not whisper to each other in the room, it creates a lot of background noise for those on the phone.

For users that are calling in:

- Please state your name when you first dial in.
- Please be sure that if you answer either phone call when you are on the conference line, it puts the conference line on hold and other users can’t hear. If you must answer another, please hang up and then re-join where complete.
- Please put your phone on Mute unless you have a question.

- Analytics/QS -
  - Q2: When will the HMQI be filed on QS? Phone call (A) By the end of January
  - Q2: When will the MU2 reports be reflecting this year? (A) By the end of January
  - Q2: Can we change it so that in QS you can add a weight over 268 lbs? (A) Yes, it is now at 500lbs.
  - Q2: Why are patients that are ES have a Deca instead of their QS? (A) Jay is looking into this example (4/4/15).
Appendix L3

Super User Blog Tips and Tricks

[Image of a webpage with a list of tips and tricks]
Appendix M

Revere Health Super User Training Materials
Appendix M1
Revere Health Patient Portal Training Slides
Prepared for Patients and Staff

- This presentation is a resource for staff, physicians, and managers to understand and implement Follow My Health into their daily workflows.

- By using Follow My Health, you will help engage your patients and provide a way for better and more efficient communication.

PREVIOUS ISSUES WITH FMH

- The clinic created a workgroup earlier this year to look at barriers previously encountered with Follow My Health.

- We recognize that historically some patients had difficulty connecting to Follow My Health. If staff follow the recommendations in this presentation, these barriers should be resolved.

- We will also provide contact information at the end of this presentation for any patients or staff who run into issues.

HOW PATIENTS CAN USE FOLLOW MY HEALTH

- Requests for prescriptions
- Feedback assessment
- Schedule follow-up appointments

HOW DOES USING FMH BENEFIT MY PRACTICE & PATIENTS?

- Audit phone log with patients
- Make requirements for Meaning of Use
- Patient reviews tracked and can be reviewed

FOLLOW MY HEALTH TASK VIEWS

- It is vital for staff to ensure the task views are set up correctly for your department to ensure all incoming tasks from patients are received by appropriate staff.

- Please refer to the Follow My Health guide for instructions and options for best practices to funnel these messages.
WHAT THE PORTAL LOOKS LIKE

SETTING UP A PROXY FMH

When a relative or third party would like access to a patient’s chart, you can set up a proxy FMH with a form available on the Internet. Use this form if:

- An adult son/daughter would like access to their parents records.
- A parent would like access to their child’s FMH chart when the child is over the age of 12.
- Instructions for creating proxy access is found in the Patient My Health Guide.

DECODING PATIENT ENROLLMENT STATUS

Questions, Problems Patient Support:

- For patient inquiries/problems: Follow My Health patient support (888) 358-3190
- For staff/provider questions or problems with the FMH support line: (888) 670-6775
- Email Revere Health FMH analytics team: fmhanalysis@reverehealth.com
Appendix N

FollowMyHealth Login Screens
Appendix N1

Patient Login via Social Media Services Prior to August 2013

Welcome to FollowMyHealth™, an innovative health engagement solution that empowers patients to take a more active role in managing their care.

FollowMyHealth is used by tens of thousands of physicians as the "power" behind their hospital or clinic’s specific patient portal.

Whether you’re looking to keep an eye on your weight, monitor your blood pressure, or manage a chronic condition, FollowMyHealth is the tool for you!

Sign in using one of your existing accounts. The login from that account will serve as your login for your health record. If you do not have an account with any of these sites, CLICK HERE.

Available on the App Store
Available on Google play

Help | Español
Appendix N2
Patient Login with Universal Login after August

Appendix N3
Patient Login with Universal Login after August
Appendix O

Code Networks

Discovery Interview Code

![Discovery Interview Code Network](image1)

Dream Interview Code Network

![Dream Interview Code Network](image2)
Appendix P

Revere Health FMH MU Scorecards
## Follow My Health Meaningful Use Scorecard

<table>
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<tr>
<th>YTD Report</th>
<th>1/1/2015</th>
<th>8/15/2015</th>
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<tr>
<td><strong>Timely Access</strong></td>
<td>More than 50% of all unique patients seen by the eligible provider (EP) during the reporting period (RP) are provided timely (within 4 business days after the info is made available to EP) online access to their health info subject to the EP’s discretion to withhold certain info</td>
<td></td>
</tr>
<tr>
<td><strong>View, Download, Transmit</strong></td>
<td>More than 5% of all unique patients seen by the EP during the RP (or authorized representatives) view, download or transmit to a third party their health info</td>
<td></td>
</tr>
<tr>
<td><strong>Secure Messaging</strong></td>
<td>A secure message was sent using the electronic messaging function of certified EHR technology (CEHRT) by A secure message was sent using the electronic messaging function of certified EHR technology (CEHRT) by more than 5% of unique patients (or their authorized representatives) seen by the eligible professional (EP) during EHR reporting period (RP)</td>
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<tr>
<th>By Department</th>
<th>Number of Providers</th>
<th>Timely Access</th>
<th>View, Download, Transmit</th>
<th>Secure Messaging</th>
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**Percent of Providers achieving measure:**

- Timely Access: 77%
- View, Download, Transmit: 83%
- Secure Messaging: 32%
### Follow My Health Meaningful Use Scorecard

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**Timely Access**
More than 50% of all unique patients seen by the eligible provider (EP) during the reporting period (RPI) are provided timely (within 4 business days after the info is made available to EP) online access to their health info subject to the EP’s discretion to withhold certain info

**View, Download, Transmit**
At least one patient seen by the EP during the EHR reporting period views, downloads, or transmits his or her health information to a third party

**Secure Messaging**
the capability for patients to send and receive a secure electronic message with the provider was fully enabled

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| 84%                | 85%          | 100%                       | 84%             | 97%                   | 100%         |
## Appendix P3

### YTD Scorecard January 2015 – August 2015

By Provider

### Follow My Health Meaningful Use Scorecard

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<th>YTD Report</th>
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<td><strong>Timely Access</strong></td>
<td>More than 90% of all unique patients seen by the eligible provider (EP) during the reporting period (RP) are provided timely (within 4 business days after the info is made available to EP) online access to their health info subject to the EP’s discretion to withhold certain info.</td>
</tr>
<tr>
<td><strong>View, Download, Transmit</strong></td>
<td>More than 5% of all unique patients seen by the EP during the RP (or authorized representatives) view, download or transmit to a third party their health info.</td>
</tr>
<tr>
<td><strong>Secure Messaging</strong></td>
<td>A secure message was sent using the electronic messaging function of certified EHR technology (CEHRt) by A secure message was sent using the electronic messaging function of certified EHR technology (CEHRt) by more than 5% of unique patients (or their authorized representatives) seen by the eligible professional (EP) during EHR reporting period (RP).</td>
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### Admin

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<th>=&gt; 5%</th>
<th>=&gt; 5%</th>
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Appendix P4
Rolling 90 Days FMH Measures July 2015 – November 2015
By Provider

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Follow My Health Meaningful Use Scorecard

Report Period: 90 Days Rolling

Timely Access: More than 50% of all unique patients seen by the eligible provider (EP) during the reporting period (RP) are
View, Download, Transmit at least once patient seen by the EP during the EP's reporting period views, downloads, or transmits a secure message.
Secure Messaging: The provider for patients to send and receive a secure electronic message with the provider was fully enabled.
Appendix Q

Dashboard Prototype Screenshots
Appendix Q1
MU Stage 2 Progress by Provider
for Access, Clinical Summaries and VDT
Appendix Q2
FMH Stage 2 Progress by Provider
for Patient Education
Appendix Q3
MU Stage 2 Task Tracking
Appendix Q4
FMH Daily Appointment Tracking

Follow My Health SuperUser Dashboard

Appointments for Today

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<th>Phone</th>
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<td>Trevor</td>
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Patient FMH Details

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<td>10/6/2015</td>
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Appendix R
AI Summit Dashboard Prototype Feedback

What are some ways you would like the patient portal used for patient engagement?
I think it is a struggle so the more we can engage the better.
Doctor/patient secure messages (timely).
Easier steps for patient to verify their information, demographics, medications etc.
Refills and appointment reminders

What role can the provider play in changing the practice workflow to encourage patient portal usage?
Providers need to buy-in and encourage the patient to use and assure them they will be taken care of.
Provider buy-in is critical. If they speak to patients about the portal its so much more effective.
Engaging the patient in the process.

What would make MU reporting more actionable for you or other staff who advocate portal usage?
Having it be more detailed or having the ability to drill down to see the detail.
I like this for the ability to see if we need to refocus staff in different areas.

Feedback on the FMH Registration, Access, Clinical Summaries dashboard page:
Love it. Puts it simple for a provider/admin quick view.
I would suggest having total patients per point. How many have VDT, how many have sent a message.
I like the simplicity of the page that shows the FMH aspects of Meaningful Use by provider.
Would need to be updated for the new recently changed guidelines.
Needs to be shown on appointment page on Allscripts & GPMS if patient is registered active

Feedback on the FMH Education dashboard page:
Really like the pie chart. Lets them visually see what. Easy to view. Especially with percentages.
I like seeing what type of education they are using.
I like this. I think it will be beneficial in helping us focus on specific areas of education.

Feedback on the FMH Task dashboard:
‘secure message’ a little vague.
Don’t love the bar graph. I feel like I have to look at the key 5 or 6 times to decipher.
Very pretty to the eye, but I feel like I have research to look at my research.
Good per provider, but access to Location/Specialty.
I felt the dashboard that showed the types of tasks being utilized would be helpful.
Feedback on the Appointment tracking dashboard page:
Like the idea of it – a lot. Just depends on where it’s located. I don’t know how many would be happy
with an additional program. But like the ease of knowing who’s portal member! Great!
A column with our FMH status icons so you don’t have to click on the patient name.
Be able to choose
a day – not just today.
I don’t think the city is necessary, but I do think the age of the patient would help.
Needs to be shown on appointment page on Allscripts & GPMS if patient is registered active

What might be some techniques a dashboard could be used to track recent patients and their secure
messaging or other interactions?
This has been a struggle a Revere Health. I think this would be helpful.
I would like to see the amount of time it is taking us to respond.
Being able to drill to individual provider grouped by department or entire clinic.

Where would you place a Patient Portal dashboard for the most visibility and tightly weave it into the
computer workflow of the office?
The closer you can link it to the EHR the better. If it can be integrated with a button within the EHR, it
would be more successful. Most users gripe about an additional program or login.
To add another screen to look at could be hard for the users, mainly if they are using Phressia.
Linked on Intranet.
If each workstation had an icon on the desktop that would take them to their provider’s numbers.
It would be great for it to be an always present “icon”
References


An emerging direction for organizational development (pp. 2-29). Champaign, IL: Stipes Publishing.


