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A Process Improvement Project: Demonstrating a Patient Portal to Increase Enrollment and Use in an Underserved Population with Chronic Illness

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A PROCESS IMPROVEMENT PROJECT: DEMONSTRATING A PATIENT PORTAL TO INCREASE ENROLLMENT AND USE IN AN UNDERSERVED POPULATION WITH CHRONIC ILLNESS

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Abstract

High risk, high cost chronic conditions such as diabetes, asthma, and congestive heart failure are prevalent in the United States. Nearly half of all Americans have at least one chronic condition (Centers for Disease Control and Prevention, 2009). Almost four-fifths of total health care spending in the U.S. is related to high risk, chronic conditions (Baker, Johnson, Macaulay, & Birnbaum, 2011). The use of patient portals in ambulatory care may be an avenue toward improving chronic disease management. Portals can be used by patients to schedule appointments, send secure messages to their providers, request medication refills, review lab and test results, make payments, and other activities. The purpose of this quality improvement project was to evaluate whether combining portal demonstration to patients during clinic visits with immediate enrollment would increase the use of a portal in a safety-net primary care clinic. Most of the participants (N = 51) were Caucasian aged 38 to 47 years, high school graduates, and diabetic with no comorbid conditions. Over half were daily internet users. Participants' use of the portal was recorded over three months. The use rate improved from none prior to portal demonstration to 39.2%. The demonstration was timed and a cost analysis was performed to present a sustainability plan for demonstration adoption in the primary care clinic. Increased portal use rates may over time equate to improved patient-provider communication and increased patient self-care, leading to improved chronic condition management.

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CHAPTER 1

INTRODUCTION

Improving self-care management for patients with high risk, high cost chronic conditions like diabetes, asthma, and congestive heart failure (CHF) is becoming a national priority. Americans with multiple chronic conditions cost the United States over $2 trillion dollars in healthcare expenditures annually (Ory et al., 2013). Disease prevention efforts and better chronic condition management can help reduce these costs (Kaiser Family Foundation, 2012). Performing healthy behaviors such as adhering to medication regimens and attending regular clinic visits are important components of effective self-care management. Patient portals are a new mechanism primary care clinics are using to enhance the patient-provider connection and improve self-care management.

The primary goal of this project was to increase patient registration into and use of MyCare, a patient portal within the NextGen electronic health record (EHR) at a Federally Qualified Health Center (FQHC) in Holland, Michigan. The FQHC provides primary care to underserved individuals who primarily have Medicaid or are uninsured. The population of interest were adult, underserved patients of any race who suffered from one or more high risk, uncontrolled chronic illness(es) and had internet access. For the purposes of this project, the term “high risk” was defined as chronic illness such as diabetes, hypertension, chronic obstructive pulmonary disease (COPD), or any other, which was in an uncontrolled state or not meeting guideline recommended parameters for control. These criteria will be explained in the target population section.

Scope of the Issue

National Data

The prevalence of chronic diseases like diabetes, cardiovascular disease, hypertension, and COPD is on the rise in the United States. As of 2013 according to the Centers for Disease Control and Prevention (CDC), approximately 117 million American adults, nearly half of the total population, suffer from at least one chronic condition (CDC, 2014). This proportion of the population is expected to increase by one percent per year through 2030. Current life expectancy is just below 80 years of age and continues to increase (Murphy, Xu, & Kochanek, 2013). This equates to a larger population of individuals in the U.S. living with chronic disease. In total, deaths from these conditions accounted for 26.7% of all deaths in the United States during 2010-2013 (CDC, 2013).

Diabetes In 2012, the total cost of diabetes care in the U.S. was $245 billion (American Diabetes Association, 2013). This was 41% higher than in 2007. The cost of care per individual with diabetes in 2012 related solely to diabetes was roughly $8,000. The American Diabetes Association (ADA) reported that people with diabetes create healthcare expenditures nearly two to three times what those without diabetes incur. Data from the CDC show the prevalence of diabetes in adults in the U.S. has tripled from 1980 to 2013 (CDC, 2013). Of the top ten leading causes of death as of 2012, diabetes ranked seventh nationally (CDC). Optimum diabetes management involves close follow-up in the primary care clinic, often quarterly, since tight glycemic control is difficult to accomplish (ADA, 2014).

Chronic Obstructive Pulmonary Disease The primary cause of COPD is years of smoking. This damages the small airways and alveoli in the lungs rendering them less efficient. Although smoking rates are decreasing in the United States, COPD is still a major health concern

(Vestbo et al., 2013). As of 2013, chronic respiratory disease ranked fourth out of the top ten causes of death (CDC, 2013). COPD costs, although not nearly as burdensome as diabetes, are expected to increase to $49 billion by 2020 (Ford et al., 2014). The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines (2013) state that proper management of COPD involves managing acute exacerbations (Vestbo). This requires diligent, close communication between providers and patients; and increased patient self-awareness of disease processes and when to seek treatment. The use of patient portals may help this by improving communication through secure messaging.

Cardiovascular Disease and Hypertension The number one cause of death in adults aged 18 years and older from 2005-2010 in the U.S. was related to some form of heart disease (CDC, 2013). Heidenreich et al. (2011) of the American Heart Association predicted that healthcare costs related to cardiovascular disease would triple to $818 billion by the year 2030. Hypertension is a leading cause of heart disease. Roughly 80% of Michigan adults were on an antihypertensive in 2010 (CDC). The Eighth Joint National Committee on Hypertension (JNC8) recommended that blood pressure be controlled to less than 150/90 mmHg in all adults (James et al., 2014). This often takes multiple antihypertensive agents and frequent visits to manage successfully. Here again, close communication between providers and patients on side effects of medications and blood pressure reporting can be augmented by the use of a patient portal.

The improved control of diabetes, COPD, cardiovascular disease, and other financially burdensome diseases, can save large amounts of taxpayer dollars. These conditions, in uncontrolled states, are very common in the clinical setting and can become better managed through the use of patient portals. Improved communication and the use of reminders through portals may be helpful to decrease problems with lack of follow-up visits in primary care, and shorten the length of time it takes to get these problems under control. This will be discussed further in the section on portals.

Michigan Data

Of all preventable hospitalizations in Michigan in 2013; heart disease, COPD, and diabetes accounted for 28.8% (MDCH, 2013). Nearly 10% of adults in Michigan had been diagnosed with diabetes alone in 2013 (MDCH). In 2015, 13% of Michigan residents had no health insurance (Population Health Institute, 2015) and 15.7% lived below the poverty line (CDC, 2013). Michigan ranks 34th nationally in state health status (United Health Foundation, 2013) and nearly 2.3 million Michigan residents are covered by Medicaid only (Kaiser Family Foundation, 2010). In Ottawa County, Hispanic adults make up 9.5% of the population, of which over 10% consider themselves of fair to poor health status (Ottawa County Health Department, 2014).

The FQHC in Holland, Michigan cares for an underserved patient population. Education and income levels are often low. Hispanic adults with less than a high school education make up a staggering 33% of the Michigan population, while low education rates among Caucasians in Michigan are only 9.7% (Michigan Department of Health and Human Services, 2013). The African American rate exists between these two groups with 18.1% having less than a high school diploma. The median annual household income for Hispanics through 2010 was $38,049, Caucasians $50,265, and African Americans $30,047 (MDHHS). Translating these numbers to the federal poverty level, 27.5% of Hispanics, 11.7% of Caucasians, and 32.7% of African Americans lived below the poverty line through 2010 (MDHHS). Self-care management is often poor among this population as survival and financial concerns are often more immediate.

Uninsured and Underserved

The uninsured represent 15% (46 million) of the U.S. population and are less likely to have a medical home or a usual source of care when compared to those with insurance (DeNavas-Walt, Proctor, & Smith, 2008). Uninsured patients are also more likely to experience poorer outcomes than those with the same condition who are insured (Institutes of Medicine, 2009). Uninsured Hispanics and African Americans, or those who have Medicaid that live in medically underserved areas, experience a higher rate of preventable hospitalizations than well-insured individuals (Oster & Bindman, 2003).

Ambulatory care sensitive conditions (ACSCs) are conditions that high-quality primary care can affect to prevent hospitalizations or complications from severe disease (Agency for Healthcare Research and Quality, 2001). ACSCs such as diabetes, asthma, and CHF cause a great deal of preventable hospitalizations through emergency departments for patients who do not routinely utilize primary care services. In Michigan, 20.1% of all hospitalizations in 2012 were considered preventable had patients' chronic health conditions been better managed in the ambulatory care setting (MDCH, 2013).

Data from the National Hospital Ambulatory Medical Care Survey from 2006-2009, show that uninsured patients account for 16.6% of U.S. emergency department visits annually (Carlson, Menegazzi, & Callaway, 2013). That is roughly 20 million per year or 1 in every 6 visits. These patients receive fewer diagnostic tests and procedures than those with insurance. These authors were able to demonstrate that despite receiving fewer diagnostic tests, uninsured patients experienced the same hospitalization rates as those who were insured. The significance of this finding is unclear. What is clear is that activated patients, those who have the knowledge, confidence, and skill to manage their own health care, experience improved health outcomes

(Greene & Hibbard, 2012). Moving patients toward being “activated” is a tremendous challenge however, especially among underserved populations. Patient portals are intended to help activate patients toward improved self-care management.

Self-Care Management

The Agency for Healthcare Research and Quality (AHRQ) defines self-management support as the support given to patients to help them manage chronic conditions on a daily basis (AHRQ, 2014). The vision is that care should remain patient-centered; patients utilizing their healthcare team to set goals and make healthy choices. This approach should lead to better self-care management and improved health for patients. Providers are expected to improve follow-up communication with patients through email, text messaging, or mailings to facilitate patients’ continued self-care management. As a result, these actions should contribute to improved healthcare quality outcomes and patient and provider satisfaction. A true partnership between providers and patients will help patients build the confidence and skills they need to lead active, fulfilling lives. Unfortunately, this partnership does not occur in many instances and many patients lack understanding of their plan of care. As a result, they do not participate fully in their own health care decisions.

The AHRQ delineates a number of ways self-care management can be effectively supported by a primary care clinic. Methods which could prove beneficial include: (a) using actionable, understandable teaching tools; (b) gathering clinical data prior to a visit; (c) setting an agenda for the visit; (d) helping patients set healthy goals; and (e) tracking health outcomes. Patient portals have been developed to facilitate some of these concepts.

Patient Portals

HealthIT.gov (2014) defines a patient portal as a secure online website that gives patients convenient 24 hour access to personal health information from anywhere with an internet connection. Although patient portals have existed in some fashion since 1990, the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, part of the American Recovery and Reinvestment Act (ARRA) economic stimulus bill of 2009, spurred on portal growth (HITECH Act, 2009). The HITECH Act was intended to promote the adoption and meaningful use of health information technology. Portals can be used by patients to schedule appointments, send secure messages to their providers, request medication refills, review lab and test results, make payments, and other activities. The Federal Communications Commission (FCC) proposed the “overarching goal that by 2017 mHealth, wireless health and e-Care solutions will be routinely available as part of best practices for medical care” (FCC, 2012, p. 1). These concepts relate to mobile interfaces, like smartphones or tablets, and involve telehealth innovations that improve remote access to care.

Meaningful Use

The use of patient portals has been encouraged by the Centers for Medicare and Medicaid Services (CMS) mandate that ambulatory care practices achieve “meaningful use” (MU) of certified electronic health records by 2015 (HealthIT.gov, 2014). Meaningful use involves using certified electronic health record technologies to achieve health and efficiency goals by engaging patients and families in their care, and improving care coordination and population health. This is congruent as well with the Institute for Healthcare Improvement (IHI) Triple Aim to improve the patient experience of care, improve population health outcomes, and reduce healthcare costs (IHI, 2014).

The final rule for stage two MU attestation criteria was published by CMS in August 2012 (CMS, 2012). Eligible providers who wish to attest to stage two MU must meet 20 core objectives. These are divided among five patient-centered domains: (a) improving quality, safety, and efficiency; (b) engaging patients and families; (c) improving care coordination; (d) improving public and population health; and (e) ensuring privacy and security of personal health information (HealthIT.gov, 2014). Examples of these core objectives include: (a) e-prescribing, (b) recording smoking status, (c) problem lists, (d) clinical summaries, (e) transmitting health information, (f) secure electronic messaging, and several others. As of April 2015, roughly half of all eligible providers in the U.S. had attested successfully to stage one MU but very few had attested to stage two criteria (Office of the National Coordinator, 2015). E-prescribing is simply sending of prescriptions electronically by providers to pharmacies.

Looking beyond stage two meaningful use, stage three meaningful use may rely heavily on portal involvement to improve quality and increase data sharing (Andrews, 2015). As of August, 2015, CMS had not considered requesting public comment on stage three. The chairman of the Senate Health Policy Committee, Lamar Alexander, had called for a halt to stage three planning because most providers still had not successfully attested to stage two criteria (Health IT Exchange, 2015).

Financial Incentives

The CMS vision is that EHRs will help achieve improved health outcomes and efficiency goals and reduce health disparities through more intentional involvement of patients in their own health care (HealthIT.gov, 2014). This is done by eligible providers “attesting” to core measures of MU in three separate stages, each stage building upon the last. Eligible providers that do not engage in MU will eventually face a financial penalty of decreased Medicare reimbursement, 1%

per year to a maximum of 5% reduction. Those who do attest to stages of MU will receive as much as $44,000 per provider from Medicare and up to $63,750 from Medicaid. Clearly this is a large financial incentive to comply with CMS requirements.

The Clinic

The FQHC in Holland, Michigan, is currently working to achieve stage two requirements. Their certified electronic health record technology is called NextGen and their patient portal is called MyCare. All stage two meaningful use core measure requirements had been met at the time of this project except the two specific measures dealing with portals: 7 and 17. These core measures involved providing patients with the ability to view, download, and transmit health information; and the use of secure electronic messaging to communicate with patients. These two criteria were the final measures the clinic needed to meet to be able to successfully attest to stage two MU requirements. The target set by CMS was that 50% of all prevalent patients in a practice will enroll in a patient portal (Measure 7) and that 5% of these patients will communicate with their provider via secure message at least once (Measure 17).

Assisting the clinic to achieve these measures was a potential avenue to increase stakeholder acceptance of this project. The MyCare patient portal is specifically designed to be able to address these measures. Strategies for optimizing patient adoption and use of portals and meeting meaningful use requirements have been described by the HealthIT.gov website (HealthIT.gov, 2013). Among the important concepts to consider is that active promotion of patient use of a portal and facilitation of registration by providers is a key ingredient to patient adoption. The positive effects of portal acceptance include: (a) improved patient activation; b) more effective, efficient communication; (c) timely self-care; (d) the ability to focus on high-risk patients; and (e) improved patient satisfaction. Achieving MU and optimization of patient portals is considered to be imperative in achieving patient-centered medical home status (HealthIT.gov, 2014).

Patient-Centered Medical Home

The concept of a medical home is the idea, rather than an actual place, of a centralized care center in which a patient's primary care provider is the first point of contact for all health related issues. The medical home maintains all records for the patient, primarily electronically; organizes and coordinates other needed types of care; focuses on holism and prevention of disease; and attempts to improve access by expanded hours and connection with providers through media such as email or text message. This is an innovative attempt by Congress to address the issues of access to health care and rising costs without compromising quality by streamlining and organizing health care delivery.

According to Schram (2012), the patient-centered medical home (PCMH) concept began as an attempt by the American Academy of Pediatrics (AAP) to coordinate care for children with special needs. It was refined in 2007 by the AAP, the American Academy of Family Practice, the American College of Physicians, and the American Osteopathic Association to include seven joint principles: (a) a personal physician; (b) care directed by a personal physician; (c) coordination of care, quality, and safety; (d) enhanced access; (e) a holistic focus; and (f) different reimbursement structures that reflect modernization rather than the standard fee-for-service model.

Patients and their families stand to benefit from streamlined provision of services and improved and increased access to primary care. Streamlined care and improved access fits well with the federal mandate for insurance coverage for all per the Affordable Care Act (ACA) guidelines. As the levels of the uninsured decrease, the public should reap the reward through the

PCMH model. Health care costs should decrease from improved chronic condition management and fewer people accessing the system at more critically ill stages.

The FQHC in Holland, Michigan has attained patient-centered medical home (PCMH) status, granted by the National Committee for Quality Assurance (NCQA). The NCQA is a non-profit agency that is a hub for accreditation and certification of medical homes as they promote extensive programs in which providers can participate to demonstrate their commitment to quality outcomes. The NCQA provides standards, guidelines, and survey tools to assist providers with enrollment in a medical home pilot program (National Committee for Quality Assurance, 2011). One of the NCQA requirements to become a full-fledged PCMH is the presence of a functional EHR. As stated, the NextGen EHR has been employed by the clinic since November, 2011 and the MyCare patient portal as of February, 2014.

Targeted Population

The Health Resources and Services Administration, a division of the U.S. Department of Health and Human Services (USDHHS), designates Medically Underserved Areas/Populations (MUA/P) as having too few primary care providers, high infant mortality, high poverty, and/or high elderly population. Many in MUP are either not insured or have government insurance, primarily Medicaid. Parts of Ottawa County qualify as a MUA and the FQHC in this underserved area services a high percentage of the medically underserved population. This population is transient in nature and the general milieu of care is one of crisis, episodic care; not one of routine, chronic disease management.

The FQHC in Holland, Michigan is designated as one of the clinics serving a medically underserved population (USDHHS, 2012). As a PCMH, one of the clinic’s stated goals is to utilize existing informatics technologies to improve care management processes and the provider-patient relationship. The clinic plans to accomplish this goal and maintain PCMH status through the use of their certified electronic health record NextGen. Fortunately, this EHR has its own patient portal incorporated within it. This is not always the case with EHRs.

Lack of patient follow through and poor self-care management are two primary frustrations of Dr. Peter Christensen, a family physician at the clinic. Dr. Christensen had been trying to develop a "recall list" to more effectively manage patients with chronic conditions (personal communication, October 27, 2014). Some primary care providers are able to generate patient lists through their EHRs of patients who have not scheduled routine screening and preventive visits to manage their chronic conditions. Staff can then contact patients to schedule appointments. This has not been successful according to Dr. Christensen as staff members have not had time to operationalize this follow-up (personal communication, October 27, 2014).

Examples of patients' uncontrolled chronic conditions are those that do not meet guideline-recommended parameters. For example, the American Diabetes Association recommends most patients achieve a target hemoglobin A1C level of less than 7.0% (ADA, 2014). Patients who do not meet this criterion would be considered to have an uncontrolled, high-risk chronic condition. In the same way, new guidelines from the Eighth Joint National Committee (JNC8) recommend a target blood pressure of under 140/90 mmHg for those diagnosed with hypertension (James et al., 2014). Patients that do not meet this goal have uncontrolled hypertension and are at higher risk for cardiovascular complications than patients with controlled blood pressure.

The same type of evaluative criteria can be applied for a host of other conditions such as thyroid disease, coagulopathies, and others. Since so many of Dr. Christensen's patients had uncontrolled pain and comprise the highest number of visits per year for medication refill requests, these patients were included as a high-risk population as well (personal communication, December 1, 2014). These patients may in fact prove to be the highest users of MyCare to communicate with their providers and requesting refills. Yet, the specific diagnosis was not important for this project, only whether or not the patient was in an uncontrolled state or had multi-morbidity. This will be discussed further in Chapter Four: Methods. The FQHC was the primary care clinic of interest for implementation of this new care management process.

Proposed Clinical Intervention

The proposed clinical intervention to address care management in this population was a process improvement intervention using the MyCare patient portal at the FQHC clinic. Knee-to-knee demonstration of the portal to patients at the end of clinic visits was coupled with immediate enrollment. The primary outcome measure was whether this method would increase portal use rates. Secondary measures included the time required for the demonstration and whether any demographic group of participant was more likely to use the portal than another. The MyCare portal was available both by computer and smartphone interface according to patient preference and accessibility. Amante, Hogan, Pagoto, and English (2014) claimed that minority patients with lower education and income levels are more likely to utilize smartphones as their main means of connecting to the internet.

The emerging term, mHealth, is broadly defined as the support of medical and health practices by mobile devices (Tomlinson, Rotheram-Borus, Swartz, & Tsai, 2013). The Federal Communications Commission (FCC) proposed the “overarching goal that by 2017 mHealth, wireless health and e-Care solutions will be routinely available as part of best practices for medical care” (FCC, 2012, p. 1).

Garside (2012) wrote that, “the number of devices connected to mobile phone networks will overtake the number of people on Earth within five years” (para 1). A 2011 report predicted there would be an increase in the numbers of downloads of health applications (apps) to mobile devices from 44 million in 2012 to 142 million by 2016 (iHealth Beat, 2011). A higher percentage of Hispanics and African-Americans in the United States own cell phones than Caucasians, which is perhaps unexpected (Fox & Duggan, 2012). As of May 2013, the prevalence of smartphone ownership overall had eclipsed that of basic phones; three out of five Americans then owned one (Smith, 2013). One study found 70.7% of nearly 250 homeless emergency department patients in Connecticut owned smartphones (Post et al., 2013).

Health-related, smartphone apps are becoming ubiquitous in the market today but only very recently, the phenomenon of incorporating care management strategies into app technology is becoming apparent. In a webinar presentation through the Health Information and Management Systems Society, Ranney (2014) reported 90% of high-risk patients desire a tech-based platform to improve their health, 50% expect mHealth to help them manage chronic conditions, and 9% had already used text-based, health-related reminders. The challenge for the future, as presented in the webinar, is to develop an evidence base for this type of technology outside of randomized, controlled trials in a real-life clinical setting, and devise ways to increase acceptability by providers by integrating these interventions into the clinical workflow.

The FQHC employed three physicians, two nurse practitioners, and one physician assistant in addition to many support staff. Staff at the clinic were informed of the intent of the project. Most closely associated with it was one of the leading physicians, Dr. Peter Christensen, and the project director (Jon Gibson BSN, Doctor of Nursing Practice (DNP) student at Grand Valley

State University) along with selected administrative support personnel which included medical assistants and medical records staff.

Outcome measures of interest were, primarily, whether MyCare enrollment and use could be successfully increased at the clinic and secondarily, the amount of time needed to demonstrate the portal and register patients on site. The long-term goal beyond this demonstration project was that through portal use, patients will improve in self-care management by being more active participants in their care and employing healthy behaviors such as attending clinic visits more frequently.

Potential Result of the Project

Wagner's Chronic Care Model provided the theoretical basis for the intervention and is discussed in Chapter Three: Conceptual Framework. Whether or not the technique for improved MyCare enrollment was successfully implemented at the clinic was be the primary outcome as suggested by the Promoting Action on Research Implementation in Health Services (PARIHS) framework. Successful implementation is a concept within the PARIHS framework that represents the function of interactions between evidence, context, and facilitation. This is discussed in more detail in Chapter Four: Methods. Successful implementation of MyCare involved the realization and uptake of the innovation into clinical practice as measured by actual use, clinician perception of value and usefulness, and the modifications that were made to the innovation to enhance or bypass barriers.

The next chapter focuses on the demographics and characteristics of patients who use portals, efficacy of patient portals to improve self-care management, and strategies that have been attempted by clinics to increase patient adoption and acceptance of portals. A gap in portal use was discovered in that underserved individuals with lower socioeconomic status utilize portals least frequently (Ancker et al., 2011; Goel et al., 2011; Lyles et al., 2013; Osborn, Mayberry, Wallston, Johnson, & Elasy, 2013; Ronda, Dijkhorst-Oei, Gorter, Beulens, & Rutten, 2013; Sarker et al., 2010). This made the FQHC in Holland, Michigan an ideal venue to attempt an intervention which could address this disparity because the population of patients fits the description of those who would be least likely to use MyCare.

CHAPTER 2

LITERATURE REVIEW

Literature Regarding Patient Portals

The phenomenon of patient portals is relatively new. The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 was intended to promote adoption and use of electronic health records. Through the HITECH Act, CMS developed criteria by which providers could prove “meaningful use” of certified electronic health record technology (CEHRT) in stages resulting in significant financial incentive (HealthIT.gov, 2014). As discussed in the introduction, patient portals were necessary to achieving meaningful use stage two requirements for CMS, which the FQHC in Holland, Michigan was attempting to do. Portals are secure online websites patients can access 24 hours a day that facilitate self-care management by allowing access to providers via secure messaging, appointment scheduling, medication refill requests, and online medical record viewing, among other features (HealthIT.gov, 2014). Improving and increasing patient-centered care was the impetus behind the CMS promotion of patient portals. This chapter will provide a review of the current state of the science relative to patient portal efficacy, characteristics of patients that use them, and strategies for processes attempted at the primary clinic level to improve patient uptake or portals.

Search Methods

The strategy for this review involved searching the Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE (Web of Science), PubMed, PsychInfo, Cochrane, grey literature (Mednar), and Google Scholar databases for all studies in English related to patient portals and improving their adoption or uptake. Searching was limited to studies from 2010 to the end of the literature search in 2015 since the most relevant literature regarding portals seemed to begin in 2010. Keywords and combinations of keywords used in the search were patient, portal, improve, effect*, impact, demonstrate, and adopt. Over 150,000 citations in total throughout these databases resulted from the term “patient portal.”

The use of the word “patient” clearly influenced the number of articles so when the term “patient portal” was specified, the most relevant articles climbed to the top of the searches. Despite thousands of results from this type of search, the number of articles specifically reflecting the term “patient portal” diminished quickly in each database, making the process simpler. Abstracts were scanned according to the inclusion and exclusion criteria listed below. In addition, manually searching reference lists of selected articles led to a final count of 19 articles, 4 of which were systematic reviews.

Inclusion criteria were broad, encompassing any studies related to patient portals. Systematic reviews that evaluated randomized controlled trials (RCTs) were desired although other designs were not excluded. The goal was to find studies outlining the characteristics of patients who use portals and interventions that had been attempted to improve their acceptance, as well as to discover if the use of portals had been successful in helping manage chronic conditions. Studies involving underserved populations were important to find due to the relevance to the population in question for this project. Broad inclusion criteria allowed for flexibility and prevented overlooking studies that may have shown the use of portals to be successful in managing chronic disease.

Literature was excluded if the intervention did not involve at least some relation to patient portals and increasing their use, or their effect on chronic disease management. The newness of the technology acted as a self-limiting criterion as data were limited regarding portal use until well into the 2000s. Studies were organized into categories reflecting characteristics of portal users, techniques to attempt improved enrollment, and overall effects of patient portals.

Critical Appraisal

Systematic reviews were evaluated for quality using the Assessing the Methodological Quality of Systematic Reviews (AMSTAR) tool developed by Shea et al. (2007). This tool scores systematic reviews across 11 items found to have face validity according to Shea et al. (2009). These items evaluate study quality related to design, literature search, methodology, and biases. All 11 items are answered with either yes, no, cannot answer, or not applicable. The 11 items are presented below. Interrater reliability between two reviewers among the individual AMSTAR tool items achieved a mean kappa of 0.70 (95% confidence interval [CI]: 0.57, 0.83) with an intraclass correlation coefficient of 0.84 (95% CI: 0.65, 0.92).

AMSTAR Criteria

1. Was an “a priori” design provided?
2. Was there duplicate study selection and data extraction?
3. Was a comprehensive literature search performed?
4. Was the status of publication (i.e. grey literature) used as an inclusion criterion?
5. Was a list of studies (included and excluded) provided?
6. Were the characteristics of the included studies provided?
7. Was the scientific quality of the included studies assessed and documented?
8. Was the scientific quality of the included studies used appropriately in formulating conclusions?
9. Were the methods used to combine the findings of studies appropriate?
10. Was the likelihood of publication bias assessed?

11. Was the conflict of interest included?

Two of the four studies scored well, over 6 (Ammenwerth, Schnell-Inderst, & Hoerbst, 2012; Goldzweig et al., 2013), the other two scored 6 or less (Amante, Hogan, Pagoto, & English, 2014; Otte-Trojel, de Bont, Rundall, & van de Klundert, 2014). Limitations reported by studies generally involved heterogeneity of patient populations, interventions, and outcome measures. A variety of methodologies including RCTs are represented in this literature review, as well as several qualitative studies. However, only four studies specifically reference a population similar to the one at the clinic (Dhanireddy et al., 2012; Goldzweig et al., 2013; Sanders et al., 2013; Schickedanz et al., 2013).

Results

Characteristics of Portal Users

The eleven studies presented in this section involved demographic characteristics of populations that have traditionally accepted patient portals to a higher degree. In general, these studies reveal Caucasian patients who are of a higher socioeconomic status tend to be more motivated to use patient portals. This reveals a gap in the use of portals for a large percentage of Americans who are underserved and could benefit a great deal from use of a portal.

Osborn, Mayberry, Wallston, Johnson, and Elasy (2013) observed 75 adults with type 2 diabetes to identify differences between portal users and non-users, frequency of portal use, and any effect of portal use on glycemic control. How and why patients used the portal was assessed qualitatively. Portal users were most often Caucasian (62.7%), privately insured (78.7%), and had annual incomes over $60,000 (42.1%). These differences in characteristics were all highly significant ($p < .01$). This presents a significant gap in engagement for those with chronic conditions who may need the most healthcare assistance, namely lower income, underserved patients with no or limited insurance. No difference was found in hemoglobin A1C between portal users and non-users but hemoglobin A1C did show improvement within the portal use group ($p = 0.02$). Specific A1C measurements were not reported although most (62%) were already less than 7.0%. Features of the portals that non-users were most interested in employing included secure messaging to schedule appointments, and viewing protected health information such as lab tests and medication lists. Users most frequently reported the ability to request online medication refills as of value.

One of the largest and most successful patient portals in terms of patient and provider satisfaction in the United States exists within the Kaiser Permanente system in California. Sarker et al. (2010) utilized the records of over 14,000 patients of diverse ethnic backgrounds with type 2 diabetes, to examine the relationship between health literacy and use of patient portals. Only 28% of the sample reported ethnicity as non-Hispanic white. Participants were surveyed regarding their experience signing on to their portal combined with health literacy scores from a validated tool measuring problems with reading, understanding, and filling out forms (Chew, Bradley, & Boyko, 2004; Chew et al. 2008). Those with self-reported limited health literacy (scoring ≤14 out of 15 throughout the 3 problems) had higher odds of never registering for their portal (OR = 1.7). Even among registered portal users, limited health literacy was significantly associated with never signing on to the portal (OR = 1.4).

One of the major contributions of this study is that it parsed out the proportion of participants who engaged in each step in the portal process: (a) registration, (b) logon, and (c) use of each of the features like emailing providers, requesting medication refills, scheduling appointments, and viewing medical records. Despite limitations in health literacy, 40% (n = 5671) of participants did register for the portal and 76% (n = 4311) of the 5671 participants went on to logon and become active users. Viewing medical records was the most frequent portal feature used; followed by medication refill requests, emailing providers, and scheduling appointments.

Lyles et al. (2013) conducted a secondary analysis of the data collected by Sarkar et al. (2010) of over 14,000 diabetic patients to determine levels of trust in providers. Trust was measured using a single, validated item in the Trust in Provider scale developed by Thom, Ribisl, Stewart, and Luke (1999). In this study of Latinos, Caucasians, African Americans, and Asians; Latinos were noted to use patient portals most when levels of trust in the provider were high (RR = 1.51). Trust in provider influences overall secure messaging use as well in Caucasians (RR = 1.29) although this relationship is much less so for other races (RR = 0.55).

These findings suggest a lack of uniformity across demographic groups in the influence that trust in the provider has toward portal use. The Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey was also used to measure overall patient-provider communication and levels of provider listening, respect, explaining things well, and spending enough time with patients. Overall ratings were high, the mean score being 81 out of 100. Lyles et al. (2013) also mentioned that providers who engage in high rates of secure messaging and encourage their patients to use their portal influence portal use rates. Despite the aggressive push from Kaiser for patients to adopt their portal, the digital divide exists between individuals with lower or higher socioeconomic status in rates of portal acceptance. Since this study was cross-sectional, relationships of high trust and communication leading to portal use, or vice-versa, were found, but causality could not be established.

In a 2-year study using data from the Institute for Family Health of over 74,000 patients, Ancker et al. (2011) reported similar findings. Caucasians with higher levels of income, education, and better insurance made use of a patient portal more than minorities of a lower socioeconomic status ($p < .05$). Interestingly, only 16% ($n = 11,903$) of participants had received a portal access code from their provider, and 60% ($n = 7138$) of these went on to register. Multivariate logistic regression revealed that women who were white, insured, and English speaking, with more chronic conditions, were most likely to receive access codes for the portal (OR = 1.06, 1.60, 4.10, 2.80, 1.15 respectively).

Barriers to enrolling in a patient portal were assessed by phone interviews of 159 patients of an urban internal medicine clinic who had not enrolled within 30 days of invitation to do so (Goel et al., 2011). Nearly three-quarters of participants were female and had a college education; half were black; and the average age was 51 years. Sixty-three percent reported a lack of information or motivation and thirty percent stated they had a negative view of portals. After adjusting for age, gender, education, and chronic disease state, blacks were less likely than whites to value the self-management features of portals ($p < 0.05$). These authors suggested ensuring patients understand the features of a portal and that attitudes toward the technology should be addressed.

Four focus groups of urban patients ($N = 30$) in Boston involving a wide variety of demographics were interviewed to gauge attitudes toward having access to their medical record through a portal (Dhanireddy et al., 2012). Patients in this qualitative study reported an overwhelmingly positive response to the concept of online access to their records. Negative themes identified by the focus groups included: (a) cynicism toward full transparency of their providers, (b) privacy and security concerns, (c) increasing the clinician’s workload, and (d) technology replacing face-to-face contact. Several patients also expressed fear of knowing what was actually in the record. Nevertheless, several positive themes identified by the patient groups included a sense of empowerment, an enhanced understanding of health, convenience, and a bolstered relationship with their providers. These patients felt a portal would stimulate interest in better self-care management. Despite a small sample size, this study involved a vulnerable, urban population with chronic illness, which is similar to that of this project's target population.

Amante et al. (2014) systematically reviewed 16 articles evaluating characteristics, barriers, and facilitators related to portal enrollment and use among diabetic patients identified between 2005 and 2014. Nine studies were quantitative, three were qualitative, and four were mixed-method studies with a total sample size of N = 59,303. This review scored 6 out of 11 using AMSTAR criteria. Patients enrolled in and utilized portals more frequently when providers encouraged and engaged patients in portal use. Notable barriers to enrollment and utilization from the patient perspective included a lack of awareness of the availability and functionality of the portal, and limited buy-in to the benefits of portals by providers and patients. Other notable factors included inadequate internet access and difficulty manipulating technology. Regarding a face-to-face demonstration of a patient portal coupled with immediate registration, the authors concluded, "leveraging teachable moments and using time spent in waiting rooms to introduce and educate patients with diabetes on portal technology create potential to improve the quality and efficiency of care" (p. 791).

Underserved patients' attitudes toward email communication with providers were assessed by interviewing 408 patients of safety net provider clinics in San Francisco whose median annual income was less than $20,000 (Schickedanz et al. 2013). The clinics were all FQHCs. Seventy-one percent of respondents indicated they were interested in using email to communicate with their providers, yet only nineteen percent of these who expressed interest reported having used email to correspond with their providers. Even among the small percentage of patients who did not use email, 40% (n = 22) stated they would use email to communicate with providers if it were available to them. This demonstrates an unmet need. Another theme in this study, as in others, was that participants felt email contact would increase the burden on healthcare workers and the face-to-face visit would suffer. Differences among racial lines in this study were consistent with the other studies reported in this literature review. Nearly all the patients interviewed indicated they would like to receive health-related text message reminders. Training for patients who may not be at ease with technology was recommended as a strategy which could be beneficial in improving email communication. The authors reported that access to internet and email would not likely be a primary barrier to adopting web-based communication strategies in this population.

Through their surveys of 654 patients in seven safety net practices in Rochester, New York, Sanders et al. (2013) found that race was not associated with interest in portal use. Internet use was the most influential factor for portal interest. Almost half, 45.2% (n = 295), of all respondents used the internet daily on their own computers and 47.7% (n = 312) reported they were not interested. Obtaining test results online received the highest interest among 84% (n = 550) of respondents, followed closely by requesting medication refills (82%, n = 537), and scheduling appointments (70%, n = 458). A large proportion of individuals, 62% (n = 405), stated they were interested in having their provider demonstrate how to communicate via the portal. Those with moderate interest in internet use were nearly three times as likely to exhibit portal interest (OR = 2.7) as those with low internet use, while those with high internet interest were almost 10 times as likely to desire using a portal (OR = 10.07). Therefore, if almost half of underserved patients use the internet on a daily basis, there seems to be a high likelihood they will use a patient portal as well.

Nearly 13,000 people with diabetes within 62 primary care practices in the Netherlands were sent questionnaires between 2011 and 2012 to gauge diabetes care self-management among those who had requested a login to their portal, compared with those who had not (Ronda, Dijkhorst-Oei, Gorter, Beulens, & Rutten, 2013). Data were analyzed from 1,390 respondents according to several criteria: (a) satisfaction with diabetes care, (b) diabetes-specific distress, (c) health status, (d) diabetes knowledge, and (e) self-efficacy. As might be expected, younger, more highly educated patients who had working knowledge of diabetes, greater perception of diabetes burden, and higher self-efficacy levels, requested a login most frequently ($p < .001$). The disparities gap in use of portals for self-management of chronic disease is evident in this study as underserved patients may be less motivated to manage their conditions well.

Effect of Portals

The next five articles help define the contribution of patient portals toward improving preventive care and overall outcomes. Overall, it appears that patients do appreciate being able to utilize portals to manage their own care and maintain it with regularity as opposed to an episodic, transient nature. However, initial evidence is equivocal and more research is needed to truly understand the effect of portals on healthcare in general.

Patient portals can improve the outcomes of uncontrolled, chronic conditions through a variety of mechanisms. Otte-Trojel et al. (2014) performed a systematic review of 32 articles from 2003 to 2013 evaluating patient portals. These included 18 randomized, controlled trials (RCTs). The authors' claim was that a "realist review method" would help to discover how, for whom, and in what circumstance patient portals work. However, this review was of mediocre quality, scoring only 5 out of 11 AMSTAR criteria. Of the RCTs, 15 demonstrated positive effects of portal use on clinical outcomes, adherence to treatment, provider-patient communication, patient empowerment, and patient satisfaction. There were four mechanisms the authors cited which seemed to be responsible for the improvements: (a) patient insight into their information, (b) the activation of said information such as through the use of reminders, (c) continuity of care, and (d) convenience.

There were no adverse consequences found through implementation of portals, although in terms of quality, the strength and consistency of positive effects in some of the studies was suspect (Otte-Trojel et al., 2014). Higher rates of healthcare utilization were seen, suggesting that patients may seek to manage their conditions more proactively and in a preventive fashion, as opposed to episodic care. Regarding the appropriateness of portal use in underserved populations, the authors wrote, “paradoxically, patient portals may have higher impact in more fragmented contexts that are less conducive to patient portal implementation and use” (p. 756).

A systematic review of the impact of portals on patient care revealed 4 pertinent controlled studies out of a potential sample of 1,306 articles from 1990-2011 (Ammenwerth et al., 2012). The authors reported surprise that there were so few studies, given that portals have been in use for some time. The only exclusionary criterion was that the CEHRT had to allow patient access to medical records. No meta-analysis was completed because of heterogeneity in outcome measures. This study scored 9 out of 11 using AMSTAR criteria. Improvement in health outcomes was not found to be significantly different between portal and control groups. Endpoints that were significant included: (a) a decrease in clinic visits and phone calls from patients, (b) an increase in the number of messages received, and (c) better adherence to treatment.

Yet another systematic review involved 14 RCTs, in addition to 32 articles employing other study methods. This review provided mixed evidence for the effect of portals on outcomes and patient satisfaction, likely due to the newness of the technology (Goldzweig et al., 2013). No meta-analysis was completed because of variability in portal capabilities and heterogeneous results. Instead, groups of articles were described. This study scored 8 out of 11 using AMSTAR criteria. The authors claimed more time and experience with the use of portals is necessary to truly evaluate their effects on health outcomes. High-quality studies that did show improvement in diabetes, hypertension, and depression combined portal use with care management. Use of portals was consistent with other studies that show patients of ethnic minority background with lower education levels use portals less often. However, the authors did note a higher level of use by those with multiple chronic conditions. Low patient-perceived value in portals remains a barrier to enrollment and use. Very little information was found by these authors to indicate that the methods practices have employed to date to enroll and engage clients have improved portal enrollment.

In a qualitative study of 17 patients and 64 health care providers, respondents were asked five open-ended questions about their experiences with the same portal (Urowitz et al., 2012). Four themes emerged through questioning: (a) facilitators of disease management; (b) barriers to use such as slow internet access, and the time and difficulty involved in data entry; (c) patient-provider communication; and (d) recommendations for portal improvements. Patients felt the portal helped them make small but important changes in their self-management, such as being motivated to change diet and exercise regimens after seeing blood sugar or weight parameters in their records. The portal itself seemed user-friendly and easy to navigate, but patients did demonstrate a degree of apathy towards it. Providers reported the use of the portal was time-consuming and there was concern diabetes may not be the right condition to target for improvement as they perceived many of their patients controlled their disease well already. Other health professionals besides physicians: nurses, dieticians, nurse practitioners, and diabetes educators, interacted more frequently with patients than did their physicians, although patients reported they wished they had more contact with their physicians. Physicians believed the portal to be of more benefit to the patients for self-management than for significant provider use. In general, recommendations for improvements in the portal revolved around greater training for patients and support for its use.

In a longer-term study of 422 registered patient portal users over three years, Nagykaldi, Aspy, Chou, and Mold (2012) found more patients received recommended preventive care measures (aspirin use or vaccinations) via the use of reminders from the portal despite having fewer overall visits than a control group who received no reminders (84.4% versus 67.6%, respectively; $p < 0.0001$). The 13-item Patient Activation Measure developed by Hibbard, Stockard, Mahoney, and Tusler (2004) and the CAHPS were used to assess patient activation and perception of patient-centeredness of care. Participants in this study were not representative of underserved populations. Only 22% ($n = 93$) were of an ethnic minority group and 80% ($n = 338$) had some college education. Yet, this was a RCT of some quality. Most patients found the portal easy to use (90%, $n = 380$), considered it a valuable resource (83%, $n = 351$), and thought that it fostered greater participation in their own care (80%, $n = 338$). This study shows the potential benefit of portals in improving preventive care and patient activation. The length of the study, 3 years, was also beneficial due to the difficulties inherent in measuring portal usage in the short-term.

Techniques for Improved Portal Adoption

The final four articles provide a brief introduction to techniques that have been employed to increase portal use and adoption. There have not been many published studies related to this phenomenon; hence the knowledge gap in understanding how best to implement portals is evident. Some of the marketing tactics that clinics have used to varying levels of success are postcards, brochures, and posters; staff persuasion; videos; emails; and the like. By far, the greatest effect comes from providers encouraging patients to consider use of their portal.

Demonstrating the use of a patient portal by video during an office visit, North et al. (2011) were able to show a higher rate of patient registration into their portal when compared to a paper instruction sheet or no portal promotion (11.7%, 7.1%, and 2.5% respectively; $p < .0001$). Over 12,000 office visits were included in this analysis and patient portal registration within 45 days was the measurement criterion. These authors compared a group receiving a paper instruction sheet about a portal, a group who watched a video demonstration of a portal, and a control group receiving no portal demonstration. While waiting in the lobby, the video demonstration group watched a two-minute video reflecting the capabilities of the portal. The researchers did not attempt registration at this time but measured enrollment within 45 days after the clinic visit. Nevertheless, the effect persisted six months after the intervention. Those who had seen the video initiated contact with their providers via secure message more often than those who received paper instruction or none (3.5%, 1.2%, 0.75% respectively; $p < .0001$). Although significant, these are very low percentages, and assisting patients with registration may prove beneficial.

Krist et al. (2014) outlined strategies eight primary care clinics employed to achieve a significant linear increase in portal registrations by 1% monthly over 31 months ($p < .001$). Some of the workflow changes that showed the most dramatic improvement included a team-based approach. Front office staff stapled information cards to registration sheets, nurses discussed the portal and registration instructions, and clinicians reinforced the importance of the portal. Clinics that relied on providers to increase registrations did poorly. Buy-in of all providers and clinic staff was essential in promoting portal use. The attitude of providers toward the portal was the most significant factor. The most influential hindrance to promoting portals was competing demands for staff time to encourage and educate patients on use of their portals.

Wald (2010) observed four different practice enrollment techniques and found that posters or postcards presented at the time of a patient visit are minimally effective unless coupled with enthusiasm from providers. Staff and provider knowledge and enthusiasm about a portal product impacted patient adoption, as did providers having their own portal account to understand portal features. The most successful of the four practices viewed the portal as critical to the process of care and explained to patients that the portal was an extension of their services, so patients would receive prompt, high-quality service.

A pediatric clinic in Kansas demonstrated their patient portal to 171 adult, parent participants (Ahlers-Schmidt & Nguyen, 2013). Most participants (72%) had not heard of a patient portal prior to the demonstration. Participants were given a demonstration of the patient portal in the waiting room prior to their child's appointment. There were no details given regarding precisely how the demonstration was presented. The average age of participants was 28 years old and 40% were white, 22% Hispanic. Following demonstration of the portal, 92% of participants reported it was easy to use. Messaging the provider was the most frequently used feature. Parents planned to view the medical records and laboratory results for their children and use the portal in the future (62%).

Synthesis

The available evidence to date appears to indicate that underserved patients of ethnic minority backgrounds, with limited education and low income, are the least likely candidates to use patient portals (Ancker et al.,2011; Lyles et al., 2013; Osborn et al., 2013; Ronda et al., 2013; Sarker et al., 2010; Schickedanz et al., 2013) although Lyles et al. (2013) determined Latinos demonstrate higher levels of trust in their providers. Sanders et al. (2013) did not find a relationship between race and portal use but instead noted a tenfold increase in the potential to use a portal among those who accessed the internet on a daily basis, regardless of race. Otte-Trojel et al., 2014 claimed that patients in fragmented care settings who are least likely to adopt and use a portal may stand to benefit the most. This finding was echoed in a survey of 76 portal users by the California Healthcare Foundation claiming that patients with chronic conditions and limited education and income were most likely to experience the positive benefits of access to their health information (California Healthcare Foundation, 2010). This adds support to the appropriateness of the targeted population for this project.

As demonstrated in the introduction, FQHC clinic patients in Holland, Michigan qualified as a vulnerable population and were likely to exhibit the highest risk in terms of morbidity, mortality, and expense due to uncontrolled chronic conditions. One caveat to the information presented in this review is that the science was nascent enough that this body of evidence is fairly equivocal. Much work is needed to fully evaluate the influence portals can have on population health. Yet, from the data presented, patients seemed to appreciate being able to email providers, view medical history information, and request medication refills the most; scheduling clinic visits least (Osborn et al., 2013; Sanders et al., 2013; Sarker et al., 2010; Schickedanz et al., 2013). This may be simply because clinic visits take the most time and effort on the part of the patient.

When this project began, portals were viewed as a necessary tool for improving patient-centered care and improving self-care management. The studies presented here were of reasonable quality to provide the evidence that an intervention designed to improve portal enrollment rates among underserved populations would be beneficial to that population. Regarding interventions to increase the use of portals by patients, two studies advocated for provider demonstration of portals (Ahlers-Schmidt & Nguyen, 2013; North et al., 2011) and two cited the importance of provider enthusiasm for a portal as crucial (Krist et al., 2014; Wald, 2010). Unfortunately, there were no studies specifically evaluating the intervention of choice for this project which involved the combined face-to-face demonstration of a portal, coupled with immediate, onsite registration assistance. Nevertheless, sufficient data were available to support that encouragement from providers to use a portal, along with registration assistance and training on how to use it, could be successful.

Relevance to MyCare

The clinical site for this project lacked a uniform method for providing patients with access to the portal other than front office staff mentioning MyCare to patients as they came in to register for their visit. Again, patient characteristics of those most likely to use a portal did not match well with the majority of the underserved population at the clinic. Facilitating the portal registration process for patients and demonstrating portal capabilities was hoped to increase portal use among this population.

The next chapter discusses the theory underlying the MyCare process improvement and the framework selected as a prospective guide to implementation of the intervention into the clinic. The intervention itself was very simple and cost-effective. There was no cost other than the few minutes it took to demonstrate the portal with patients and to help them register. However, in a busy primary care practice, even a few extra minutes can be burdensome to staff. If face-to-face demonstration with patients can improve enrollment and use of MyCare, the increased staff time may be offset by the incentive money offered by CMS for successful stage two MU attestation. Sustainability of the intervention could then be realized as it would be financially beneficial for the clinic to ensure MyCare demonstration continued.

CHAPTER 3

CONCEPTUAL FRAMEWORK

Conceptual and Implementation Frameworks for the Project

Wagner’s Chronic Care Model (CCM) and the Promoting Action on Research Implementation in Health Services (PARIHS) proposed by Kitson and colleagues in 1998 were used in this project to guide the implementation of the MyCare intervention in the primary care setting. This chapter will discuss how some of the components of the CCM interact to facilitate the improved self-care of activated, informed patients; and how the PARIHS framework elements work together to promote successful implementation of a care management tool in the primary care setting.

Chronic Care Model History

Wagner’s Chronic Care Model originated through a review of literature in the early 1990s undertaken by the MacColl Institute for Healthcare Innovation (Improving Chronic Illness Care, n.d.). The Robert Wood Johnson Foundation (RWJF) sponsored a 9-month review of the CCM by an advisory panel of experts, comparing elements of the model to chronic illness care management strategies employed throughout the U.S. The CCM was refined and a final publication was released in 1998. Improving Chronic Illness Care (ICIC) is a program directed by Dr. Wagner through the RWJF which seeks to help health systems implement the CCM to better serve low-income persons. Continuing quality improvement efforts, research, and dissemination of results pertaining to CCM implementation occur today under the auspices of the ICIC.

Transforming the delivery of health care from a sick-care system to one that manages chronic illness more effectively is the overall goal of the CCM. Lack of care coordination, lack of active patient follow-up by rushed practitioners, and patients poorly trained to manage their chronic illness contribute to the ineffectiveness of chronic illness management in the U.S. (ICIC, 2014.). The developers of the CCM believe the model can aid in successful management of chronic illness.

A well-known diagram, the care model (Figure 1), reflects the interaction of the informed, activated patient with a prepared, proactive practice team resulting in improved patient outcomes. The four primary components of the model involve self-management support, delivery system design, decision support, and clinical information systems within community and health systems. These four elements; when operationalized in a patient-centered, evidence-based, timely, efficient, and coordinated matter; facilitate the productive interactions between patients and practice teams mentioned above.

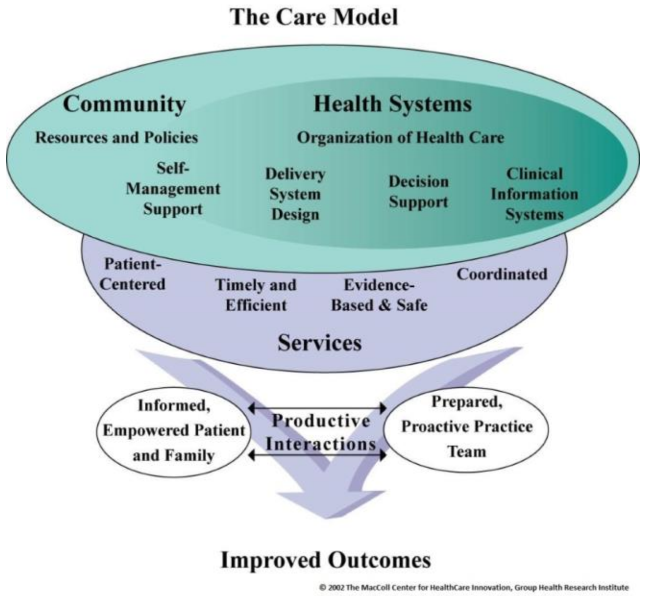


Figure 1 The Chronic Care Model

Developed by The MacColl Institute, © ACP-ASIM Journals and Books, reprinted with permission from ACP-ASIM Journals and Books.

Four Main Chronic Care Model Components

Wagner et al. (2001) developed the four main components of the CCM: self-management support, delivery system design, decision support, and clinical information systems. Self-management support involves patient empowerment and emphasizes the patient’s central role in goal setting, establishing action plans, and overcoming barriers. Delivery system design incorporates the coordinated actions of experienced clinical caregivers. These authors regarded decision support as the utilization of reminders for overdue services. Lastly, clinical information systems include the use of registries of patients based on chronic conditions. A critical function of these registries is their ability to assist in treatment planning.

In this project, the CCM components to be addressed primarily included self-management support and delivery system design. MyCare can empower patients to self-manage their chronic illness more effectively by allowing seamless access to their providers through secure messaging, appointment scheduling capability, and tools for requesting medication refills. Performing the demonstration intervention and measuring the time it takes and potential impact on workflow reflected the concept of delivery system design. The demonstration intervention is detailed in Chapter Four: Methods. If the demonstration did improve patient enrollment and use of MyCare, a case could be made that the clinic should consider adjusting staff workflow to incorporate the demonstration in a sustainable way, in essence redesigning the care delivery system.

The Veteran’s Affairs (VA) system works to achieve quality chronic care and is a good care setting to use in benchmarking. Jackson and Weinberger (2009) discussed the intersection of the VA and the CCM. They stated that in 1995, organizational changes unified the VA from a system of individual, specialty care silos, to a group of 21, regionally-based Veterans Integrated

Service Networks (VISNs). These VISNs, according to the authors, utilize the Computerized Patient Record System (CPRS), “one of the most advanced electronic health record systems in the United States” (p. 930). This integrated EHR allows any VA provider to view records on any patient within the VA system, thus supporting chronic illness care as suggested by the CCM.

In addition, the VA employs the web-based patient portal My Health*e*Vet that allows patients access to their health records and connects patients with their providers, a key component of self-management support. The VA boasts improvements in quality care outcomes as a result of this portal and CPRS use. Flu vaccination rates among patients older than 65 increased from 67% to 84% from 1997 to 2008. In the same time period, the percentage of patients with blood pressure less than 140/90 mmHg increased from 41% to 75%.

Nazi, Turvey, Klein, Hogan, and Woods (2014) reported survey data that showed the majority of My Health*e*Vet users felt that viewing their clinical notes helped them understand their conditions better, remember their plans of care, adhere to medication regimens, and prepare for clinic visits. The VA is a good exemplar showing how portal use can improve patients’ self-care management. Successful operationalization of the CCM components self-management and delivery system design by the clinic can lead to improved health outcomes as the VA has shown.

Research on the Chronic Care Model

A systematic review of 39 studies employing components of the CCM in diabetes care revealed an improvement in at least one diabetes outcome measure in 32 of its 39 studies (Bodenheimer, Wagner, & Grumbach, 2002). Five studies included in the review utilized all four primary CCM components. An improvement in patient outcomes was realized, although the same result occurred in most studies that included less than four components, making it unclear exactly which components are critical to the model. These authors reported that a financial benefit for ambulatory clinics utilizing CCM components in a fee-for-service environment might come from increased preventive care visits stemming from reminders and chronic condition self-management support. Better care can reduce specialty referrals and increase patient satisfaction. These in turn could encourage patients to continue as faithful customers of a primary care practice.

The use of self-management support and delivery system redesign resulted in a 56% decrease in hospital readmissions for congestive heart failure (Rich et al., 1995). Similar findings were reported by Stewart, Vandenbroek, Pearson, and Horowitz (1999) and Cline, Israelsson, Willenheimer, Broms, and Erhardt (1998). Asthma self-management support, nurse case management, and education sessions resulted in fewer emergency department (ED) visits and reduced hospital length of stay (Bolton, Tilley, Kuder, Reeves, & Schultz, 1991; Mayo, Richman, & Harris, 1990; Greineder, Loane, & Parks, 1999). It was assumed that vascular complication outcome improvements would only be seen in the long term among people with diabetes but some short term studies showed decreased ED visits due to improved hemoglobin A1C levels and intensive care management (Wagner, Grothaus, Sandhu, Galvin, McGregor, Artz, & Coleman, 2001; Wagner, Sandhu, Newton, McCulloch, Ramsey, & Grothaus, 2001).

Lyles et al. (2011), in a small, qualitative study of eight adults with poorly controlled diabetes, tested a self-care management intervention involving patient smartphones with a nurse practitioner care manager using the four primary CCM components. Individuals were aged 18-75 years but more specific demographic information was not given. Participants were given $500 to upgrade their phones to smartphones and include a data package which they reported was an effective incentive to participation. Although they appreciated being able to connect with their nurse practitioner and felt their care was well-managed, participants felt the smartphones were frustrating and difficult to use. Overly sensitive touch screens and poor sound quality were cited by the participants in addition to problems uploading data and unwanted programs launching unexpectedly. Yet, the sense of increased connection with their practitioners reinforced and intensified patients’ self-care efforts.

Tsai, Morton, Mangione, and Keeler (2005) performed a meta-analysis of 112 studies involving CCM components in the care of those with diabetes, asthma, and congestive heart failure and found interventions using at least one CCM component resulted in improved clinical outcomes and care processes. A more recent systematic review of 82 articles involving use of the CCM showed that the more the primary components of the CCM were utilized, the better the improvement in process and patient outcome measures. However, improvements have been noted even when only self-management support interventions have been used (Coleman, Austin, Brach, & Wagner, 2009).

The most robust improvements in process, patient satisfaction, and outcomes seemed to come from practices that used reminders and a patient registry (clinical information systems), team-based care (health care system), computerized clinical decision support, and self-management support. Lastly, Hibbard and Greene (2013) wrote that building the skills and confidence of patients increased patient activation and the least activated patients tended to gain the most confidence as their role in self-care management was affirmed.

PARIHS Framework History and Elements

The Promoting Action on Research Implementation in Health Services (PARIHS) framework was developed in the late 1990s by researchers in Britain looking to improve the translation of research into clinical practice (Kitson, Harvey, & McCormack, 1998). They proposed that the successful implementation of research depends on the interaction of the nature of the evidence, context of the clinical environment, and facilitation of the process. The most successful implementations of evidence into practice occur in situations where the evidence quality is high, the context is conducive to change, and the facilitator is a strong leader. Conversely, the least successful implementations occur where context and facilitation are low. As long as the evidence and facilitation are strong however, these authors proposed a poor clinical context may be overcome. Figure 2 shows the PARIHS Diagnostic and Evaluative Grid which demonstrates these relationships.

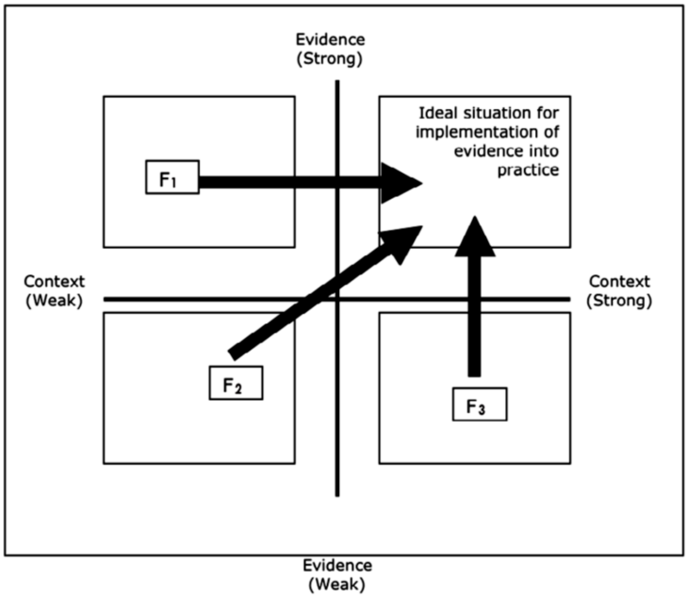


Figure 2 PARIHS Diagnostic and Evaluative Grid

From "Evaluating the successful implementation of evidence into practice using the PARIHS framework: Theoretical and practical challenges," by A. L. Kitson, J. Rycroft-Malone, G. Harvey, B. McCormack, K. Seers, & A. Titchen, 2008, *Implementation Science, 3*, 1-12. Open access but reprinted with permission.

Within the PARIHS framework, the nature of the evidence may be research-based, derived from clinical expertise or patient preference, or based on local information (Kitson, Rycroft-Malone, Harvey, McCormack, Seers, & Titchen, 2008). Implementing evidence requires a team-based approach to negotiation and shared understanding of the benefits of a potential process adoption. The context of an organization varies widely and involves the cultural dynamics of all of its members. The power structures and relationships among staff members and the paradigm or way business is conducted should be evaluated prior to attempting an implementation.

Facilitators are often external to the context and successfully lead with the assistance of an internal champion or champions who have the authority and leverage to move a project forward. Facilitation, as defined by Harvey et al. (2002), is “a technique by which one makes things easier for others” (p. 579). Successful facilitation requires the flexibility to operate on a role continuum from direct, hands-on, practical support to enabling processes and relationships. Some skills and attributes present in an effective facilitator include networking; vision and energy; credibility; being knowledgeable; sensitivity; good communication; patience; and pragmatism (Harvey).

Evidence

Strong evidence is related to high quality research, published guidelines, clinical and patient experience, and local practice information such as quality improvement initiatives (Helfrich et al., 2010). The degree to which research and guidelines are utilized by providers is a good indicator of high tendency toward evidence-based practice and can influence successful implementation. Just as important is whether patients perceive any evidence-based practice to be of value personally and whether they will choose to participate in that practice. Quality improvement data allow practices to identify gaps in care or suboptimal outcomes. Finally, the relative advantage of any practice change should be apparent to that practice; users should be able to observe the innovation in use; and it should be compatible with current workflow to be able to be considered strong evidence in the PARIHS framework (Stetler, Damschroder, Helfrich, & Hagedorn, 2011).

Context

Context, as it relates to healthcare, is the setting in which people receive healthcare services or the environment into which a change is to be implemented (Rycroft et al., 2002). Three sub-elements make up the context component of the PARIHS framework: leadership, organizational culture, and evaluation or measurement. A "transformational leader can alter the prevailing organizational culture and create a context that is more conducive to the integration of evidence and practice" (McCormack et al., 2002, p. 99). A strong context for successful implementation involves a setting with clear sociocultural and structural boundaries with an understanding of who holds power and authority; receptivity to change; and effective decision-making processes and feedback mechanisms (McCormack, 2002).

Facilitation

Facilitation is comprised of four sub-elements: purpose and role of the facilitator(s), and their skills and attributes (Helfrich et al., 2010). As mentioned, the facilitator may operate on a role continuum from task-oriented attainment of a specific goal to a more holistic approach of enabling attitude or work process change. Diagnostic analysis of the needs of a clinic serves to define the necessary purpose, role, and skills of an internal or external facilitator. External facilitators often encounter more success when an internal champion with the power and authority to make change is involved (Stetler et al., 2011). The PARIHS framework advocates clear and regular communication with stakeholders, tracking data collection, maintaining supportive relationships, being available and responsive, credibility, authenticity, and flexibility as essential attributes and expectations of the successful facilitator. Problem solving, listening, negotiating, networking, and persuasion skills are also important.

Successful Implementation

A successful implementation of an intervention, according to the PARIHS framework, involves the level of uptake of the evidence-based practice, degree of adherence to the implementation plan, and the achievement of patient and clinical outcomes (Stetler et al., 2011). Whether the intervention in this project was actually operationalized with sufficient conformity and fidelity to the original plan was assessed. Contextual factors such as the type of evidence-based practice change (provider or organizational system level change) and resources needed to support the uptake of the innovation are outlined in the Discussion chapter to guide future replication of the intervention.

Rycroft-Malone et al. (2013) explained that the exact relationship between evidence, context, and facilitation may likely differ based on the setting and cannot be conscribed as purely linear. The authors reported that patterns of interaction between the players involved in an implementation are dynamic and a successful implementation may not necessarily require high levels of all three elements. Furthermore, a logic model method of implementation, "through its linear and deductive approach to the identification of inputs, processes, and outcomes… does not fit well with the underlying premise of PARIHS, which acknowledges dynamism and the potential for inductive explanation" (p. 37). Accurately defining successful implementation may need to occur iteratively, rather than in a staged approach; taking care to "pay attention to planning, the process, and evaluation of implementation activity" (p. 37). This recent study proposed the extension of the importance of the capabilities, motivation, decision-making abilities, and other qualities of individuals to be integral within each of the three elements, as a new concept within the PARIHS model.

MyCare in Relation to the CCM and PARIHS

Setting

The setting for this improvement project was a FQHC in Holland, Michigan. The FQHC provided primary care to underserved individuals of any race who were generally uninsured or had Medicaid. Providers included three physicians, two nurse practitioners, and one physician assistant. Medical assistants and a few registered nurses (RNs) provided direct patient care and care management duties. Two of the RNs performed full-time care management and one provided diabetes education. Dr. Peter Christensen, family practice physician at the clinic, was considered the internal champion for this project. The project director acting as the external facilitator worked closely with the internal champion at the clinic to mutually develop the methodology for the MyCare intervention.

Roles of DNP Student Facilitator and Physician Champion

During this project, the facilitator and the champion were instrumental in clarifying team member's roles and understanding of the implementation, maintaining clear communication, managing barriers and issues that arose, and garnering an ongoing level of support and enthusiasm for the project. Sustainability or persistence over time of the use of MyCare at the clinical site can help clinicians observe its acceptance and uptake. Direct observation of provider interaction with the intervention and its perceived usefulness by stakeholders could be reported as measures of successful implementation. Any diffusion or informal spread of the intervention throughout the clinic should be observed and noted.

Characteristics of the Population

The patient population at the clinic was very transient. Many migrants frequented the clinic during the summer, then returned to southern states or Mexico during the winter. Missed appointments were a common occurrence and preventive care was almost non-existent. Patients mad appointments when they needed medication refills or some significant acute problem was occurring. Transforming the nature of these clinic visits from one of episodic, crisis care to more routine, preventive visits was one of the main goals and desires of Dr. Christensen who, as discussed, had been frustrated with the episodic, transient, crisis-oriented style of care provided by the clinic. The increased enrollment and use of MyCare by patients was an opportunity for the health care team at the clinic to address these issues. As mentioned in the article by Lyles et al. (2011), an enhanced sense of connection with providers may increase self-care management and change this episodic milieu to one of prevention.

The MyCare portal deftly incorporates aspects of both the CCM and PARIHS frameworks in its functionality. Having a strong evidence base is proposed in the PARIHS framework as being essential for successful implementation. The evidence for the effectiveness of patient portals to improve self-care activities has been presented in the literature review chapter. Overall, there was support for the efficacy of portals to improve self-care. The other two elements: context and facilitation, involved the clinic and actions of the project director as external facilitator and Dr. Christensen as internal champion. These roles are delineated more clearly in the chapter on methodology.

Implications for Future Implementations

The CCM and PARIHS frameworks were well-suited for this implementation project. The time frame required to truly observe improvements in quality health outcomes was beyond the scope of this project. As discussed regarding the processes in the VA, outcome improvement was measured over a decade. This project occurred over just a few months, not long enough to measure improved health indicators. However, much evidence pointed to improved outcomes through use of portals and EHRs.

Components of the CCM are solidly addressed by the MyCare product. The PARIHS framework, although mostly used to retrospectively assess implementation, could be used proactively to guide the implementation of the MyCare process improvement into the clinic. Next, a detailed description of the execution of this pilot project is presented.

CHAPTER 4

METHOD

Method for MyCare Implementation

Early Phase

This project occurred during NextGen EHR adoption at the clinic, which had been ongoing since April, 2011. An upgrade to the system went into effect in September, 2014. The MyCare patient portal had been operational since February, 2014, but patient registration had been difficult and slow to increase. The purpose of this project was to implement a process improvement, to evaluate the effectiveness of a method to increase enrollment and use of the MyCare patient portal. The target population was, as mentioned in the introduction, adult patients of the clinic who exhibited one or more uncontrolled, high-risk chronic conditions. Most of the participants in this project had diabetes but patients with other conditions were not excluded. The method in question was face-to-face demonstration of MyCare with patients during a visit, coupled with immediate on-site registration. This method had not been explicitly demonstrated in the literature although there seemed to be some evidence that provider encouragement coupled with demonstration may be effective to increase patient participation in portals.

At the time of project initiation, the clinic had been minimally successful in achieving stage two meaningful use core measures 7 and 17 (described on page 19), and registration into MyCare had been meager. The primary marketing method the clinic had employed was through posters and brochures discussing MyCare, with minimal encouragement from providers to enroll. This chapter delineates the plan to successfully increase MyCare enrollment and use at the clinic.

Clinic Characteristics The clinical setting for this project belonged to a network of five FQHCs in western Michigan. The organization started in the 1970s and was one of the largest migrant health systems in Michigan, providing over 20 million primary care visits per year. Stephanie Pinkowski, a medical information specialist at the clinic, reported the largest percentage of patients was between 20 and 35 years of age (personal communication, January 20, 2015). Despite the youth of the patients, chronic illness was still prevalent.

The clinic provided services on a sliding fee scale for those with no insurance based on their ability to pay. A large portion of clinic patients also had Medicaid and a select few had Medicare or private insurance. According to employees in the billing department, roughly 60% of clinic patients were uninsured; 30% had Medicaid, Medicare or both; and the remaining 10% had some type of private insurance (personal communication, November 17, 2014). The clinic also provided dental services.

Patients at the clinic were a very transient population, rarely scheduling or attending regular check-up visits for diabetes or other preventive care. Most visits were episodic in nature and were triggered by a need for medication refills or ED follow up. The clinic itself had nearly completed MU stage two requirements by the fall of 2014 but was struggling with core measures 7 and 17 involving secure electronic messaging, and online access to patients' medical records. The clinic planned that the use of their patient portal MyCare would allow them to achieve the required percentages to meet those measures, but patient interest in registration into MyCare had been meager, likely because there was no strategic method employed to engage patients with the technology. As mentioned, the clinic stood to lose thousands of dollars in CMS incentive payments if they failed to successfully attest to stage two MU requirements.

Stakeholder Involvement Discussions began with clinic staff about improving enrollment into MyCare in October, 2014. Subsequent meetings, phone conferences, and multiple emails involving the project director (PD), and Grand Valley State University (GVSU) clinical faculty had occurred up to the completion of the project. These interactions helped clarify the direction and scope of the project.

On November 25, 2014, Dr. Peter Christensen was approached by the PD about implementing this project, and he agreed it was a feasible idea to attempt the process improvement at the clinic. Barriers and facilitators were discussed along with a plan for the intervention and data management. Dr. Christensen was most interested in focusing on the population at highest risk, both physically and from a cost perspective, regardless of diagnosis. One of his greatest frustrations had been the difficulty inherent in the underserved population regarding lapses in maintaining routine visits for chronic illness management. Dr. Christensen had been working on a way to obtain some sort of recall list through the NextGen EHR, but had not been successful. MyCare might become helpful in this regard. Stakeholders included clinic staff and administration, patients affected by MyCare, the PD, and dissertation committee guiding the PD and the project.

Middle Phase

MyCare Functionality

A dummy MyCare account or patients' own accounts were used for demonstration as described in the intervention section. The interface appeared fairly similar on laptop and smartphone. Accessing MyCare via smartphone required using an internet address as there was no MyCare app for smartphones. Ena Gunnink, technical support specialist at the clinic, reported there were many functions that had not been enabled but might be in the future (personal communication, December 2, 2014). One of these was the scheduling feature, which although in the literature appears to be the least important to patients, is still desirable. Gunnink called patients scheduling their own appointments “tricky” and “messy” and not appropriate at the time of the project, and was unsure when or if that would change in the future. Unfortunately, one potentially beneficial feature was not functional as well, the capacity to send text-based reminders.

Yet, many features were workable and easy to use, both in the mobile and computer-based MyCare versions. These included viewing medical record information and test results; secure messaging with providers; requesting medication refills; and viewing upcoming appointment dates. Upon login in both versions, the subscriber saw a home screen, and navigating to various sections was very intuitive and smooth. Multiple links were available to be able to click into messaging, medication refill requests, and scheduling sections. Unfortunately, there were disclaimer popups patients had to navigate through, stating that they should call 911 in case of a medical emergency. These occurred initially, but could be disabled. Drop down arrows were easy to use to specify the clinic and provider patients wanted to message (there were multiple clinic sites in western Michigan).

Unfortunately, medical information specialists at the clinic were not able to provide information regarding the literacy level of MyCare. Evaluating potential participants’ literacy levels was accomplished simply by verifying whether they could read the website information and understand how to manipulate the links and drop-down arrows. Participants with inadequate language ability or little experience with computers were not eligible candidates for the project.

Recruitment Methods and Inclusion Criteria

A Review of Determination through GVSU deemed this project did not meet the definition of research according to the U.S. Department of Health and Human Services (see Appendix C). This project was process-improvement in nature. English-speaking patients with high risk, uncontrolled conditions were identified during clinic visits. These conditions were any of the conditions discussed earlier: diabetes, COPD, heart failure, hypertension, and/or others. The level of comorbidity, rather than any specific condition, was the more important criterion. This was measured by the Charlson Comorbidity Index (to be discussed later in this chapter) and the number of medications.

Very simply, a patient with a chronic condition was asked by either the PD or Dr. Christensen during a patient visit if he or she used email regularly and had reliable internet access. If so, he or she was encouraged to consider using MyCare. Besides speaking English, having internet access was the only definitive inclusion criterion necessary in the project. In essence, the participants self-selected because they were all considered for the demonstration if they used the internet. Current portal users and those who did not access the internet or use email were not eligible. No specific inclusion criteria concerning the chronic nature of a patient's condition was used other than the judgment of the PD or Dr. Christensen as to the potential benefit of MyCare to each individual patient. This allowed the flexibility to cover a wide range of patient conditions.

The initial target sample size was 2 patients per shift over 15 shifts for the enrollment of 30 participants, but this number remained flexible. At the completion of the project, 51 participants had successfully enrolled in total. The patient-portal interface was accessible whether patients primarily use computers or smartphones to access the internet. As mentioned in the introduction, Amante, Hogan, Pagoto, and English (2014) noted that minority patients with lower education and income levels are more likely to utilize smartphones as their main means of connecting to the internet. Details for the portal demonstration process are provided in the intervention section.

Enrolling participants was estimated to take less than 15 minutes each and was the responsibility of the PD. Front office staff provided the PD with instructions on how to use a patient's email to get them registered into MyCare automatically. Once registered and having had a demonstration of the features of MyCare, patients were sent home and encouraged to use the portal to view health information and to message their provider. One of the outcome measures was the time it takes for enrollment and demonstration to occur so that the sustainability of the process and potential integration into workflow could be determined. No payments were made to clinic staff, patients, or the PD. Consent was implied when patients provided their email address for the demonstration of MyCare, and an explanation was given that their information is protected and secure.

Intervention

This process improvement intervention was elegant in its simplicity but proved to be very effective. The PD brought a laptop and smartphone directly into the patient room and was present with Dr. Christensen and the patient during the visit. Three features were emphasized by the PD in an effort to increase the attractiveness of the portal: viewing lab and test results, communicating with providers via secure email, and requesting medication refills. Scheduling clinic visits is another important feature that was not yet available in MyCare but could be in the future. These were the features mentioned in the literature review that appealed most to patients. The PD also mentioned that all messages are secure and go directly into the patient record, guaranteed not to be lost as phone messages sometimes can be. Also, patients would not have to navigate phone trees to make requests or schedule appointments.

If patients agreed to enroll, the PD sat next to the patient for the demonstration and the timer was started. The timer was used to measure the time taken to present the demonstration via the laptop, smartphone, or both depending on the patient's preferred mechanism for connecting to the internet. A standardized temporary username and password provided by MyCare was used to access the screen where login information and security questions could be set as determined by the patient. This information was written by the patient on wallet-sized cards customized by VistaPrint with an appealing look (Figure 3). The patient was encouraged to keep the wallet card secure.

MyCare login info **www.nextmd.com**

User Name

Password

Security question answer

Forgot password answer

Figure 3 VistaPrint Wallet Card

Once successfully enrolled, the patient's own portal home page was displayed and functionality was reviewed. Sending messages, refilling medications, and viewing health information were demonstrated, either on laptop, smartphone, or both, according to patient preference. An actual test message was sent to Dr. Christensen both to demonstrate the process and to help meet stage two MU requirements for secure messaging. Also, a webpage “bookmark” was created on patients’ phones so they could access MyCare more easily. The PD assisted patients with this.

Successfully enrolled patients were sent home and encouraged to use the portal on a regular basis to view health information and message their provider as needed. A three-month window for the intervention began on the date a patient was enrolled using the method described above. All participants had three months to use the portal and use rates were collected retrospectively. Use and enrollment rates were monitored daily by the clinic as noted, and were obtained at the end of the three months to be reported with other data as described below.

Participants were instructed to contact the clinic to discuss with clinic staff or the PD any problems accessing the portal. The PD was the main point of contact for clinic staff and participants if questions arose. All issues that arose were to be dealt with collectively between participants and clinic staff, as facilitated by the PD.

Data Management and Variables

The Charlson Comorbidity Index (CCI) was used to assess the severity of comorbid conditions among participants. The CCI is a widely used, reliable, validated tool that estimates 10-year mortality based on the weights of 17 chronic conditions such as previous heart attack or stroke, pulmonary disease, hypertension, and diabetes, for example (Charlson, Pompei, Ales, & MacKenzie, 1987; de Groot, Beckerman, Lankhorst, & Bouter, 2003). The authors adapted an earlier model from Kaplan and Feinstein (1974) in which an indexed score is given, accounting for age; the higher the index, the greater the risk for mortality within 10 years. A “0” indexed score would reflect no comorbidity, “1” mild, “2” moderate, and “3” severe comorbidity. The authors reported 10-year survival rates among the four strata in increasing severity of comorbidity to be 93%, 73%, 52%, and 45%, respectively (Charlson et al., 1987). The adjusted relative risk of death with each level increase in comorbidity severity was 2.0 [95% CI: 1.6-2.4] (Kaplan & Feinstein, 1974).

Demographic data to be recorded were: age, gender, race, education level, chronic condition, and regular internet use. Quantitative variables included the number of days from enrollment to first use, total number of portal uses in three months, number of prescription medications, and time in minutes for the entire demonstration. For participants who did use the portal over the three month period, the type of usage was recorded as a medication refill request, appointment request, general message, or some combination of these three.

Finally, a visual analog scale (VAS) score regarding participants' perceived ease of use of MyCare, after the demonstration, was included as a percentage. This was reported as a patient satisfaction measure to initially assess participants' perceptions on the usability of the portal. The standardized question posed to each participant was, "having seen the MyCare portal, how easy do you think it will be to use? Please make a mark on the line with this pen." The VAS line ran 100mm, the left end reading, "not easy at all" and the right end, "very easy."

Participants' preferred internet connection method such as laptop, smartphone, or both was collected as well, and termed: interface. Tablets were not considered in this intervention as there were none available at the clinic to demonstrate the portal. The categorical variables gender, race, education level, condition, CCI score, regular internet user, interface, and type of use were categorized numerically as follows:

1. Gender (0-male, 1-female)
2. Race (0-Caucasian, 1-Hispanic, 2-African American, 3-Asian, 4-bi-racial, 5-other)
3. Education level (0-less than high school, 1-high school graduate, 2-some college, 3-college graduate)

4. Condition (0-diabetes, 1-hypertension, 2-COPD, 3-CHF, 4-chronic pain, 5-other)
5. CCI score (0-no comorbidity, 1-mild, 2-moderate, 3-severe)
6. Regular internet user (0-daily, 1-weekly, 2-monthly)
7. Interface (0-laptop, 1-smartphone, 2-both)
8. Type (0-refill request, 1-appointment request, 2-general message, 3-mix)

All protected health information (PHI) was kept in a password-protected excel spreadsheet on site at the clinic under the login belonging to the PD. This spreadsheet was uploaded directly from the clinic to the GVSU private network assigned to the PD, which is a secure network location (N-drive). As an added protective measure, all medical record numbers (MRNs) were coded into project identification numbers at the clinic so that MRNs would not be uploaded into the N-drive. This was a written log kept in the providers' locked office. Therefore, no PHI was exposed. Descriptive statistics were performed to report the demographic characteristics of participants. Logistic regression was used to determine which participants were more likely to utilize the portal and to predict whether the level of comorbidity influences the likelihood of portal usage. All data analysis was performed on campus at GVSU using the Statistical Package for the Social Sciences (SPSS), version 20.

No attempt was made to generalize information to another clinic or population group. The first patient enrolled using this intervention signaled the beginning of the three-month measurement period. Enrollment and use rate reports of patients in MyCare are already monitored by the clinic daily and were accessible to the PD to determine if the process improvement had increased these measures at the end of the three-month period. Written spreadsheet data that was kept in the locked office belonging to Dr. Christensen was shredded after the data had been uploaded securely to the GVSU private network as specified in the data management section. This was witnessed by Dr. Christensen.

Anticipated Barriers

Clinical context Prior to discussions with clinic staff about the possibility of implementing this process improvement, the PD had an opportunity to observe the dynamics and culture of the clinic and its patient population. Clinic staff members were realistic about the limitations of the FQHC and nature of the patient population. Yet, they appeared to be flexible, willing, and able to adapt to new technologies, as evidenced by their adoption of a recent upgrade to their electronic health record. As with any new IT implementation, staff hesitancy to adopt a practice change and the burden of extra time requirements were expected to be barriers.

Participants Concerning the patient population, the transient and episodic nature of many of the patient visits made it seem like MyCare might be a low priority to many patients as they were seen sporadically and often only if medication refills were needed or a significant health concern arose. Patients may not have had regular access to the internet even if they had an email account; this needed to be assessed during the initial contact for the intervention as well. Potential participants may only have had internet access via smartphone.

Ironically, patient population characteristics appeared to influence clinic staff characteristics, which could have affected project implementation. Since patients did not often present for regular follow up visits, the entire milieu of care at the clinic seemed fairly episodic and crisis-oriented, not focused on chronic condition optimization, and certainly not prevention. Therefore, obtaining staff and patient buy-in to the idea seemed a large hurdle. Also, the timing of this project, the fall of 2015, was such that most of the seasonal farmworker population that makes up a large proportion of the clinic population, was missed. Most of these individuals presented for care in the summer months.

Lastly, a potential limitation of this project was acknowledged in that the target sample size of 30 participants may not have made an appreciable difference in overall enrollment and use rates because Dr. Christensen's patient panel (the group of patients assigned to him) numbered in the thousands. Also, a three-month evaluation was not likely a long enough period of time to determine accurate use rates. However, the sample of participants was to be viewed as a microcosm of the overall panel of patients, and a high percentage of them were expected to engage in portal enrollment and subsequent use of the portal. It was expected that if the demonstration intervention was successful within the sample of participants, it could be assumed that greater adoption of MyCare demonstration and enrollment assistance clinic-wide would result in higher enrollment and use rates overall.

Anticipated Facilitators

Attesting to stage two MU requirements was of primary interest to clinic administration as much revenue was likely to be lost for failure to attest successfully. Increasing enrollment and use of MyCare was a high priority for this organization. For attestation, enrollment targets had to hit 50% of prevalent patients and use must have exceeded 5% as measured by the EHR. In addition, stage three MU requirements were expected to rely heavily on the use of patient portals and some intervention needed to be in place to facilitate stage 3 MU in the future (Andrews, 2015).

There was no need for a capital request for this project. The process itself was very simple and essentially cost neutral for the clinic because the EHR and portal were already in place and in use. The only cost was in time spent by the PD to demonstrate MyCare to patients and to assist them in registering. The flexibility and adaptability of clinic staff was observed by the PD when staff adopted an upgrade to their NextGen electronic health record. Coupled with this was the desire on the behalf of the providers to stay as current as possible regarding evidence-based practice. A culture of inquiry was evident, and there seemed to be an awareness of upcoming foci in healthcare for population and community health outcomes and care management, especially self-care. Both of these foci were what MyCare was designed for, and intended to improve.

MyCare enrollment and use percentages for each provider were tallied on a daily basis and easily available, so monitoring these data was straightforward. One problem that emerged nationally with portals as well as EHRs in general is the lack of interoperability between systems. In some regions, patients were required to have multiple portals as systems were not standardized. In western Michigan however, the choices were more limited. According to Dr. Christensen, most providers offered portals that generally belonged to the Epic, eclinicalworks, or NextGen systems, which made portal competition less likely (personal communication, November 25, 2014). Being enrolled in multiple portals was considered to be a situation that would dissatisfy patients. However, keeping regular contact with these patients with chronic conditions could have resulted in time savings overall, as patients often presented after a year or two without care, having myriad clinical issues to work through (Dr. Christensen, personal communication, October 7, 2014).

Pay for performance and accountable care organizations were reimbursement strategies expected to affect primary providers soon after project conclusion and improved clinical outcomes were expected to be central to increasing revenue. Patients themselves were felt to be the drivers of adoption of new technologies in a slow-to-adapt industry such as healthcare. As stated by Bauer, Thielke, Katon, Unützer, and Areán (2014), “patients already believe that HIT and mHealth tools will be an important force in achieving healthcare's Triple Aim, which includes improving accessibility, convenience, and quality of care, while simultaneously reducing healthcare costs” (p. 171). Naturally, the ability of the clinic to sustain the project after its implementation was an issue to be addressed as well.

Late Phase

Measurement Indicators

The PARIHS framework and how it could be used to operationalize and evaluate the successful implementation of MyCare into the clinic has been previously described. Outcome measures for this project included average time to perform the intervention and outcomes data regarding the potential increase in MyCare enrollment and use that clinic medical information specialists monitor on a daily basis. Successful implementation according to the PARIHS framework involved operationalization, fidelity, contextual factors, and diffusion within the clinic. These will now be discussed.

Operationalization involved the degree to which the intervention was actually adopted. Fidelity reflected the degree to which the intervention conformed to or deviated from the plan. Contextual factors included the resources needed to successfully intervene and whether the process was a provider-level change or a clinical delivery system change. Finally, diffusion related to any informal spread of the intervention throughout the clinic.

The CCM concept of self-management support was intrinsic to the MyCare portal as its very nature supported self-care management through its functionality. Delivery system redesign involving the intervention represents a longer-term outcome to measure because changes to workflow will take time to develop. Sustainability of this demonstration project depended on whether the clinic adapted staff roles to accommodate the time to perform face-to-face portal demonstrations with patients. This was also considered to be an area for future nurse practitioner students to pursue, as well.

As compared with the other providers offering usual care, an increase in enrollment percentages for Dr. Christensen’s patients was expected, at least within the sample of participants, as a result of this intervention. Usual care at the clinic consisted of sporadic encouragement from front office staff and providers to the patients to sign-up for MyCare; as well as printed brochures, posters, and postcards explaining how to enroll. Receptionists asked for email addresses from patients for MyCare but no follow up occurred. If they declined, a notation was made in the EHR and no further progress was made. An attempt was made by the clinic to have an interpreter take time with a laptop after patient visits to enroll patients, but for an undetermined reason that process did not occur regularly. For a time some staff were attempting to enroll patients while they waited in the lobby. This was unsuccessful as well. There had not been a consistent method employed to facilitate enrollment prior to the start of this project.

Dissemination

Project outcomes were shared with interested participants and with clinic staff, namely the Chief Executive Officer (CEO). The average time recorded for the demonstration was shared with clinic administration to help determine the cost of staff performing the intervention. A brief cost analysis to determine sustainability is provided in the results section and was submitted to assist the clinic in determining whether the cost of using staff to perform the demonstration would be offset by meaningful use incentive payments.

The PD planned an oral presentation at the clinic if there was interest and at a local Lakeshore Chapter of the Michigan Council of Nurse Practitioners (MiCNP) meeting. Also, an abstract submission was planned for poster presentation to the annual conference of the MiCNP in March, 2016. Copies of this report were made for all members of the dissertation committee, and one for the clinic. A final dissertation defense was presented for the dissertation committee and the general public at the completion of the project. Sharing of the results of the project was also planned with the Michigan Center for Effective IT Adoption (M-CEITA) so that they would be aware of clinical efforts in Holland, Michigan to increase portal adoption. An executive summary was written to present findings and recommendations concisely to the clinic and other agencies as applicable.

CHAPTER 5

RESULTS

As discussed, portals allow patients 24 hour access to their medical records, secure messaging to their providers, medication refill and appointment requests, and more. The primary goal of this demonstration project was to determine whether patient portal demonstration combined with immediate enrollment would improve use rates among a population of low income individuals served by a FQHC. Secondary goals were to assess the time required for the intervention and determine if any participant groups were more likely to use the portal than another. Successful implementation of the demonstration is discussed using the PARIHS framework. A sustainability plan for the clinic is presented as well.

Implementation Timeline

The demonstration project began at the clinical site on September 8, 2015. In 15 shifts with Dr. Christensen over 5 weeks, 51 participants were successfully enrolled in MyCare and received portal demonstration. The 51st participant was enrolled on October 13, 2015. January 13, 2016 was therefore the final date designated as the three month window for collecting data regarding usage of the portal post-enrollment. A three month observation period was designated for each participant for monitoring portal usage. Uses after the three month period were not counted in the total. As of January 13, 2016 only one patient had used the portal outside the three month window, and that participant used it twice.

Barriers

The enrollment into MyCare was not user-friendly or easy. Emails sent from MyCare to patients containing links for changing login information were not sent reliably. When they were sent, there often was no link included for resetting security information. The enrollment process (changing security and login information) was difficult to perform initially on a smartphone; a laptop seemed much more stable. For some reason unknown to the informatics department at the clinic, the temporary username and password used to enroll in MyCare for roughly one-third of potential participants resulted in an “invalid credentials” message. These complications were resolved by the third shift of implementation.

Facilitators

Patients were willing and receptive to staying after clinic visits for the several minutes it took to perform the demonstration. The most effective method for enrollment was with patients who already had an email address entered into the system. The temporary username and password could be entered into MyCare, and security and login information were changed to the preference of the patient and written on specialized wallet cards created by a print shop so that patients would not have to remember login information. However, even for several others who received the “invalid credentials” message, enrollment was achievable by using a password-reset link sent to their email. These findings were included in the report of recommendations presented to the organization’s administration.

Demographic Statistics of Participants

Of the 51 portal-enrolled participants, the majority were Caucasian (70.6%), aged 38 to 47 years (33.3%), high school graduates (54.9%), and had diabetes (41.2%) with no comorbid conditions (62.8%). Males and females were evenly represented (51% and 49%, respectively). The youngest participant in the project was 28 years old, the oldest, 91 (*Mdn* = 49 years). More than half (52.9%) were daily internet users (see Table 1). Inclusion criteria, as discussed in the Methods section, were simply whether a patient used email and had internet access. The chronic condition was not exclusionary. At least two of Dr. Christensen’s patients in each of the fifteen shifts met inclusion criteria, three or four patients in most shifts. The CCI is a validated tool used to calculate comorbidity. The number of prescription medications (see Table 2) was recorded as an adjunct to the CCI scores for comorbidity and to see if there was a correlation between the number of medications and portal use. Table 3 reveals no correlation between the number of medications and portal use.

In the literature review, it was noted that daily internet users were ten times more likely to use a portal than those who use the internet less frequently (Sanders et al., 2013). The participants’ preferred internet interface was distributed fairly evenly among laptop users (33.3%), smartphone users (39.2%), and those who use both (27.5%).

Table 1

Demographic and Descriptive Characteristics of Participants

	n	%
Age		
18-27	0	0
28-37	9	17.7
38-47	17	33.3
48-57	13	25.5
58 and older	12	23.5
Gender		
Male	26	51
Female	25	49
Race		
Caucasian	36	70.6
Hispanic	11	21.6
African American	2	3.9
Asian	2	3.9
Bi-racial	0	0
Education		
less than high school	5	9.8
high school graduate	28	54.9
some college	13	25.5
college graduate	5	9.8
Condition		
Diabetes	21	41.2
Hypertension	4	7.8
COPD	0	0
Chronic pain	9	17.7
Other	17	33.3
CCI score		
No comorbidity	32	62.8
Mild comorbidity	3	5.9
Moderate comorbidity	6	11.7
Severe comorbidity	10	19.6
Regular internet user		
Daily	27	52.9
Weekly	11	21.6
Monthly	13	25.5
Interface		
Laptop	17	33.3
Smartphone	20	39.2
Both	14	27.5
Used portal over 3 months	20	39.2

Note: N=51.

Demonstration Description

The portal demonstration itself ranged from 4.13 to 20.33 minutes (*M* = 10.2, *SD* = 4). The median recorded time was 9.05 minutes so the distribution of times was relatively normal. Factors that affected the length of time were whether patients needed a password reset link or could directly enroll in MyCare, performing the demonstration on both laptop and smartphone, and trying to bookmark the portal on participants' phones. Internet connectivity was not a significant impediment. Phones worked well and the laptop did not "freeze." Table 2 describes the quantitative variables.

Table 2

Summary of Quantitative Variables

	M (SD)	min	med	max	1Q	3Q
# Rx meds	6.7 (4.7)	0	6	21	3	10
Time (min)	10.2 (4)	4.1	9.1	20.3	7	12.4
# Portal Uses	3.1 (3.1)	1	1	10	1	6
Days to 1st use	10.3 (12.3)	0	4.5	44	2	16
VAS (%)	84.6 (14.5)	45	85	100	81	96

Portal Usage

As mentioned in the Methods chapter, the VAS measured participants' perception of MyCare ease of use post-demonstration and was recorded as a mark made by participants on a 100 mm continuum line from not easy at all to very easy. The distance from the far left end of the line to the mark was measured in millimeters and converted to a percentage. The median score of 85% shows participants felt the MyCare interface seemed fairly easy to use. The "# Portal Uses" variable in Table 2 corresponds with the number of portal uses by participants over the three month period. All participants identified during clinic visits as potential candidates were encouraged to receive the portal demonstration, and were successfully enrolled. As expected, few patients had even a basic understanding of the purpose of a patient portal, despite being told about it at registration when they offered their email addresses to front office staff. When the benefits of the patient portal were explained to patients at the end of clinic visits, most were quite eager to learn about it. Each patient expressed a desire to use the portal and thought it was a good idea as a communication tool. None had ever used the portal in the past.

Several patients did use the portal during the three month observation period after they had seen its benefits and ease of use (n = 20). Some patients used portal secure messaging within one week of receiving the demonstration (n = 12). The longest interval from demonstration to use was 44 days. Most of the portal usage by participants during the three month observation period was in the form of general medical questions (45%), followed by medication refill requests (30%). In essence, the demonstration improved the use rate among enrollees from zero to 39.2%. Demonstrating improvement in portal use was the primary outcome measure of this project. Clearly, portal demonstration coupled with enrollment showed an improvement in use rate.

Statistical Analysis

Chi-square comparisons of all categorical variables listed in Table 1 (except age which was considered continuous) and correlations for quantitative variables were performed. The quantitative variables were age, number of prescription medications, demonstration time in minutes, number of portal uses, days from demonstration to first use, and the VAS. No significant chi-square interaction was found among any of the categorical variables and only the VAS scores correlated negatively with age ($p = 0.000$) [see Table 3]. The older the participant, the lower the VAS score, which may be expected ($r = -0.544$, $p < 0.000$).

Table 3

Pearson's r Correlations between Quantitative Variables

	# Rx meds	Time (min)	# PortalUses	Days to 1st use	VAS (%)
Age	.047	.043	-.269	.061	-.544**
# Rx meds		.198	.242	-.058	.126
Time (min)			.139	-.462*	.156
# Portal Uses				-.183	.075
Days to 1st Use					-.439

Note: *p < 0.05 (2-tailed), **p < 0.01 (2-tailed).

In addition to the significant negative correlation of VAS scores with age, a significant correlation was found between time in minutes for the demonstration and days to first use. Logistic regression was performed for age, VAS, days to first use, and time in minutes, on the number of uses as the dependent variable. Backwards, stepwise regression eliminated the least significant terms one by one and the model was rerun. No variables were found to be significant. Therefore, it cannot be said that any demographic group of participants was more likely to use the portal than any other demographic group. However, the relationship of VAS scores and days to first use approached significance ($r = -0.439$, $p = 0.072$), which could indicate that perceived ease of use may be associated with greater use rates. The level of comorbidity was not found to influence portal use.

CHAPTER 6

DISCUSSION

Summary of Findings

The long-range goal of increased portal use is that it will improve the provider-patient connection and improve patients' involvement in their own care. This project aimed to address the CCM components of self-care management and delivery system design to achieve the interaction of informed activated patients with prepared providers to achieve improved health outcomes. Over time, portals may prove important for the health care system as a whole in achieving the Institute for Healthcare Improvement (IHI) triple-aim of decreased cost, enhanced patient satisfaction, and improved health outcomes. This project supports what was found in the literature review that brief portal demonstration coupled with immediate enrollment at the encouragement of an enthusiastic provider can positively influence portal use rates. Whether increased use rates translate into an impact on the IHI triple aim is beyond the scope of this project and requires further research. A cost analysis and plan for sustainability of the intervention is presented in this section and has been shared with the project site.

Successful Implementation

According to the PARIHS framework, successful implementation of a project involves some congruence of operationalization, fidelity, contextual factors, and diffusion.

Operationalization

Operationalization, or whether the intervention is actually adopted remains to be seen and is a decision to be made by the setting after being presented with the data. During implementation, the demonstration went smoothly. In actual practice, other day-to-day factors like staffing may affect whether the demonstration can be successfully adopted.

Fidelity

Concerning fidelity, the demonstration adhered closely to the plan. As many technical glitches as could be anticipated were prepared for by the project director (PD). Several technical challenges occurred, as mentioned in the results section, but those were resolved quickly. A step by step procedure for staff to replicate the portal demonstration was drafted and proposed to the clinic CEO.

Contextual Factors

Regarding contextual factors, this demonstration was viewed as a process change rather than a provider-level change. As mentioned, this demonstration takes only an average of nine or ten minutes to perform; there were plenty of rooms available to providers so they could continue to see patients; and it involved minimal cost. A more detailed cost analysis follows. If necessary, the patient could be moved to another room to perform the demonstration.

Diffusion

Three other providers asked during the project if the PD wanted to perform the demonstration with some of their patients. They reported genuine interest in getting patients enrolled. One of the behavioral health staff took several of the printed wallet cards thinking they would try to help patients enroll in the portal. In these ways diffusion occurred, although the demonstration for the purposes of this project was limited to Dr. Christensen’s patients. In all, it could be said that the project was successfully implemented. However, it remains to be seen whether the organization will adopt the procedure in other clinics.

Strengths

The evidence presented in the literature review formed a viable foundation upon which to base this implementation project. There seemed to be evidence that provider recommendation of portal use could result in increased portal use. Portal demonstrations seemed to be helpful in increasing use as well, but combining portal demonstration with provider recommendation to use a portal had not been attempted. Also, the techniques presented in the literature, while somewhat successful, did not include hands-on portal demonstration and enrollment with patients, with the exception of the Ahlers-Schmidt and Nguyen (2013) study. The practical approach in this project of hands-on demonstration coupled with immediate enrollment, along with written login information, may have played a part in the increase in portal use rate.

The setting at the clinic provided a perfect environment to examine these two approaches together. Dr. Christensen enthusiastically recommended portal use, then the PD demonstrated the product, and the results are as presented. Other clinic providers were interested as well in the implementation. These providers stated anecdotally that they would not feel burdened by increased messages in their inbox. Conversely, they felt it might decrease the need for cumbersome, episodic, crisis visits through enhanced communication.

Using patients' smartphones to view their portals seemed to be quite desirable to participants. In the beginning stages of this project, there was a concern that the underserved patient population at the clinic would not have smartphones. This proved to be an unnecessary concern as most patients did have them. This was consistent with the findings of Amante, Hogan, Pagoto, and English (2014), Post et al. (2013), and Smith (2013) that most Americans, even the homeless, now have smartphones. Underserved patient populations often use smartphones as their means for connecting to the internet.

As mentioned, few of the participants had attempted enrollment into MyCare after offering their emails to front office staff. Of those who had attempted enrollment, none were successful because the sign-on process was cumbersome. One benefit of this demonstration approach was that it showed participants exactly how a patient portal could be used to improve provider-patient communication, and accomplished enrollment at the same time. Also, the practical, simple nature of this demonstration encourages adoption at other sites. Minimal time, space, and staff are required, as discussed in the sustainability plan.

Limitations

Although the setting's providers stated they would not feel burdened by increased messaging, this may still be a concern of providers in general. In this pilot project, only three months of observation of use patterns was completed post-demonstration due to time constraints. In reality, patients may only use a portal once or twice a year. It may be beneficial to observe use patterns over a longer time period.

It is unknown whether the bookmarked MyCare page on their smartphone home screens would allow them to stay logged in or if they were required to re-enter their username and password each time they used the portal. This could potentially be an important factor in the continued use of the portal since anecdotal reports from providers claim as many as 70% of patients would use apps on their devices if they did not have to continually log in (Terry, 2015). This would not be a security or patient privacy issue if a patient had a password "lock" on their phone, however, it could present a privacy issue in the event a patient's phone was lost or stolen.

Most patients felt the appearance and usability of the portal was fairly easy (as shown previously by the VAS scores), yet there are some problems with the MyCare EHR. The medications list shows every medication a patient has ever been electronically prescribed, plus refills. For example, if lisinopril had been prescribed and the patient had been on it for several years, it showed up repeatedly on the medication list, causing it to seem cluttered. Attempting to open the lab results link often resulted in a blank page or a link that went nowhere. Finally, the appointment scheduling feature had not been operationalized by the clinic. This was to avoid logistic difficulties at the site. Patients were only able to view upcoming appointments at the time of the project. Potentially in the future, as mentioned previously, this feature may be "turned on."

Although income level was not measured in this project, race and education level demographics for participants were consistent with the literature that suggests that Caucasians with higher education and socioeconomic status are more likely to use a portal (Ancker et al.,2011; Lyles et al., 2013; Osborn et al., 2013; Ronda et al., 2013; Sarker et al., 2010; Schickedanz et al., 2013). Unfortunately, though the majority of patients at an FQHC are by definition underserved, the participants in this project were mostly Caucasian high school graduates. Therefore it is unknown if this demonstration method would truly work with non-Caucasian individuals with limited education and literacy levels. Although the demonstration dramatically improved portal use rates from zero to 39.2%, the majority of participants remained non-users after three months. This may not represent a critical set of users to propel portal use to "go viral" and become commonplace for patient populations. The limited observation period of three months did not capture portal use that may only need to occur sporadically or annually for more stable patients.

Outcome Measures

Again, the primary outcome measure for this project was whether portal use rates would be increased by hands-on portal demonstration coupled by immediate enrollment. Secondary measures included the time required to perform the demonstration and whether or not a certain demographic group of the patients was more likely to use the portal than another.

Provider attitudes toward portal use are important factors to consider as well (Krist et al., 2014; Urowitz et al., 2012; Wald, 2010). Not all clinical environments have proactive, enthusiastic provider champions as was the case in this project. Provider hesitance toward portals may hinder demonstration adoption in different sites. In addition, administrators may not see enough value in portal use to invest in sustainability efforts, despite meaningful use incentive payments. Since a staff member would be dedicated to the task for 15 shifts, the usual MA or front office specialist role would be lost for that period and additional staff would be needed to cover demonstration staff. A sustainability plan and cost analysis are now presented to advocate for portal demonstration adoption.

Recommendations

Sustainability Plan

Written recommendations regarding the results of this project and method for implementation were provided to clinic administration. The technical competence level of the PD was fairly high so if the demonstrator role is to be undertaken by clinic staff, this should be taken into account. It may take a staff member longer to perform the portal registration and demonstration process if their level of comfort in informatics and software is not similar to that of the PD. The main operations of registration into the portal and changing user settings were done via laptop for ease of use. Using a smartphone is a possibility for some of the administrative duties of the demonstration process, but is more cumbersome and time consuming. It would be more efficient for clinic staff to demonstrate the patient portal via smartphone after the logistics of registration have been accomplished using a laptop.

No less than two patients were successfully enrolled into MyCare in each of the fifteen shifts reported in this project. Three or four participants were enrolled in most shifts. The PD focused solely on one provider’s patients. Almost exactly 15 shifts were needed to successfully enroll 51 patients into MyCare and demonstrate the portal. Fortunately, simply entering patients’ email addresses into the EHR counts as “enrollment” for meaningful use purposes. This is done by front office staff at registration. However, as demonstrated in this project, no patients who offered their email address actually entered their portals. Suggestions for future implementations were presented at the end of Chapter Three of this report. One additional area of potential interest may be to address why patients do not pursue the use of the portal on their own.

In order to attest to stage two meaningful use criteria for core measures 7 and 17, providers needed approximately 50 patients to send a secure message through the portal. Assuming a provider has roughly 2000 patients in his or her panel, which is a clinic standard, 50% need to be enrolled in the portal to achieve core measure 7. As discussed on page 19, of these patients, only 5% need to send a secure message via the portal. This equates to roughly 50 patients sending a secure message via the portal. In this demonstration project alone, core measure 17 was met for the physician champion Dr. Christensen (N = 51) because a secure message was sent at the end of the demonstration as an example to the patient, but also to satisfy this meaningful use criterion. Simply by performing this demonstration, meaningful use objectives can be met. As indicated in the earlier discussion of diffusion of the process, there was interest among the other providers about this portal project.

Cost Analysis

According to the office manager at the clinic, the average wage for front office specialists (FOS) was $15.48 and $16.44 for medical assistants (MAs) (personal communication, September

30, 2015). There were a total of six primary care providers at the Holland site. The portal demonstration itself took roughly 10 minutes to perform, including sending the initial secure message. Not every patient at the clinic would be an appropriate candidate for the portal, meaning those with no internet access or email use. Yet, one FOS or MA could be available for all providers during a shift, continually enrolling potential candidates throughout the clinic. Four to five patients could potentially receive the demonstration each hour over an eight hour shift. This could equate to one patient per hour for each of the providers. The providers could simply recommend a patient enroll in the portal during a clinic visit and ask the support staff to perform the demonstration after the visit.

Assuming it would take 15 shifts to enroll the 50 patients per provider needed to meet core measure 17, this would cost the clinic approximately $1857.60 for a FOS to perform the demonstration, $1972.80 for an MA. Of course, the clinic would need to replace the services of the staff member during the fifteen shifts, effectively doubling the incurred expense for an MA or FOS. However, this may be a worthwhile expense to incur considering there are over $40,000 in Medicare CMS incentive payments for MU, or over $60,000 for Medicaid per provider. These data were presented in an executive summary to the clinic and a policy was written by the PD detailing how to perform the demonstration should the clinic choose to adopt it.

Doctor of Nursing Practice Essentials and Roles

The Doctor of Nursing Practice Essentials outlined by the American Association of Colleges of Nursing (2006) most pertinent to this project were those related to informatics, organizational and systems leadership, clinical scholarship and analytics, and scientific underpinnings for practice, essentials IV, II, III, and I, respectively. Some of the roles important to the nurse holding the Doctor of Nursing Practice degree are as clinician, advocate, innovator, leader, scholar, and educator (Chism, 2015). In this project, these roles dovetailed nicely with the essentials listed. For example, the PD exemplified the clinician role and scientific underpinnings for practice in that the appropriate target population for the intervention had to be determined according to the evidence base. As advocate and innovator, the PD exhibited organizational and systems leadership by developing a simple intervention encouraging patients' involvement with their own care and implemented it according to a well-designed plan. Naturally, some mastery of the informatics environment of the clinical site was required. Scholarship and analytics were demonstrated by a thorough literature review and statistical analysis of the data after implementation. Dissemination efforts showed the educator role and scholarship essential. The executive summary and draft policy and procedure outlining the demonstration submitted to clinic administration reflected leadership and systems thinking.

The scope of this project was right-sized for a DNP student to undertake. The translation of evidence to the clinical site is one of the main functions DNP-prepared nurses are trained to perform. This project was an exemplar of that translation. The success of this project for the setting in which it was completed, provides a framework for initiating similar approaches in other primary care clinics faced with challenges in attesting to meaningful use objectives.

Future Research or Project Recommendations

Potential future work by nurse practitioner students could include measuring whether there is an impact on health outcomes from increased use of patient portals in an underserved patient setting such as the FQHC. Decreasing the no-show rate for clinic patients was important to the organization. Better preventive self-care may improve this criterion. A process improvement project aimed at modifying current staff workflow to accommodate the demonstration intervention would also be a valuable endeavor for a future student. Potentially, implementing some marketing of MyCare through the automated appointment reminder calls the clinic makes to patients could be of value to the organization. The literature demonstrates the potential for improved patient satisfaction through better connection with providers. Evaluating portal impact on patient satisfaction would also be a relevant project as would a cost analysis to see if more preventive care improves the clinic's revenue stream. A deeper investigation of what may make the portal interface more user-friendly in the patient's perception may be meaningful to stakeholders. Patient satisfaction and decreasing healthcare costs are two of the IHI's triple-aim goals. A larger, possibly longitudinal study to more accurately determine the effect of portal demonstration on enrollment and use rates would also be valuable.

Policy Implications

Influencing health policy is one capability of DNP-prepared nurses. Several factors related to health policy at the clinic level are important to consider. The rapidly changing landscape of technology in primary care has led to the creation of informatics departments within organizations. Whereas fifteen years ago there may have been few people responsible to help with technology questions from staff, most clinics today have several full-time informatics specialists assigned with keeping electronic health records functioning properly. This can be very burdensome financially, especially for FQHCs that are dependent on federal grant funding, state Medicaid reimbursement, and collections from sliding fee patients to function. The penalty imposed by CMS for failing to successfully attest to meaningful use criteria, a reduction in Medicare reimbursement from one to three percent, can mean hundreds of thousands of dollars in lost revenue for clinics (CMS, 2015).

So although MU financial incentives are helpful, EHRs themselves cost millions of dollars to implement. Following implementation, there are ongoing maintenance costs to EHR vendors and informatics specialists in primary care clinics. Consideration of the return on investment for informatics infrastructure is something that is now being heavily scrutinized at a national level (Payne et al., 2013). The National Opinion Research Center (NORC) explained that safety net providers, such as the clinic where this portal demonstration occurred, face budget constraints, competing funding demands, and are understandably cautious about taking on increased debt (2010). NORC also validated that the use of smartphones for health IT may be an effective tool to address health disparities among underserved patient populations. However, to fully realize smartphone portal use potential, federal investments in FQHC IT infrastructure need to be more substantial (NORC, 2010).

Further complicating IT implementation among safety net providers is that the burden of high-cost, chronic conditions is overrepresented among the underserved. Customization of available informatics tools to meet the needs of these patients and their providers is difficult because “many health IT tools currently on the market…are not designed to address the complex and unique demands of a community-based setting” (NORC, 2010, p. 42). The most recent National Association of Community Health Centers (NACHC) survey on health IT adoption stated that managing the implementation of new informatics technology and having dedicated staff to oversee implementation is considered a very significant, ongoing barrier (NACHC, 2009). Despite the threat of decreased reimbursement from CMS for failure to attest to MU and the limitations of MU incentive payments, safety-net providers are rising to meet the challenge. As of 2014, over half of all FQHCs have successfully attested to stage two MU requirements (NACHC, 2014).

Most organizations do not publicly report financial statements regarding investments in informatics. This makes performing a sufficient cost-benefit analysis for informatics adoption difficult. The VA system is one of the few where data can be obtained. Although not solely primary care in nature, the VA does report over $3 billion in savings from reduction in duplication of tests and unnecessary care following the 2007 inception of their EHR framework (Payne et al.). Still, a recent systematic review showed that MU incentives are too modest to offset the burden of EHR maintenance and robust reimbursement structures for provider time spent answering portal queries must be developed (Otte-Trojel, de Bont, Rundall, & van de Klundert, 2015).

Michel (2016) reported Meaningful Use itself may possibly end in 2016, or be transformed, in favor of the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). Stage three MU is still in effect at the time of this writing. There is much speculation at the current time within the primary care community about the direction EHR financial incentives will take in the future. Being actively involved in reporting concerns with EHR use and implementation during public comment periods for stage three MU and potential future iterations of MACRA are important actions for DNPs to take. Gaining financial leverage with EHR vendors can more successfully be achieved with help from federal legislation if providers make concerns known while they have the ear of legislators.

Practice Ramifications

Authors of a recently published study concerned with provider perceptions of portal use among lower income adults reported concerns from providers that portals will generate more work for them, confuse patients, and actually worsen health disparities (Miller et al., 2016). A systematic review of 27 articles related to patient and provider attitudes toward portals revealed mixed opinions (Kruse, Argueta, Lopez, & Nair, 2015). Some thought portals improved provider-patient communication, while some expressed concerns about security and a low perceived ease of use.

An attempt was made to compare portal use rates for Dr. Christensen’s patients with other providers in the clinic to see if there was a difference in the demographics among portal users. Communication with an information specialist at the clinic revealed that the rules for CMS stage two MU portal secure messaging were recently decreased by the agency. Requirements that 50% of portal-enrolled patients send a secure message to their provider were changed to a requirement that only one patient need do so, per provider. Thus, the clinic’s database, which had been recording meaningful use data, was found to have been changed to reflect this measure. Portal use rates were therefore not available to informatics staff as they were no longer being compiled by the system.

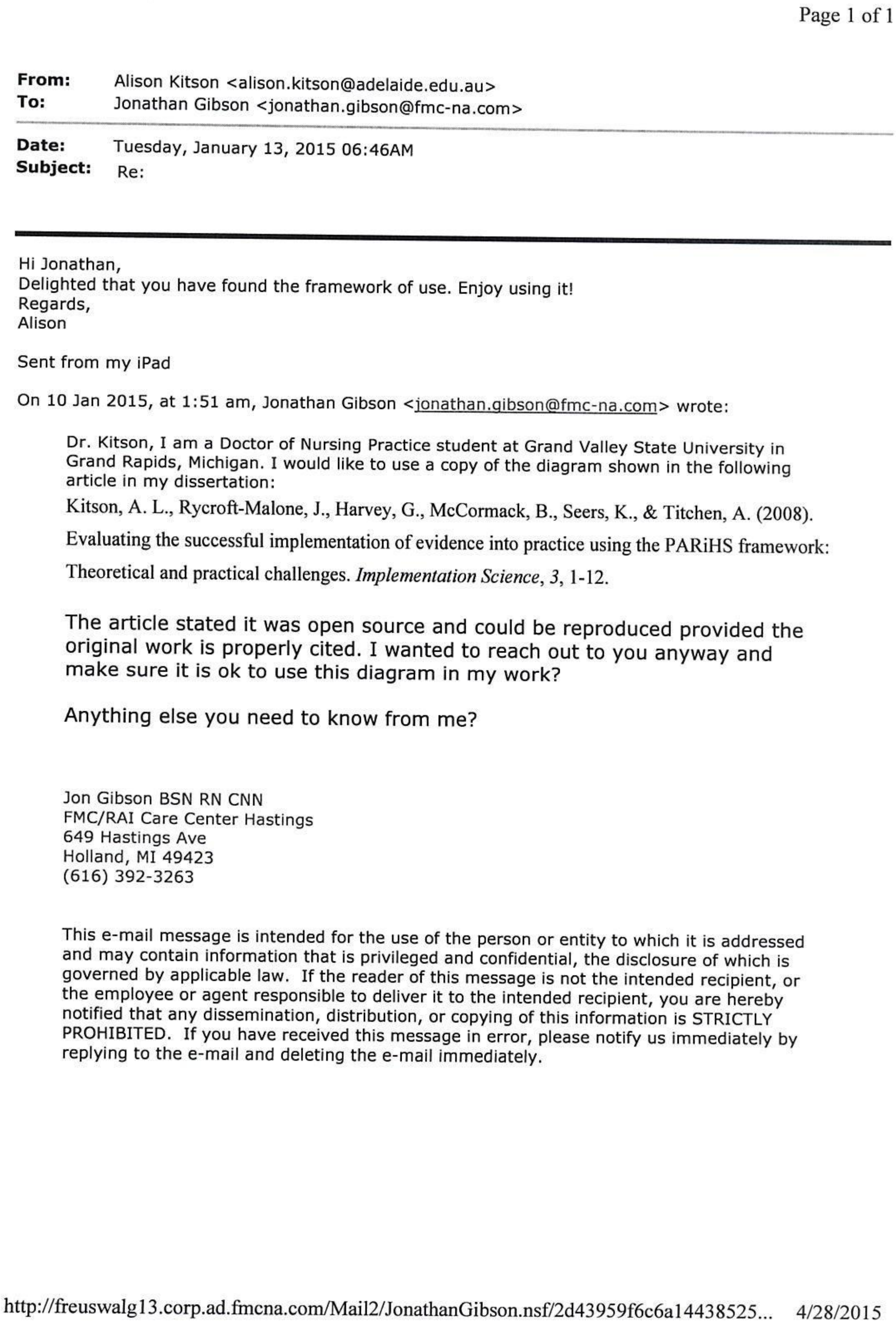
One interesting aspect to consider is how the workload and time requirements for clinic staff are changed by the use of portals. As mentioned, there are fears that increased patient use of secure messaging will increase the workload for providers. While this may in part be true, it could be offset by the reduced workload and time burden on staff nurses who must triage phone calls coming in to the clinic. In addition, many of the simple messages patients send could be handled by staff nurses, leaving the more complicated, diagnostic-related messages for the providers. Another consideration is how in the future there might be reimbursement for time spent answering portal messages. If providers’ time spent using a portal can be adequately compensated, that could help alleviate fears about increased use by patients (Otte-Trojel, de Bont, Rundall, & van de Klundert, 2015). Finally, as professionals, providers are not helpless victims of portal messaging burden and should develop boundaries with their patients who may be considered portal “over-users.” In the end, improving patients’ health and the patient-provider connection should be the goal.

Conclusion

The main goal of this project was to determine whether face-to-face portal demonstration coupled with immediate portal enrollment would improve portal use rates. The demonstration was found to be an effective method to improve use rates. Over time, increased portal use may improve the patient-provider connection and increase patient involvement in self-care activities. These are health outcomes predicted by the CCM. Stage three meaningful use, if and when it becomes a reality, will rely heavily on capabilities of patient portals. In the future, portals may be used as a hub for telehealth interventions like uploading biometric data and pictures for improved acute and chronic disease management. Health care agencies and providers can adopt the method of portal demonstration presented in this project to promote portal use as one avenue toward achieving the IHI triple aim of decreased cost, enhanced patient satisfaction, and improved health outcomes. Lessons learned by this author include the understanding that the status quo can be challenged and that good preparation and planning leads to stakeholder buy-in and successful implementation.

Appendices

Appendix A – PARIHS model permission



Page 1 of 1

From: Alison Kitson <alison.kitson@adelaide.edu.au>
To: Jonathan Gibson <jonathan.gibson@fmc-na.com>

Date: Tuesday, January 13, 2015 06:46AM
Subject: Re:

Hi Jonathan,
Delighted that you have found the framework of use. Enjoy using it!
Regards,
Alison

Sent from my iPad

On 10 Jan 2015, at 1:51 am, Jonathan Gibson <jonathan.gibson@fmc-na.com> wrote:

> Dr. Kitson, I am a Doctor of Nursing Practice student at Grand Valley State University in Grand Rapids, Michigan. I would like to use a copy of the diagram shown in the following article in my dissertation:
>
> Kitson, A. L., Rycroft-Malone, J., Harvey, G., McCormack, B., Seers, K., & Titchen, A. (2008). Evaluating the successful implementation of evidence into practice using the PARiHS framework: Theoretical and practical challenges. *Implementation Science*, *3*, 1-12.
>
> The article stated it was open source and could be reproduced provided the original work is properly cited. I wanted to reach out to you anyway and make sure it is ok to use this diagram in my work?
>
> Anything else you need to know from me?
>
> Jon Gibson BSN RN CNN
> FMC/RAI Care Center Hastings
> 649 Hastings Ave
> Holland, MI 49423
> (616) 392-3263
>
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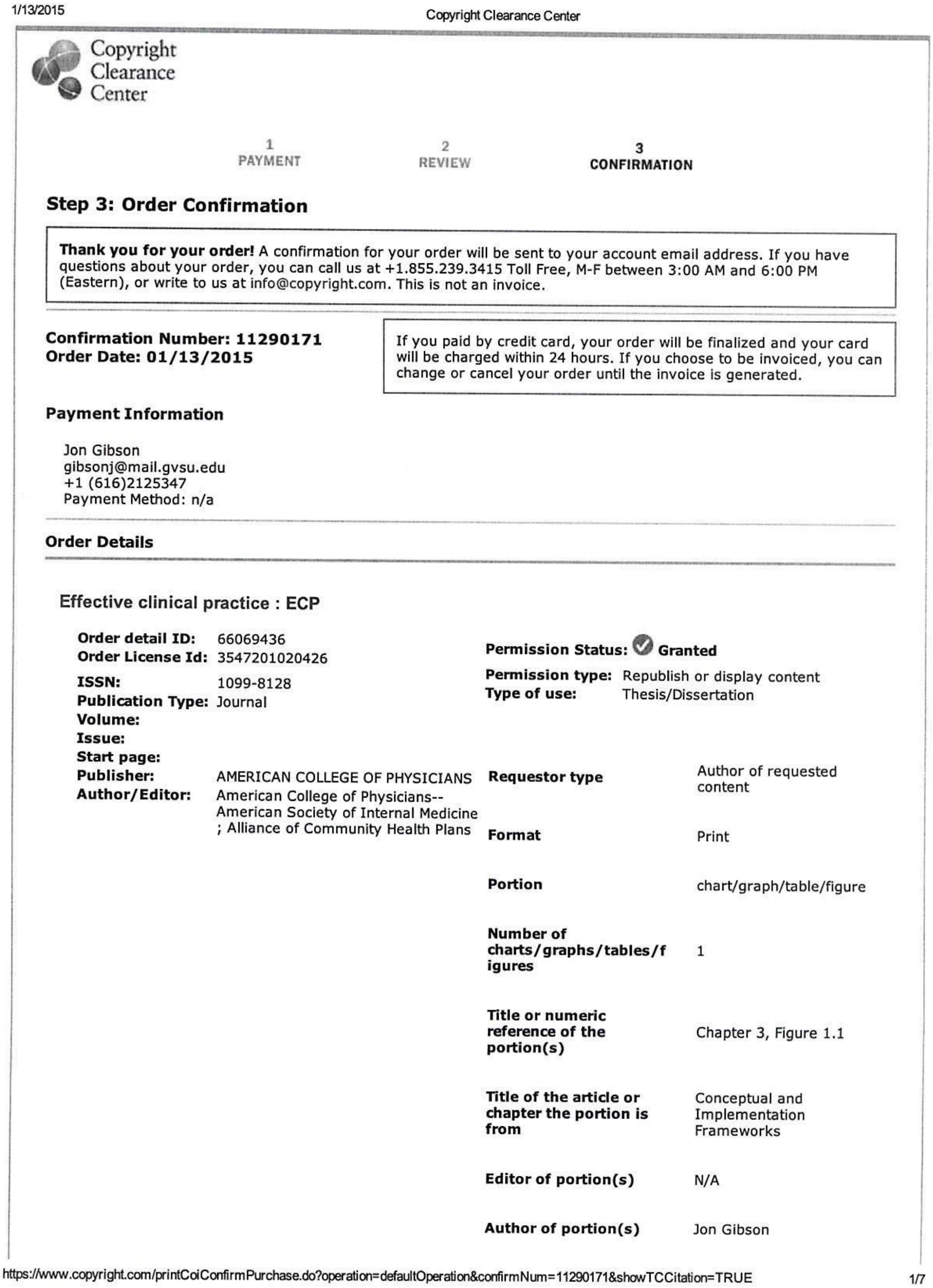
Appendix B – Chronic Care Model permission



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gibsonj@mail.gvsu.edu
+1 (616)2125347
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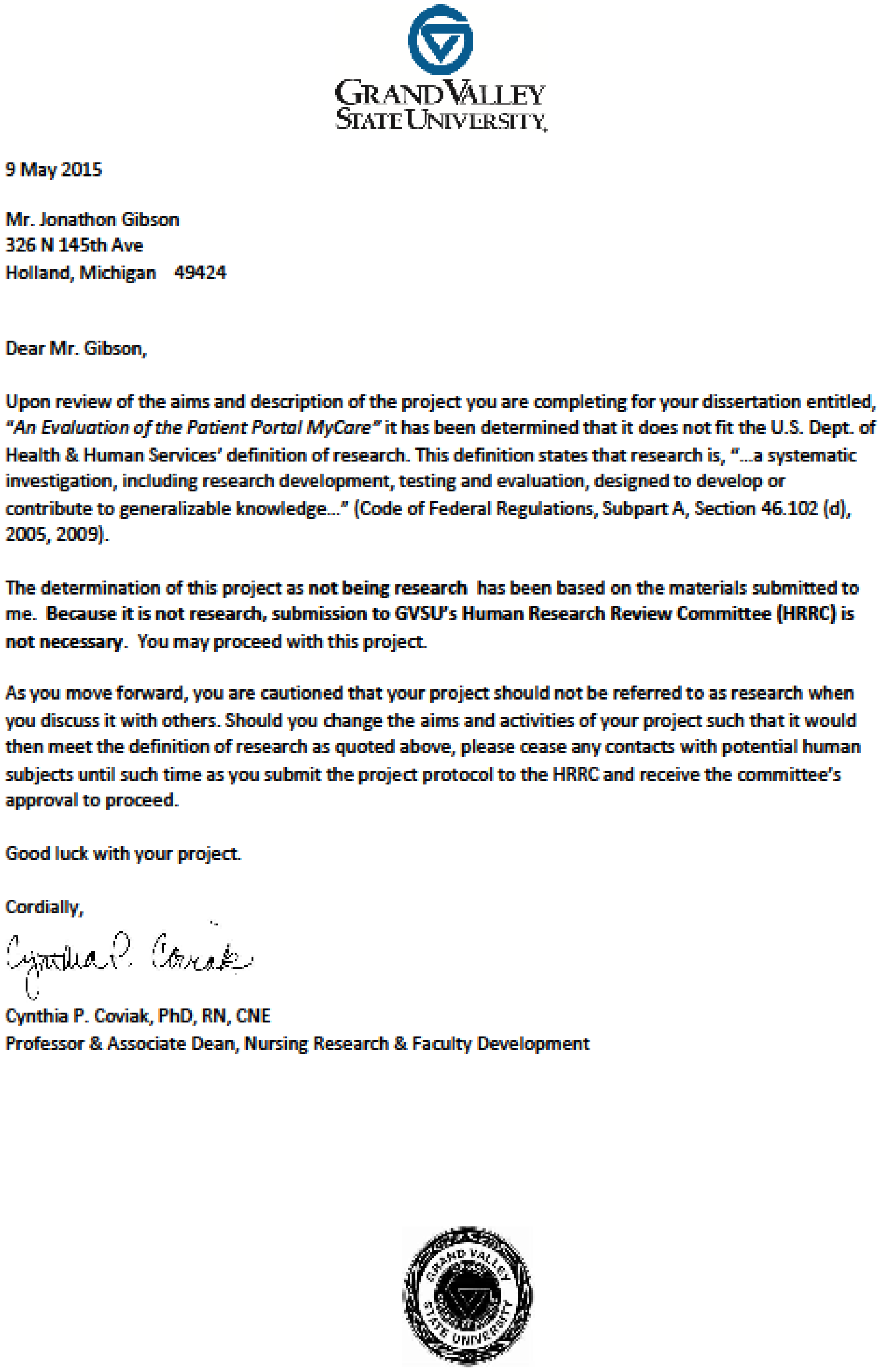
Editor of portion(s)	N/A
Author of portion(s)	Jon Gibson

https://www.copyright.com/printCoiConfirmPurchase.do?operation=defaultOperation&confirmNum=11290171&showTCCitation=TRUE 1/7

Appendix C – Human Subjects Determination



GRAND VALLEY
STATE UNIVERSITY

9 May 2015

Mr. Jonathon Gibson
326 N 145th Ave
Holland, Michigan 49424

Dear Mr. Gibson,

Upon review of the aims and description of the project you are completing for your dissertation entitled, *"An Evaluation of the Patient Portal MyCare"* it has been determined that it does not fit the U.S. Dept. of Health & Human Services' definition of research. This definition states that research is, "…a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge…" (Code of Federal Regulations, Subpart A, Section 46.102 (d), 2005, 2009).

The determination of this project as **not being research** has been based on the materials submitted to me. **Because it is not research, submission to GVSU's Human Research Review Committee (HRRC) is not necessary**. You may proceed with this project.

As you move forward, you are cautioned that your project should not be referred to as research when you discuss it with others. Should you change the aims and activities of your project such that it would then meet the definition of research as quoted above, please cease any contacts with potential human subjects until such time as you submit the project protocol to the HRRC and receive the committee's approval to proceed.

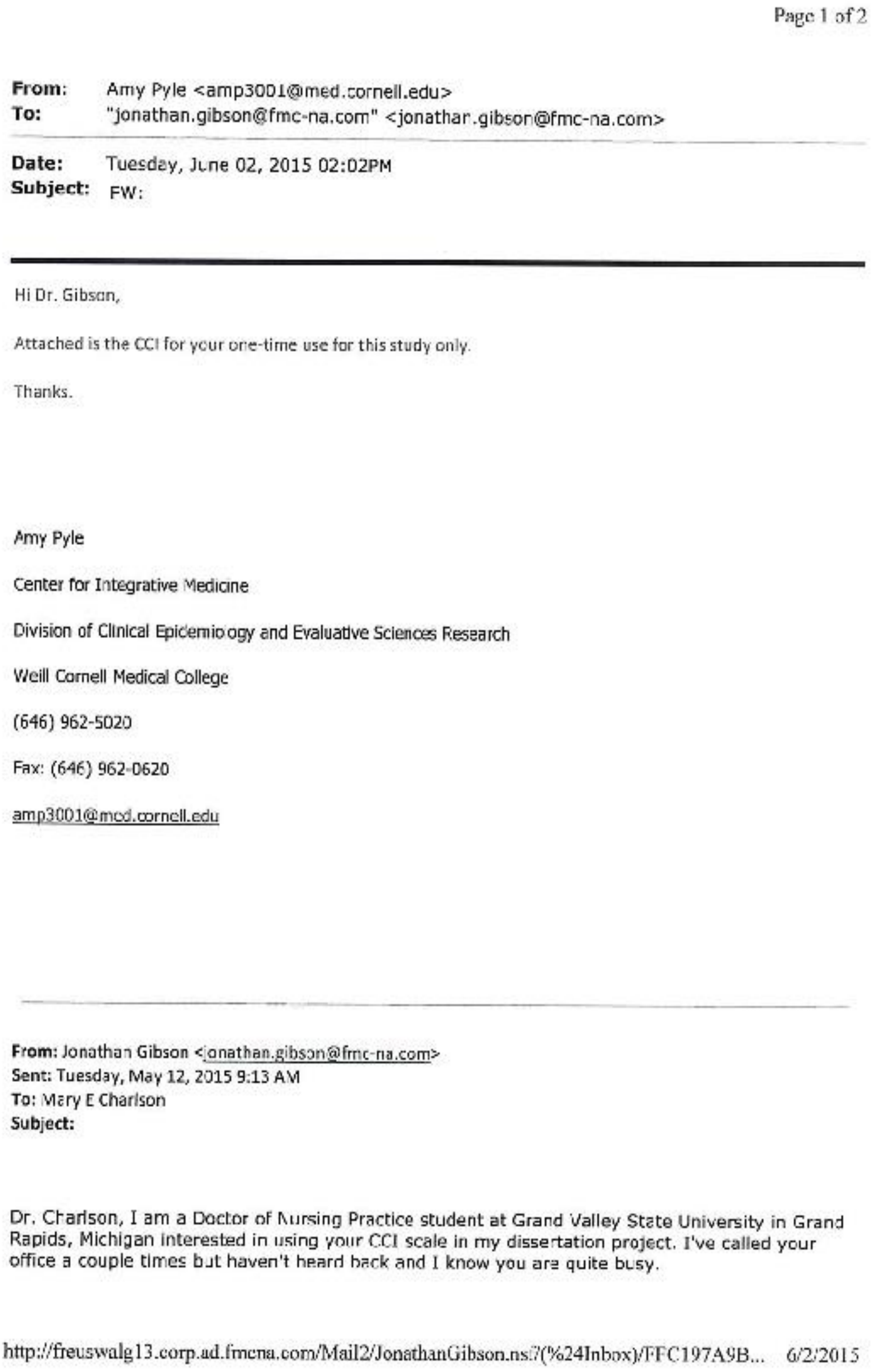
Good luck with your project.

Cordially,

Cynthia P. Coviak

Cynthia P. Coviak, PhD, RN, CNE
Professor & Associate Dean, Nursing Research & Faculty Development

Appendix D – Charlson Comorbidity Index Permission



Page 1 of 2

From: Amy Pyle <amp3001@med.cornell.edu>
To: "jonathan.gibson@fmc-na.com" <jonathan.gibson@fmc-na.com>

Date: Tuesday, June 02, 2015 02:02PM
Subject: FW:

Hi Dr. Gibson,

Attached is the CCI for your one-time use for this study only.

Thanks.

Amy Pyle

Center for Integrative Medicine

Division of Clinical Epidemiology and Evaluative Sciences Research

Weill Cornell Medical College

(646) 962-5020

Fax: (646) 962-0620

amp3001@med.cornell.edu

From: Jonathan Gibson <jonathan.gibson@fmc-na.com>
Sent: Tuesday, May 12, 2015 9:13 AM
To: Mary E Charlson
Subject:

Dr. Charlson, I am a Doctor of Nursing Practice student at Grand Valley State University in Grand Rapids, Michigan interested in using your CCI scale in my dissertation project. I've called your office a couple times but haven't heard back and I know you are quite busy.

http://freuswalg13.corp.ad.fmcna.com/Mail2/JonathanGibson.nsf/(%24Inbox)/FFC197A9B... 6/2/2015

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