IMPLEMENTING AN ELECTRONIC PATIENT PORTAL ENROLLMENT PROGRAM IN PRIMARY CARE

by

Caitlyn MacKay Cayer

A Dissertation submitted in partial fulfillment
of the requirements for the degree

of

Doctorate in Nursing Practice

in

Family and Individual Health

MONTANA STATE UNIVERSITY
Bozeman, Montana

April 2022

ACKNOWLEDGEMENTS

I would like to express my heartfelt appreciation to my family who have supported my through my long academic journey and have always encouraged me to meet my potential. I would also like to thank Lonie Stimac for being my greatest supporter in bringing this project to fruition and for never failing to believe in me. An additional thank you to Denise Gresham for being an amazing mentor and a key player not only in the fulfillment of the project, but in assisting me to develop as a clinician as well. Finally, I must give recognition to my DNP committee chair, Dr. Amanda Lucas. Her tireless efforts and dedication not only contributed to the quality of this project but have also had a profound impact on me personally and professionally. I will be forever grateful for her guidance and support both in the role as my committee chair and as a mentor for whom I hold in deep regard.

TABLE OF CONTENTS

TABLE OF CONTENTS CONTINUED

LIST OF FIGURES

Figure Page

ABSTRACT

Purpose: This the purpose of this quality improvement (QI) Project was to implement a portal enrollment program that includes staff training and a new workflow process to provide accessibility to patients' PHI and comply with federal regulations. Successful long-term implementation will positively affect the primary care clinic reimbursement by achieving the overarching goal of offering enrollment to all patients, thereby aligning the clinic with regulatory expectations of Health Information Technology (HIT).

Methods: The project site was an FNP-owned clinic with approximately 888 active patients with an average of 160 patients seen monthly. The project purpose addressed through the implementation of three evidence-based methods, including (a) training employees on electronic patient portal use and enrollment; (b) providing marketing materials to patients presenting for visits; and (c) evaluating the success of offering "on-the-spot" electronic patient portal account activation through an innovative workflow.

Results: 175 adult patients presented to the clinic for an appointment during the six-week intervention period. Of these participants, 151 were provided with a brochure highlighting the portal per the project workflow which was fell under the goal of 100% of patients being given the brochure. Additionally, 38% of patients chose to activate their portal "on-the-spot" which met and exceeded the goal of 20% for the intervention period.

Implications for Practice: This quality improvement project provides insight into the effectiveness of using informational materials and a new workflow to introduce patients to a newly activated Electronic Patient Portal. The workflow established will continue at the clinical site with some minor adjustments to improve long-term sustainment. This continued process not only addressed the need to maintain compliance with federal regulatory expectations, but also laid the framework for the clinic to carry out similar quality improvement projects involving health information technology in the future.

CHAPTER ONE

IMPLEMENTING A PATIENT PORTAL ENROLLMENT PROGRAM IN PRIMARY CARE

Introduction

When discussing issues related to healthcare, it seems inevitable that the conversation will shift to the use of technology and its application toward health. The concept is of such importance that the World Health Organization (WHO) recently published a global strategy on digital health to develop a deliberate plan for creating an infrastructure for health information and communication technologies. A key goal of this plan, which spans from 2020–2025, is to foster digital health innovations and ensure patients have universal access to their electronic health records (WHO, 2021). The strategy also highlights the need for enabling the exchange of relevant information across the health ecosystem and providing tools for the self-management of care (WHO, 2021). Should the meteoric rise of technological advances continue to affect healthcare at as rapid a rate as we have seen in recent decades, it is staggering to imagine what will soon be possible in providing care to patients.

The utilization of technology for health literacy education, patient resources, and treatments is no longer optional, as 85% of Americans now own a smartphone, and three-quarters of American adults own a desktop or laptop computer (Pew Research Center, 2021). The immediate access to information has had an impressive effect on the healthcare sector, ultimately driving the creation of tools like the electronic patient portal, henceforth referred to as "portal." The portal tool is a secure online website that allows patients access to their personal health information (PHI). This access to PHI has become increasingly important in the wake of

the COVID-19 pandemic, as indicated by the increase from 27% in 2014 to 39.5% in 2020 in adults accessing their medical records from home (National Institutes of Health, National Cancer Institute, 2021).

The nationwide increase in portal usage demonstrates the growing trend for using this digital health tool. It also underscores the importance of having such an option available to all patients in a given practice setting. Failure to offer portal accessibility in primary care hampers the future of a clinic, as it places the organization in noncompliance with national and regulatory standards of interoperability or the processes that support the exchange and access of health information (Vreugdenhil et al., 2019). For clinics seeking reimbursement, choosing not to meet federal regulations endangers the stability of the clinic, as compensation from federal agencies will only continue to build upon current interoperability expectations (Office of the National Coordinator for Health Information Technology [ONC], 2021). Failure to implement portals also does a disservice to patients, as it has been demonstrated that patients are more engaged in their care and show increased satisfaction rates when they can access their records online (Ramsey et al., 2018; Turvey et al., 2014).

Therefore, the purpose of this quality improvement (QI) project is to implement a portal enrollment program that includes staff training and a new workflow process to provide accessibility to patients' PHI and comply with federal regulations. Successful long-term implementation will positively affect the primary care clinic reimbursement by achieving the overarching goal of offering enrollment to all patients, thereby aligning the clinic with regulatory expectations of health information technology.

Background and Significance

HIT innovation and use has grown exponentially and continues to drastically improve the quality of care to patients, with the most effective HIT heralded as a crucial component to closing safety and quality gaps in healthcare (Johnson, 2016). HIT encompasses many different types of technology, most notably the electronic health record (EHR). In 2009, Congress passed the Health Information Technology for Economic and Clinical Health (HITECH) Act requiring the replacement of all paper records with electronic systems (House of Representatives [HR] 1, 2009). The HITECH Act was developed primarily in response to findings from the National Academy of Medicine report which showed that although the United States spent more on health care expenditures than any other country in the world, care was often of poor quality, and fraught with numerous examples of patient harm and significant disparities (Gettinger & Zayas-Cabán, 2021). These staggering observations provided the impetus for the HITECH Act and the subsequent financial incentives from federal agencies that administer the nation's major healthcare programs (Gettinger & Zayas-Cabán, 2021).

The HITECH Act and Meaningful Use

The HITECH Act transformed both large and small healthcare organizations through the establishment of programs to promote HIT, including EHR implementation and the secure exchange of electronic health information (ONC, 2021). This legislation necessitated a major transition from paper to electronic records to ensure compliance and avoid monetary penalties. However, this vast transformation was validated as the HITECH Act also authorized the creation of incentive programs offered by the Centers for Medicare & Medicaid Services (CMS). The incentive program was defined through a congressional final rule entitled *Medicare and*

Medicaid Programs; Electronic Health Record Incentive Program and was largely based around the concept of "meaningful use" (42 Code of Federal Regulations Part 412, 2010). Meaningful use was defined as a complex set of criteria with three main requirements that organizations must meet to qualify for incentive payments, including (1) use of certified EHR technology in a meaningful manner, (2) use of certified EHR technology in a manner that provides for the electronic exchange of health information to improve the quality of care, and (3) use of certified EHR technology to submit clinical quality measures and other measures determined by the U.S. Department of Health and Human Services secretary (Henricks, 2011). These requirements are implemented in three stages, with each stage focusing on the objectives necessary to comply with the overarching requirement. For stage one, the healthcare organization must specifically attest to compliance with objectives directly related to the meaningful use of EHRs, which requires structured data entry in an EHR system over paper-based systems (Marcotte et al., 2012). The incentive program worked well, as Shi et al. (2020) reported that ambulatory clinic use increased by 17.7 percentage points from 2013 to 2016, showing compliance with stage one requirements. However, other HIT functionalities, such as those required in stages 2 and 3, did not significantly change including portal access to PHI, which grew only by 9.8 percentage points over the same time (Shi et al., 2020).

Although portals are not specifically named by meaningful use, they facilitate the objectives related to health information exchange and are considered core elements in health informatics (Shi et al., 2020). It is evident that significant gaps remain in the complete adoption of HIT functionalities, which may be partially due to differences in resources among clinics (Shi et al., 2020). The small primary care clinic that will serve as this project's site aligns with this

observation by Shi et al. (2020), as the facility has implemented EHR functionality to replace paper records but has not embraced other HIT tools like portals. According to the clinic's manager, the lack of portal adoption is due to the absence of an IT department, the labor burden required for implementation, and a poor understanding of the functionalities available through the EHR system (L. Stimac, personal communication, September 17, 2021). Despite the perceived barriers, portals facilitate patient engagement and are deemed essential by regulatory healthcare organizations, thus indicating project necessity (Jensen et al., 2016).

21st Century Cures Act

When discussing HIT legislature, it is imperative to address the 21st Century Cures Act signed into law on December 13, 2016. The act's purpose is to accelerate the process of research to prevent and cure serious illnesses, improve mental health services, accelerate drug and medical device development, and address the opioid abuse crisis (Lengyel-Gomez, 2018). The act also includes a significant push for interoperability beyond electronic records, with the ONC being the driving force behind standards development. Key components of interoperability include enabling the secure exchange of electronic health information, facilitating complete access to accessible health information, and the avoidance of acts that constitute information blocking (ONC, 2021). In service of these tenets, the ONC's Cures Act Final Rule was published to provide an additional mandate which modified provisions of interoperability in the act (H.R. 34, 2016).

The ONC's ruling impacted healthcare facilities by specifying how patient health engagement relies on the power of EHR accessibility (ONC, 2021). Implementing a portal will enable compliance with the ONC's expectations that patients have unimpeded electronic access

to their PHI that avoids inadvertently "blocking" information, which would subject the primary care practice to civil monetary penalties or financial disincentives (85 Fed. Reg. 25642, 2020). In addition to financial penalties, organizations sacrifice involvement in the CMS Medicare Access and CHIP Reauthorization Act financial incentive program by not complying with HIT meaningful use requirements (Marcotte et al., 2012). Although there are significant barriers to complying with HIT legislation, the underlying benefits of patient engagement, financial disincentives or reimbursements, and more efficient clinical workflows demonstrate that implementation is necessary (Gettinger & Zayas-Cabán, 2021). For small practices, even a single report of an information blocking violation has the potential to financially cripple the clinic, as penalties could be as high as $1 million per violation (Rosario, 2021).

Scope of the Problem at the Project Site

The doctor of nursing practice (DNP) project site is a family nurse practitioner-owned primary care clinic, located in an urban Montana city, caring for 888 primarily middle to older adult patients. On average, 8-9 patients are seen four days per week, for an approximate total of 160 patients seen monthly. Most patients hold Medicare or private insurance coverage, and the clinic does not participate in the Medicaid passport program. Patient health literacy and comfort with technology for health care have not been explored at this site. The clinic's EHR does provide reporting capabilities related to the CMS Merit-Based Incentive Payment System (MIPS) core interoperability measures, and noncompliance was evident via a report generated from January 26, 2021 to August 26, 2021. The report showed that 0/694 patients seen for an appointment in the clinic met criteria for compliance with the MIPS objective regarding access to

PHI and the patient's ability to view, download, or transmit the information electronically (Centers for Medicare & Medicaid Services, 2021).

Therefore, activation of a portal is an ideal and necessary tool that can be used to meet the CMS MIPS requirement and that of the ONC's Cures Act Final Rule. The clinic's failure to meet national regulations jeopardizes long-term fiscal stability and may alter the clinic's ability to continue providing needed primary care services. Thus, the primary aims of this DNP project are the successful activation of the patient portal through the existing EHR, development of a staff education presentation, a workflow process, and a six-week mentored enrollment pilot program with at least 20% of patients seen for appointments agreeing to patient portal enrollment.

Congruence of DNP Project to the Organization's Mission

The project site's mission is "to provide excellent healthcare service in a welcoming environment with a caring spirit" (L. Stimac, personal communication, August 26, 2021). This mission aligns with the aims of the DNP project as the implementation of a patient portal enrollment process will facilitate excellent care by continuing to expand on services currently in place to improve the patient experience. Meeting the ever-changing needs of patients requires flexibility and adaptability from healthcare providers and facilities to ensure that quality is always a top priority. Implementing an electronic patient portal will improve the value and quality of care by empowering patients, improving communication processes, and promoting transparency by directly facilitating the successful execution of the organization's mission.

CHAPTER TWO

LITERATURE REVIEW AND SYNTHESIS OF EVIDENCE

Search Methods

A comprehensive literature review related to the implementation, adoption, and enrollment of patients in a portal was accomplished to understand trends and successes, or barriers, associated with the concept. Multiple databases were consulted, including Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane Library, Google Scholar, Joanna Briggs Institute Evidence-Based Practice Database, and PubMed. Only articles published in English were included, with literature limited to studies published from 2011 to 2021 to contain the most relevant information on the subject. A combination of keywords and search terms were utilized including “patient portal,” “patient portal AND (engagement),” “patient portal AND (enrollment),” “patient portal AND (outcomes),” “patient portal barriers,” “patient portal education,” “patient portal literacy,” and “patient portal strategies.” The following key terms were utilized to organize evidence: successful enrollment, clinical benefits, enrollment strategies, facilitators, barriers, literacy, stakeholders, and technology. Evidence appraisal was completed, and while the majority of studies were found to be Level III or IV perhaps due to the need for case studies to inform future research, 7 High-Level I studies were also identified (Melnyk & Fineout-Overholt, 2005).

Electronic Patient Portal Effects and User Characteristics

Effects of Electronic Patient Portals

Patient portals are aligned with foundational principles developed by the Institute for Health Improvement known as the Quadruple Aim (QA). The QA framework emphasizes the enhancement of the patient experience, improvement of population health, reduction of costs, and improved work life of individuals who deliver care (Bodenheimer, 2014). Portals address these QA domain aims through their ability to engage patients, alter healthcare workflows, and improve the overall quality of care (Avdagovska et al., 2020). Empirical evidence substantiates that activation of portals improves patient engagement and is associated with better patient health outcomes (Ancker et al., 2014; Nagykaldi et al., 2012; Stewart et al., 2020). Ancker et al. (2014), contended that higher activation rates are associated with healthy behaviors, disease self-management, and improved health information seeking. Additionally, evidence supports that when a comprehensive patient portal is embedded into primary care, there is increased patient-centeredness, enhanced delivery of preventive services, and improved utilization of web-based personal health records (Nagykaldi et al., 2012).

User Characteristics and Perceptions of Patient Portals

Many characteristics influence the perception of portals and may contribute to the overall adoption of this intervention in the healthcare setting. For instance, Irizarry et al. (2015) found that interest in portals is strongly influenced by patient-specific factors such as “age, ethnicity, education level, health literacy, health status, and role as a caregiver” (p. e148). Similarly, to understand predictors of satisfaction and enrollment, Tao et al. (2018) and Portz et al. (2019) found that portal-specific factors, such as ease of use and usefulness, were the most significant

indicators of adoption. In addition, Zhao et al. (2018) describe patients' perspectives on online portal use prior to its implementation at an acute care hospital and found that patients are generally enthusiastic about portal use. These findings are consistent with a recent scoping review by Antonio et al. (2020) supporting that patient interest in portals increases if portals are easy to use and facilitate provider communication.

Furthermore, evidence has shown that initial experiences with patient portal enrollment have far-reaching effects. Prior to the complete deployment of portals, implementation should be designed to optimize usability. Patient concerns should be addressed, specifically those related to the accuracy of data and security (Wildenbos et al., 2018). Additionally, Avdagovska et al. (2020) identified that the most commonly used portal function was the ability of the patient to access laboratory or diagnostic test results. In support of this finding is the qualitative evidence gathered by Tieu et al. (2015) in which one patient stated that viewing his labs prior to his appointment helped him ask specific questions thus maximizing his visit. This body of literature shows the importance of highlighting patient interest in the translation of patient portal enrollment programs and developing a strategy that emphasizes areas of greatest importance to the patient.

Patient Portal Enrollment Challenges and Strategies

Barriers

Despite the literature support for patient portals, evidence has shown several barriers remain to the enrollment and adoption of patient portals. Important patient-specific barriers identified include medical complexity, health literacy, income level, and psychosocial or mental health factors. There are mixed results in the literature regarding patients with chronic

conditions. Wildenbos et al. (2018) discussed the portal usage factors and benefits that are important to highlight when implementing a portal adoption program in chronically ill patients. It was concluded that for chronically ill patients to gain greater benefits from portals, the portal landscape needs to change from individual to integrated systems and provide a single portal for those with multiple chronic illnesses (Wildenbos et al., 2018). Patients who have portal access through other health systems may have no interest in activating an additional single portal; a finding shared by Neuner et al. (2014), who found portal enrollment decreased slightly with the increasing number of chronic medical conditions. In contrast, Krist et al. (2014) and Ketterer et al. (2013) found that an extensive problem list or the presence of comorbid conditions were the primary influencers of positive portal activation. This disparity is likely due to the variation in portal enrollment and adoption between different health systems and the population they serve.

In addition to patient usage factors serving as barriers, health literacy is another area in which there is a preponderance of literature associated with portals. Multiple studies cite the importance of considering populations with limited health literacy, such as older adults and vulnerable individuals (Bauer et al., 2017; Wildenbos et al., 2017; Wildenbos et al., 2018; Zhao et al., 2018). Bauer et al. (2017) also explored patients' awareness and use of patient portals to determine their comfort level in utilizing patient-oriented health tools. Key findings of the study include the importance of promoting patient awareness, addressing security concerns, and providing education to patients when initially introducing a portal.

Intriguingly, Bauer et al. (2017) found that older adults were equally as likely to be aware of and use a patient portal as younger patients. Therefore, efforts should be aimed toward providing quality education that addresses health literacy disparities rather than focusing on age-

dependent strategies. Finally, Nambisan (2017) explored the previously held belief that internet access is a common barrier to portal adoption and usage in vulnerable populations, ultimately discovering that access was not typically an issue. Instead, their results showed that education on the importance of maintaining health records and providing hands-on training is more likely to influence portal adoption and use than having access to the internet.

A growing body of research on lesser-known barriers to portal adoption involves psychosocial factors, including mental health status, social influences, and habits (Tavares et al., 2018; Fatehi et al., 2020). Fatehi et al. (2020) studied electronic patient portal registration in relation to psychological factors such as PHQ-2 and GAD-7 scores and financial, employment, housing, and food security status. It was determined that there is an association between higher registration in a portal for patients with fewer symptoms of depression and anxiety and those of a higher socioeconomic class (Fatehi et al., 2020). According to Tavares et al. (2018), social influence, self-perception, and habits also influence a patient's behavioral intent to enroll and use a portal,. Therefore, emphasizing EHR portal advantages and assisting users in managing health-related activities should be included in the initial promotion of portals (Tavares et al., 2018). These findings suggest a better understanding of what motivates patients and the importance of placing intentional effort toward welcoming all patients to use the portal, which may improve participation and overall effectiveness of the intervention.

A final barrier to adoption and enrollment in portals is the notion that this technology will replace face-to-face interactions with providers. Latulipe et al. (2015) found that patients specifically feared the loss of face-to-face interactions with their providers when they were offered enrollment in a portal. Due to similar findings, Zhao et al. (2018) concluded that for a

portal implementation to be effective, it must be designed with patient perspectives in mind and provide reassurance that portals provide an adjunct to care that will not replace traditional interactions.

Strategies and Facilitators of Adoption

As the importance of implementing various types of HIT continues to grow, so does the evidence related to best practices for effective programs. Much of the literature describes the importance of usability and design considerations; however, there is limited usefulness in translation to the primary care practice. Several exemplars and real-world applications will be described in further detail to provide specific instances of success related to a patient portal enrollment intervention in the clinic setting.

Training and Education

Multiple sources of literature highlighted the importance of training staff and providers when initially adopting a portal (Antonio et al., 2020; Coughlin et al., 2018; Nahm et al., 2017; Poussard et al. 2021; Ramsey et al., 2018). One study even recommended the identification of key members of staff to solely assist patients with portal sign-up, as it was shown to be an effective method of increasing enrollment (Ramsey et al., 2018). Additionally, training staff on new workflows that include patient portal registration and introduction of the patient portal view through step-by-step training is necessary, as it helps staff answer questions about the program thus promoting patient comfort in adoption (Nahm et al., 2017). Providing timely and appropriate staff training also assists with buy-in and enrollment rates, as they need to have a willingness to help patients complete the process (Fix et al., 2016). Literature has shown that without support from front-line staff including receptionists, nurses, and medical assistants, it is

unlikely that an enrollment program will be sustained and successful (Nahm et al., 2017; Poussard et al., 2021).

Stakeholder Involvement

In addition to patients, providers and program leaders are important stakeholders in a portal intervention project. Some program managers have emphasized that marketing tools are of critical importance (Fix et al., 2016), while others underscore the need for pilot testing of portal features during program development (Zhong et al., 2018). Stakeholders in other projects have mentioned the usefulness of education and tailoring messages to promote the portal. Emani et al. (2018) emphasized the importance to both staff and patients of showing the possible advantages of portal usage through fliers and brochures to demonstrate specific functions and practical uses.

Finally, several studies explicitly describe the importance of provider endorsement, as their trusting relationship with patients often leads to increased interest and enrollment in the portal (Antonio et al., 2020; Goel et al., 2011; Irizarry et al., 2015). In particular, Irizarry et al. (2015) emphasized that endorsement by providers and conceptualization of portals as a dynamic component of the patient-provider relationship will improve efforts to promote adoption and effectiveness.

Exemplars and Models for Success

Clinical examples of successful implementation programs for patient portal enrollment have been demonstrated and provide valuable insight into the successful translation of similar projects. First, Nahm et al. (2017) described the development and employment of a toolkit for ambulatory clinics to improve portal activation and usage. In the first phase, clinicians and staff

were trained to teach patients about the portal, and then general patient education was initiated. Staff training included adjustment of workflow, and the authors stressed the importance of designing training to meet the needs of each practice. This implementation process supported both the staff and patients by successfully addressing barriers that previously resulted in low adoption rates, such as poor staff involvement and electronic portal education.

Second, in a 12-week portal adoption program, Crockett and Carter-Templeton (2020) achieved a 90% portal utilization rate with a 94% new patient adoption rate by utilizing a tablet for portal registration. Check-in windows were used to highlight the benefits of portal use, and a host subdomain link to the office-based electronic medical record was employed for a simple one-step portal registration. Crockett and Carter-Templeton (2020) emphasize the importance of targeted on-site point-of-contact registration to improve portal adoption rates and a patient-centric portal design that is easy to use.

Similarly, Poussard et al. (2021) described a successful implementation program that involved instructing clinic staff and providers on how to educate patients on portal registration and use. Content included a portal overview, key points for patients, and how-to instructions with screenshots. Front desk staff provided an information sheet to patients explaining the program, and patients were immediately registered at a designated patient portal registration area with a dedicated mentor available to provide hands-on assistance. Marketing posters highlighting portal features were displayed in the clinic, and step-by-step access handouts were provided for accessing the portal at home upon completion of registration. The authors exceeded their aims and increased patient portal registration by 70% during the eight-week implementation timeline (Poussard et al., 2021).

Finally, in their recruitment of multiple clinic sites tasked with implementing a framework for patient portal enrollment, Avdagovska et al. (2020) determined two factors were associated with the successful uptake of portal implementation. The study site with the highest enrollment had a dedicated portal enrollment support person and offered enrollment to all patients presenting for visits (Avdagovska et al., 2020). In summation, the lessons and key factors described in the above sources of evidence will guide the implementation of the proposed project and assist in designing an effective patient portal enrollment program in the primary care setting.

Literature Synthesis for Project Interventions

Based on the reviewed body of literature, the proposed DNP project will utilize overarching implementation strategies that have demonstrated usefulness in patient portal enrollment in the adult population. The DNP student will guide the nursing staff, receptionist, and provider through an educational presentation on portal usage, a portal enrollment workflow process, and "on-the-spot" portal registration by a designated staff member, as demonstrated by Avdagovska et al. (2020). Positive marketing materials will also be implemented along with a patient brochure delineating step-by-step login instructions, as these items were shown to be crucial to obtaining patient buy-in and improving adoption rates (Emani et al., 2018; Fix et al., 2016; Poussard et al., 2021). Along with marketing materials displayed in the office, a brochure highlighting key factors gleaned from the literature will be provided at each patient visit. At the conclusion of each visit, the site nurse practitioner (NP) will be asked to encourage portal enrollment and reassure patients this will only augment current services, not replace personal interactions (Irizarry et al., 2015). The aim of the project is to increase the rates of patient portal

enrollment in the DNP project site after the adoption of the technology with the long-term goal of offering enrollment to all patients. This aim will be further facilitated through the mentorship of the new workflow and technical aspects of the enrollment process by the DNP student during the six-week implementation period.

CHAPTER THREE

SETTING AND METHODS

Introduction

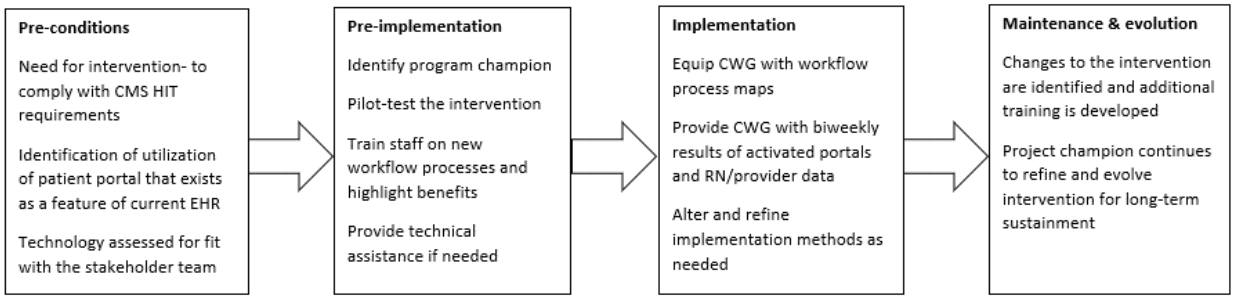
This DNP QI project's aim was to implement an employee workflow and standardized process to facilitate the enrollment of patients in a newly activated electronic patient portal. This aim was accomplished by three evidence-based methods, including (a) training employees on electronic patient portal use and enrollment, (b) providing marketing materials to patients presenting for visits, and (c) evaluating the success of offering "on-the-spot" electronic patient portal account activation. This chapter discusses the framework and theory chosen to guide the project, the setting, population, and procedures for implementation.

Quality Improvement (QI) Framework

The conceptual framework chosen to guide the DNP project is replicating effective programs (REP) as seen in Appendix B. This framework is applicable to the project as it was developed based on experiences from the U.S. Centers for Disease Control and Prevention (CDC) and has successfully been utilized to implement healthcare interventions (Kilbourne et al., 2007). Although the short-term goal of this project was to increase the number of patients enrolled by at least 20%, the REP framework was chosen because it also incorporates planning for long-term goals that will be accomplished after the completion of the project. The REP framework consists of four phases: pre-conditions, pre-implementation (e.g., intervention packaging and community input), implementation (e.g., package dissemination, training,

technical assistance, and evaluation), and maintenance and evolution (e.g., preparing the intervention for sustainability) (Kilbourne et al., 2007). To fully demonstrate the usefulness of the chosen framework, each phase will be further described below along with its relation to the project.

Figure 1. REP Framework



Note. Adapted from Kilbourne et al. (2007)

Pre-Conditions

The first critical component of the REP framework was identifying the need for the intervention, the population of interest, and a suitable intervention. These precondition components were achieved through the problem analysis and include examination of the current EHR technologies in use at the site, stakeholder support due to potential future financial incentives, and the site's desire to improve patient engagement along with caregiver support. Planning was also a component of this step and included meetings with key stakeholders and assessment of the technology supporting the intervention was completed during this phase.

Pre-Implementation

The pre-implementation phase required the development of staff training and included logistics planning and technical assistance. A pilot test of the intervention was conducted during

this stage and a program champion was identified at the organization as recommended by Ramsey et al. (2018). The patient brochure outlining the specific benefits of the portal, including communication with the clinic team, was developed during this stage and addresses the security of the portal (Wildenbos et al., 2018). A specific consideration in this phase was the development of the project budget, which generally requires the approval of funds from the organization or executive management. Therefore, a cost analysis was completed outlining the direct costs required for intervention deployment compared to the savings to the clinic for 270+ hours of voluntary work contributed by the DNP student. Additionally, logistic aspects of the implementation period were established, a timeline was created, and a community working group (CWG) was identified. Due to the small size of the clinic, stakeholders acted as CWG members and provided input for any adjustments of the intervention prior to the project kick-off (Kilbourne et al., 2007). The project budget and timeline are included in Appendix C and were presented and approved by the clinic owner and office manager during the pre-implementation phase. As the enrollment intervention takes less than two minutes to complete by front desk staff, the cost of increased workload was deemed negligible by the clinic manager and was not included as an overall project cost.

Implementation

The main phase of the REP model was to implement the chosen intervention. This phase included ongoing support of established partnerships and required the evaluation of the developed processes with feedback so the intervention could be refined. When necessary, booster training was also given to staff to ensure barriers were addressed and sustainability considered (Kilbourne, 2007). It was crucial during this time to maintain investment from the CWG and

proactively address barriers from feedback received. In addition, progress of the implementation was evaluated beginning in this phase, including advice on how to uphold fidelity of the core elements of the implementation while maintaining flexibility.

Maintenance and Evolution

Finally, the REP model discusses organizational and financial changes that will enable the maintenance and evolution of the intervention. This phase often includes tailoring the intervention, adjusting training recommendations, and preparing for national dissemination. The organizational and financial changes that will sustain the intervention are also discussed during this component and multilevel initiatives are taken to ensure long-term sustainment (Kilbourne, 2007). As this project provides the framework for becoming compliant with objectives associated with the CMS Quality Payment Program, its evolution and sustainment have financial implications for the clinic. Therefore, the program champion will remain committed to continuing to refine and develop the program at the conclusion of the project. Further maintenance and evolution techniques will be discussed in chapter five.

Conceptual Framework

The conceptual framework chosen to inform the implementation and evaluation of the DNP project is the Technology Acceptance Model (TAM). This model has previously been utilized to guide research on the effects of portals and the factors that drive the patient to engage in their activation and use (Lazard et al., 2016; Portz et al., 2019; Tao et al., 2018). Over the past three decades, the TAM is one of the most cited models in technology adoption, as it provides a robust and valid model to examine the acceptance of various types of technologies (Al-Emran et

al., 2021) Davis (1989) introduced the model to develop a valid measurement scale to predict user acceptance of computers. The implications grew exponentially from this original design as advances in technology and its various applications have occurred. The TAM was first integrated with Bandura's self-efficacy theory by Davis (1998) but has also been integrated with the Theory of Planned Behavior (Al-Emran et al., 2021). Due to its flexible nature, the model has proven to be useful for assessing the deployment of a variety of technologies and was, therefore, an appropriate choice for guiding this DNP project.

Project Setting, Target Population, and Stakeholders

The project site was a family nurse practitioner (FNP) owned clinic with approximately 888 active patients with an average of 160 patients seen monthly. The clinic consists of mostly middle to older adult patients; however, all patients were offered electronic patient portal enrollment regardless of age or health literacy status. The inclusion of all patients during the intervention period was first step in complying with regulatory expectations, and it may also encourage caregivers of vulnerable patients to use the electronic patient portal on their behalf.

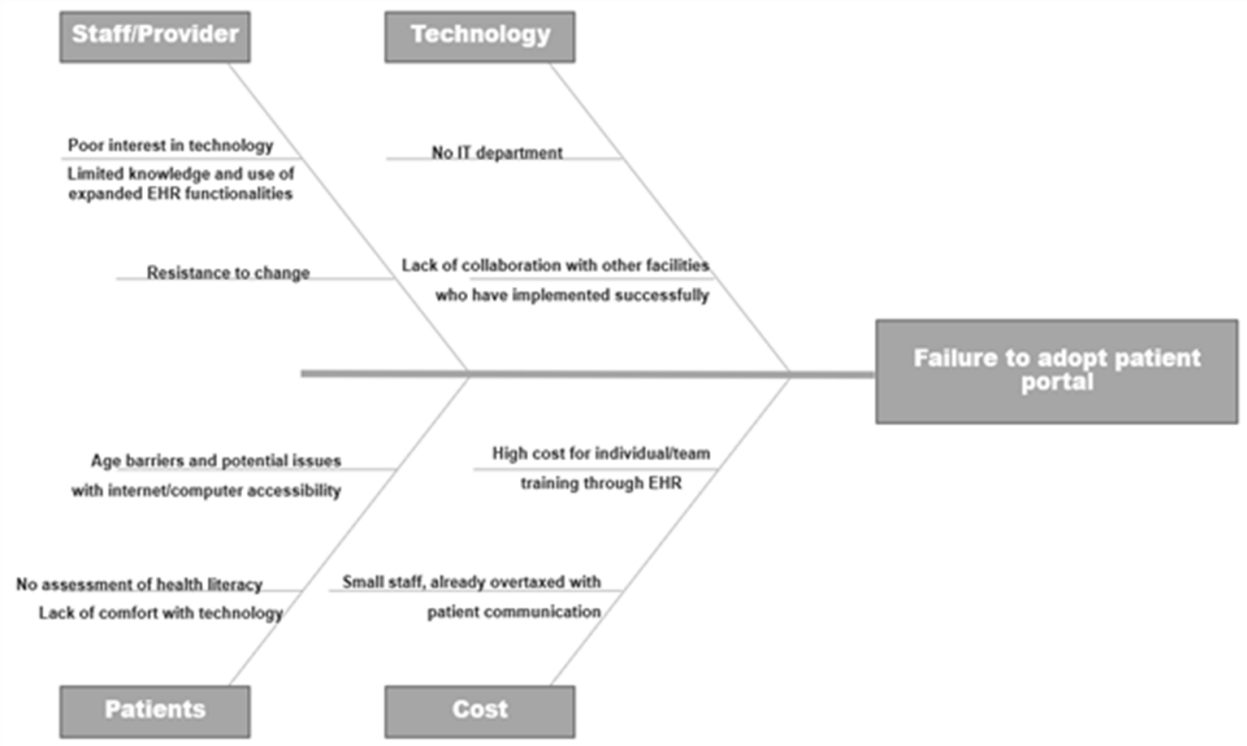
The DNP project included a team of key stakeholders, the CWG, which helped to facilitate the success of the project. The team was designed to be led by the DNP student with the office manager acting as the primary stakeholder and program champion in the absence of the DNP student. Evidence supports the incorporation of a support person should the team need assistance with technical aspects of the intervention. Although literature specifically cited the use of an registered nurse (RN) for this project, the role was fulfilled by the office manager due to the level of training and understanding this individual has of the portal tool. The team included full-time staff members comprised of the FNP, licensed practical nurse (LPN), and RN who also

functions as the receptionist. As the clinic is extremely limited in size, the FNP and office manager acted as the administrative/executive staff and were consulted for any issues related to the implementation and evaluation plan.

Project Barriers

There were several barriers prior to the implementation of the project, including the site's lack of previous attempts to enable the electronic patient portal function. The EHR system in use is Amazing Charts, a popular system for small clinics and provider-owned practices (Amazing Charts, 2019). Although the EHR excels in usability related to documentation of the patient encounter and e-prescribing of medications, add-on functions like portals have yet to be explored by the practice. Intriguingly, when discussing enabling the portal function with the office manager, it was discovered that there is no additional cost to utilize the tool, but rather the staff are "just not great with technology and don't even know that [the portal] is part of our system" (L. Stimac, personal communication, August 26, 2021). This reluctance is understandable in a small clinic without IT support. However, this barrier threatened full implementation of the project; therefore, education and development of new workflows and processes related to the function were given high priority. Additional considerations related to the problem analysis at this site are described in the fishbone diagram, Appendix A, which also considered the costs and potential staff burden associated with the project.

Figure 2. Fishbone diagram of project barriers



Project Facilitators

One inherent facilitator of the project was the site's EHR offers integration with a third-party platform that facilitates features such as electronic faxes, messaging, and patient portal access (Updox, 2021). The readily available electronic patient portal integration facilitated the project, as it eliminated the need for a dedicated IT department to lead the team through the intricacies of implementing a novel form of HIT. The portal platform is also integrated with the feature to grant family members or caregivers access to the primary patient's portal, further enabling its application for use in vulnerable populations. Additionally, the office manager functioning as the primary stakeholder facilitated the project as this individual is the most

knowledgeable on the EHR functions, supporting the findings of Ackerman et al. (2017) in which program champions eased the challenges of a new workflow.

An additional facilitator to the project was the utilization of the DNP student for implementation. A number of cost savings were identified, including an estimation of the cost of an RN's hourly wage at this site multiplied by the number of hours required for the DNP project course during the two semesters. Although some costs are required for the promotion and successful initiation of this intervention, the clinic saved $5,422.01 by facilitating the project through a DNP student rather than an employee (see Appendix C for a complete breakdown of costs and savings). The staff members at the clinic also routinely eat lunch together and discuss clinic business or host pharmaceutical representatives with potluck-style lunches. Therefore, the educational aspect of the project was conducted during one of these events, resulting in there being no additional cost for staff training or catering of a lunch-and-learn style presentation.

Project Design and Methods

SMART Goals and Measures

In establishing goals and measures for the DNP project, the SMART goals acronym was utilized. Although certain constraints to the project are predetermined, goals that are Specific, Measurable, Achievable, Realistic, and Timely are necessary (Moran et al., 2020). The short- and long-term goals were created in conjunction with the primary stakeholder to ensure feasibility and success. The short-term structure outcome of the project was to have 100% of site staff trained on the new work processes for enrolling patients in the portal by December 15, 2021. The intermediate-focused outcomes were to have 100% of patients seen during the six-week intervention period be given an informational brochure about the portal and have 20% of

patients seen for routine appointments during the intervention period choose to activate their portal. Finally, the long-term goal of the project, which extends beyond the DNP project timeline, is 100% of patients will be offered enrollment by December 31, 2022, in accordance with the 21st Century Cures Act deadline.

Project Methods

Steps

The project was conducted in two phases, with pre-conditions assessment and pre-implementation steps occurring prior to the six-week intervention period. Primarily, phase one included activation of the electronic portal component within the EHR and enrollment of the office manager as the pilot patient, as suggested by Akerman et al. (2017) and Zhong et al. (2018), which provided feedback and a better understanding of the technical aspects of the portal. This also allowed the DNP student and key stakeholder the opportunity to troubleshoot technology issues prior to the intervention period and provided a basis for becoming expert users of the program.

The next step of phase one focused on staff education, performed through a lunch-and-learn approach with a focus on familiarizing staff with the electronic patient portal and their individual roles in the project. The staff education that was presented is outlined below and included areas of importance as identified by Antonio et al. (2020), Coughlin et al. (2018), Nahm et al. (2017), Poussard et al. (2021), and Ramsey et al. (2018).

Staff Education Outline:

- Unique Portal Aspects
  - Usability

- Resources
- Patient Benefits

Workflow

- Limited time constraint on current work
- Simple activation process
- Endorsement at multiple areas within clinic

Benefits to Clinic

- Improved communication processes
- Decreases amount of time on phone with patients
- Secure form of communication, provides record of discussions
- Allows patients to view results and plan of care to prepare for appointment

A process map (Appendix E) was embedded within the presentation and explained in detail with time allotted for questions or feedback. Additionally, the staff was provided with a sample of the patient brochure (Appendix F) to elicit feedback on its design and support the new workflow processes presented.

The second phase, or implementation phase, of the project occurred during the six-week intervention period ranging from January 17, 2022 to February 24, 2022. The process map was posted in key areas as a visual reminder for staff to follow the steps outlined to maximize patient enrollment in the electronic patient portal. Due to the small cost of printing these pages and their incorporation into regular clinic processes, this cost was not included in the overall project budget. Per the process map, the nurse was to give the patient a portal brochure (Appendix H), allowing time for the patient to read about the potential uses and enrollment process while

waiting for the provider. At the conclusion of the visit, the provider verbally endorsed portal use for following up and communicating with the care team, as discussed by Irizarry et al. (2015). This step also supports the tenets of the TAM framework as the provider is equipped to address the two primary factors influencing an individual's intention to use new technology: perceived ease of use and perceived usefulness (Davis, 1989).

Finally, during the standard checkout workflow of scheduling follow-up appointments, the patient was offered the opportunity to have their patient portal activated by a member of the CWG. If they answered in the affirmative, steps were taken by reception to activate their portal "on-the-spot" before the patient left the clinic. Once the patient was successfully enrolled in the electronic portal, their username and password were written on their brochure to promote seamless login from their home computer. Finally, the electronic patient portal was promoted through the use of marketing materials posted in the lobby, at the reception desk, and in exam rooms. In a weekly huddle, data was shared with the project team to show the progress of patients successfully enrolled.

Human Subjects Protection

Patients engaging in the DNP project were protected through the use of Montana State University (MSU) Institutional Review Board (IRB) submission prior to project implementation. The project site did not have its own internal review process and consented to the review provided through MSU, see Appendix G. The IRB review was completed in November 2021 and granted exempt approval. This project constituted a change in process to the organization and offered no risk to the patient, as participation was completely voluntary and did not impact the

routine care received. No patient-specific information was obtained, thus promoting confidentiality and PHI protection by project design.

Measures and Instruments

Several measures were employed to determine the success of the implementation of electronic patient portal activation. The literature did not provide a specific validated tool or survey to utilize in determining success in patient portal enrollment, and success was typically determined simply by an increase in the aggregate number of patients enrolled. Therefore, one process measurement was the number of patients seen in the clinic for appointments as compared to the number of patients successfully enrolled. These numbers were collected each Friday during the intervention period via the CWG log and provided the total number of patients who completed the portal activation process.

Patient brochures were set out each week according to the approximate number of patients expected for visits. When a brochure was given to the patient, a checkmark was placed on a tracker next to the stack to show compliance with brochures being provided to each patient. Additionally, as provider endorsement is a key finding to success seen in the literature, portal endorsement was given at every encounter during the project timeline. The site provider is the primary owner of the practice and thus has a vested interest in advocating for the intervention; however, fliers were present in all exam rooms, further prompting endorsement. Data on brochures given were also collected on each Friday of the intervention and utilized to assess compliance and whether adjustments of the intervention were indicated. These results prompted discussion and determined any problems to be addressed in the next week's cycle.

The reception role at checkout was also assessed for compliance through the use of a tracker entitled, *Electronic Patient Portal Enrollment Offered*? The receptionist was able to quickly place a check mark after offering enrollment as the patient left the clinic, and this process also served as a reminder to offer enrollment. Qualitative feedback was also recorded if offered by the patient or a member of the CWG, as this provided valuable insight in guiding future project adaptations. Although the technology in place for use was not adjustable for the pilot enrollment program, once feedback was received, future adjustments may be indicated for long-term sustainment.

CHAPTER FOUR

DATA COLLECTION AND ANALYSIS

Introduction

Data was collected and analyzed weekly throughout the intervention and at the conclusion of the six-week intervention period. Participants included all adult patients presenting to the clinic, regardless of appointment type, for the intervention period from January 17, 2022, through February 24, 2022. A password-protected Excel spreadsheet was updated weekly with de-identified data in aggregate form with the following categories: number of patients successfully enrolled in the electronic patient portal, total number of patients seen in the clinic, and number of patients declining enrollment. These data are presented as a run chart for analysis and as a histogram for a final visual representation of the intervention success, both of which were shared every other Friday with the CWG. Data related to brochures given were also collected in the aggregate form via checkmarks tallied after providing care to each patient, with the denominator being a total number of patients for the week and the numerator being the number of checks marked indicating brochures were given to patients.

All data was protected and stored in a locked cabinet with only the primary stakeholder and the DNP student having access to the aggregate data recorded on the logs. The logs did not contain any patient identifying information, and after data was obtained in the aggregate form, the weekly logs were returned to the locked file cabinet and shredded after the six weeks.

Outcomes and Results

Outcomes were analyzed according to the previous SMART goals delineated and discussed in chapter three. Only the short-term and intermediate goals were analyzed as the long-term goals are beyond the scope of the current project. The initial short-term goal of having 100% of staff trained on the new system processes for enrolling and educating patients on portal functions was satisfied with the lunch-and-learn educational session held on December 15, 2021. The education session had maximum attendance with all clinic employees present, as well as two members of the public. The second smart goal analyzed at the end of the implementation period was to have 100% of patients seen during the intervention period be given an informational brochure with patient portal functions and capabilities. A total of 175 patients presented to the clinic for an appointment during the six-week intervention period, and 151 of these patients were offered a brochure, equating to approximately 86%. Of the 175 patients seen for a visit, 67 (38.29%) activated their patient portal, which exceeded the 20% goal put forward at the project's outset. The total number of patient visits, brochures given, and portals activated are displayed as a histogram in Figure 3 below and tallies of daily numbers are also presented as a run chart in Figure 4. Finally, although no official surveys or qualitative measures were collected, members of the intervention team were encouraged to keep a record of patient comments throughout the intervention period to assist with adjustments for long term sustainment. These comments can be seen in Figure 5 below and will be analyzed in more detail in the discussion section.

Figure 3. Total number of patients compared to project goals

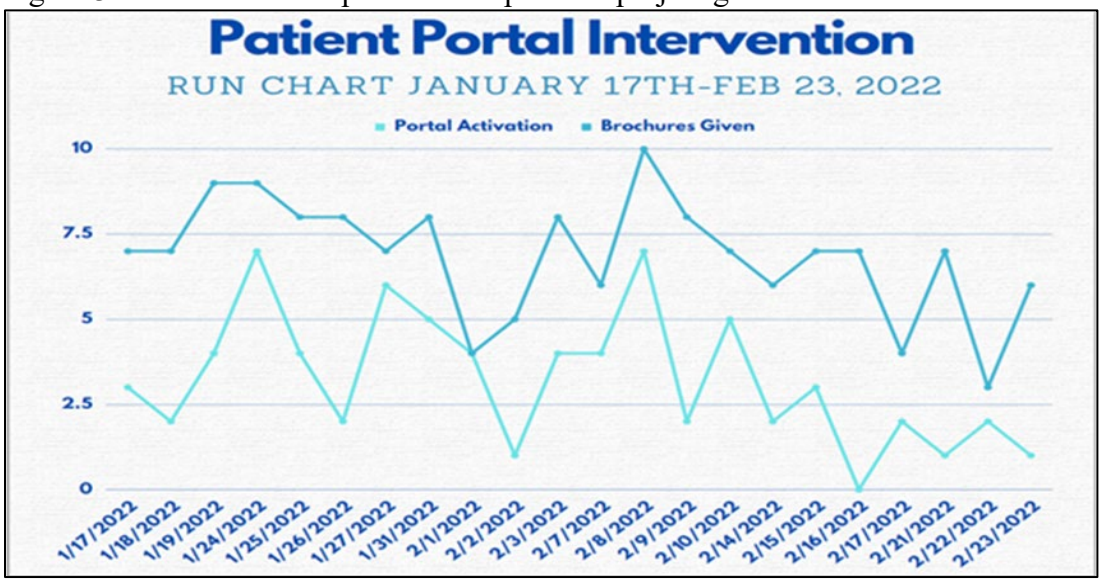


Figure 4. Brochures given and portals activated by date

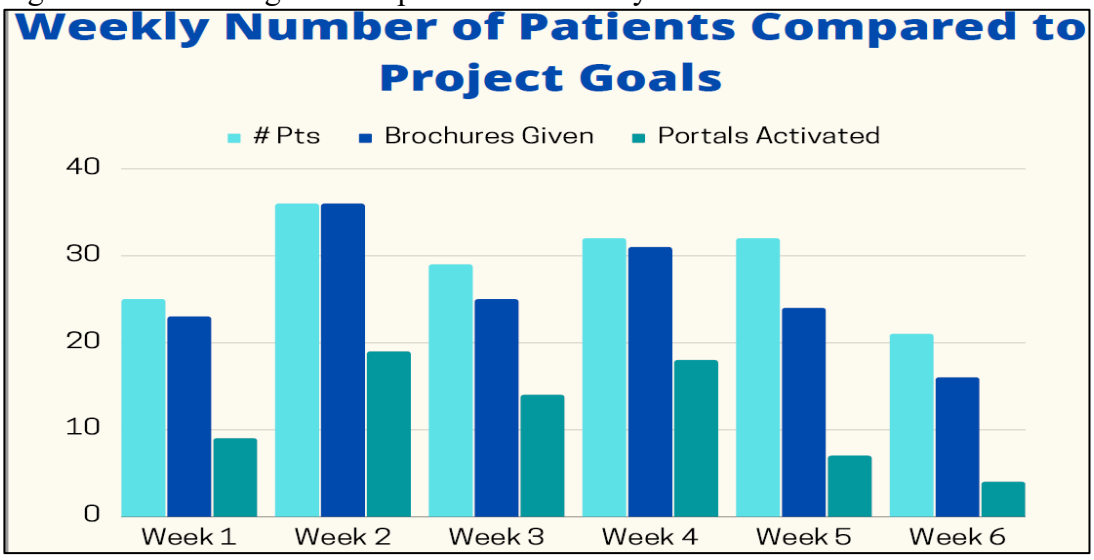
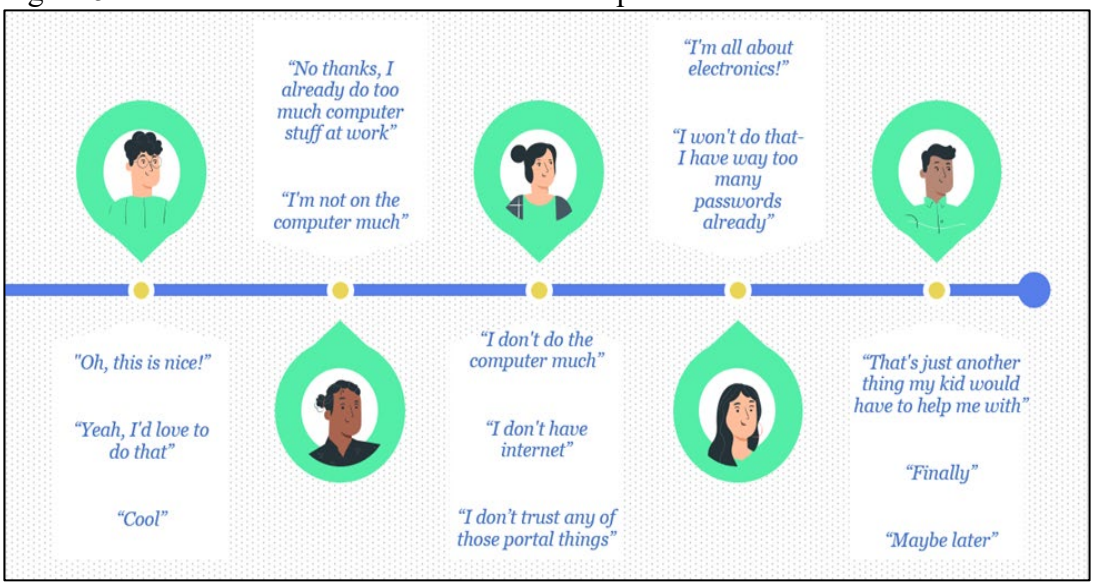


Figure 5. Patient comments and feedback when portal activation was offered



Discussion and Lessons Learned

The primary purpose of the intervention was to make all patients aware of their option to electronically request their medical records through the newly activated patient portal to comply with the federal mandates from the 21st Century Cures Act: ONC's Final Rule. Several lessons were gleaned upon analyzing the data at the end of the intervention period in light of the purpose presented in chapter one. One of the more surprising aspects of analyzing the data throughout the intervention was the failure to meet the SMART goal of providing each patient with a brochure highlighting the portal. However, the receptionist provided valuable feedback on this process change, stating that it was difficult to adjust to the addition to her routine, which will be discussed in further detail in the recommendations section. This scenario demonstrated that no matter how seemingly simple an intervention may be, it is always useful to anticipate human error by intuitively incorporating changes into current processes. Additionally, it was clear from the outset of the intervention period that flexibility and adaptability are key components of

success. After the first couple of days of working through the intervention, the team identified areas in the process map that could be adjusted to save time and simplify the process for the patient.

Another key lesson was discovery that team roles originally designated may need to shift to facilitate intervention processes. Although the program champion role was assigned to the office manager, the receptionist who had previously voiced concerns and discomfort with technology ended up being the lynchpin to the success of the intervention. This individual identified in the first couple days of the intervention that it would make more sense to provide the patient with the brochure at check-in, rather than having the RN give it to them during the rooming process. This week one change aligns with the recommendations from Ramsey et al. (2018) as it allowed patients more time to peruse the brochure and resulted in continuity that likely had a positive effect on portal activation. The success seen in week two seems to indicate that this change resulted in higher numbers of brochures given as well as the highest number of portals activated. A change led by a member of the CWG rather than the DNP student shows investment in sustainability and is also supported by Langley (2009) who discussed that input from stakeholders after initial implementation by of an organizational change is useful in conducting planning for improvement.

Figure 3 also demonstrates close alignment between brochures given and portal activation. This suggest that patients are likely to activate their patient portal if given the opportunity. Poussard et al. (2021) had similar engagement when offering a portal information sheet to patients presenting for visit, further supporting the effectiveness of this intervention. It can also be noted that the number of patients versus brochures given seemed to change more

drastically in Weeks 5 & 6. At the CWG post-intervention de-brief, a specific reason was not given for this decline, but the receptionist conjectured that those weeks ended up being "less routine" than the initial weeks and that other priorities took precedence.

Finally, project team members highlighted the importance of not underestimating a certain subgroup of the population in an intervention that involves technology. Although patient demographics were not collected, the receptionist and nurse discussed that many of the patients who were the most excited about the intervention were 60 years of age or older. These findings are similar to those of Bauer et al. (2017) who found that older adults were equally as likely to be aware of and use a patient portal as younger patients and highlights the importance of inclusivity. Figure 3 suggests that although the acceptance and activation of portals exceeded the predetermined goal, there is a mixed acceptance and hesitancy with more technology. This finding is directly related to the findings of Tavares and Oliveira (2018), who discussed factors that drive the adoption of EHR portals, including the importance of determining what a patient values when managing their health.

Limitations

A number of limitations were identified throughout the intervention, many of which were related to the EHR capabilities supporting the patient portal function. One limitation noted by the office manager was the inability to enable a notification system or "pop-up," which could be added to the EHR system at checkout to prompt the receptionist's memory. Next, limitations in the features provided by the software included constraints on the type of document that is automatically generated and sent to the portal upon completion of a visit with the provider. Several of the patients who expressed interest in portal access were primarily concerned with

having immediate access to their lab work and imaging reports, which was consistent with the findings discussed by Avdagovska et al. (2020) when discussing the most commonly used portal functions. These results can be manually sent to a patient's portal upon request, it is unfortunately not as seamless an experience as one may have in utilizing a large health system's patient portal that populates in-facility results immediately. Although this did not appear to be a deterrent to the goal of patients choosing to activate their portal, it is noteworthy for future implications and uses of the portal at this site.

In addition to the technical issues, there were also some limitations in the short time frame of the intervention, as well as some overlap with patients who required two-to-four-week follow-up appointments from the start of the intervention. Staff discussed the lack of a process for determining whether a patient had already been offered portal information at a prior visit, which resulted in some patients being asked and declining enrollment twice during the intervention period. This was not addressed in pre-implementation planning as no baseline data was available to account for patients returning more frequently for follow-up appointments.

Recommendations for Future Practice

Collaborating with a practice who had previously activated the same patient portal might have facilitated the project's success. This would have provided the opportunity inquire as to how they handled initial enrollment issues and incorporated portal usage into their staff workflow. Additionally, although establishing a portal account for the project champion was useful to view login functionality and trial various functions, it may have been more useful to have a small group of patient volunteers to be part of the pilot enrollment as supported by Tavares & Oliveira (2016). Seeing the process through with patients who are actually scheduled

for encounters and then walking through the features with them would have given much better insight to the CWG. Piloting the process with a small group of patients may have also mitigated some confusion, as in the first week of implementation the team was contacted through the portal messaging function by a patient in who wondered whether the portal homepage should be blank upon logging in. After some investigation by the DNP student, it was discovered that certain administrative actions needed to be taken to ensure that the clinical summary document would be sent automatically.. This pre-implementation change is consistent with the recommendations given by Zhong et al. (2018) and stresses the importance of gathering information with a small group of patients prior to complete implementation. The patient feedback was valuable not only in alerting the team to adjust the technical issue within the first week of the intervention but is also a crucial area for sustainment. In fixing the technical issue, the CWG also discovered a feature enabling a welcome message to be displayed upon patients logging into their individual portal account.

The data collected in regard to providing a patient with a brochure informed a key area for modifications when planning future project iterations. This is a crucial point in the process as it provides an introduction to the portal and its functions prior to asking patients if they would like to activate their portal at the end of their visit. Once the deficiency of failing to provide each patient with a brochure was identified, action was taken in week one by the receptionist through the form of a sticky note placed as a visible reminder, but ultimately this was not satisfactory as the 100% goal was still not met in the following weeks. Due to the EHR limitations, it would be better to automate the workflow by placing a portal brochure in every patient's chart. For clinics that still utilize hard charts in addition to EHR's, this has the dual benefit of knowing whether

patients have already been offered enrollment and allows for a more seamless process by removing the barrier of having to remember to grab a brochure from a separate stack. In future iterations of this project, it is recommended that a dedicated person take the role of placing the portal brochure in the remaining hard charts. In the clinical site, the employee who prepares charts for clinic visits is a natural fit for this workflow adjustment. This individual prepares charts four weeks at a time and has already been approached by the clinic manager to implement this process now that the DNP pilot QI project is complete. When prepping the charts, the EHR will first be checked to determine whether the portal has been activated, if not, the brochure will be added to the hard chart and a checkmark will be placed on the chart itself. Although there will still be some duplication in offering the portal to patients presenting in the pilot intervention period who previously declined portal activation, this process change will facilitate sustainability and ensure all patients are offered enrollment.

In summation, in post-project discussion with the CWG, the below recommendations for project adaptation and sustainability were identified:

1. The receptionist recommended that the brochure be given at check-in rather than during rooming to provide continuity in the portal activation process. This will allow the brochure to be given with other check-in paperwork and provides more opportunity for the patients to read about portal functions. This sustainability measure was identified in the first week of the intervention period and the CWG agreed that this process should continue until all patients are introduced to the portal.

2. As discussed, difficulty remembering to provide each patient with a brochure was a key finding from the data and required action be taken to ensure sustainment. After completion of the intervention period, the office manager suggested proactively placing a brochure in each chart as they are prepped for the month's appointments. This recommendation was approved by the CWG, and this action was taken immediately after the completion of the intervention period as described above and will continue until all patients have been exposed to the patient portal. The new SMART goal related to providing patients with brochures is: 100% of charts prepped for upcoming patient visits will be provided with an informational brochure with patient portal functions and capabilities starting Feb 28, 2022 and continuing until all patient charts have a checkmark indicating a brochure has been given.
3. The office provider, LPN, and office manager recommended that a process be initiated to establish a workflow to prepare for increased numbers of patients with active portals and the addition of future portal functions. As part of the sustainability program, the office manager will continue to act as the program champion and began developing a workflow for identifying various types of portal interactions in the week following the intervention period. Another SMART goal is being developed to ensure effective communication is facilitated by the portal and workflows are created. The working goal is as follows: 100% of staff will be trained on the new system processes for checking portal messages

and following the workflow for organizing messages by various categories by May 15, 2022.

Conclusion

Overall, it appeared that patients presenting to the clinic were mostly enthusiastic about the possibility of obtaining their records online and having an alternative method of communication with the office rather than the pre-project voicemail process. While future iterations of the project will likely allow for additional actions to be taken by patients, such as self-scheduling appointments and requesting prescription refills, only basic portal functions were enabled and highlighted to the patients in this initial enrollment period.

Although some adjustments were required to facilitate the continued progress and success of the intervention, the process ended up being a fairly simply addition to the clinic's previous workflow, as evidenced by only 24 patients being missed in the primary goal of project implementation. In spite of the several identified shortfalls, the intervention appeared to be successful with the project exceeding the secondary goal of portal activation approximately 18%. The CWG members verbalized that they intend to continue with the current process to provide information on the portal and offer enrollment to all patients with minor modifications as recommended above. The primary goal of the DNP project stemmed from the need to maintain compliance with federal regulatory expectations. This need was successfully met through the successful activation of the patient portal at this site and had the additional benefit of providing the clinic with the tools to carry out similar quality improvement projects involving health information technology in the future.

CHAPTER FIVE

DNP ESSENTIALS

Reflection of DNP Essentials

Throughout my academic experiences in the MSU DNP Program, I have had ample opportunities to master the eight DNP Essentials outlined by the American Academy of Colleges of Nursing (AACN). Essentials I, *Scientific Underpinnings for Practice*, was emphasized in a number of courses, but particularly through the Design of Healthcare Systems and the Translational Research course. In the Design of Healthcare Systems course, I became familiar with tools that can be utilized to evaluate healthcare systems through flowcharts, run charts and Pareto charts, for example. Using the knowledge gleaned in this course, I successfully evaluated a clinic microsystem, determined areas for improvement, and proposed changes to current processes to address inefficiencies. This knowledge was further solidified when applied to the development and assessment of the clinical problem that was to be addressed through the DNP project. The creation of a flowchart to identify areas contributing to the clinical problem was conducted at the outset and was useful for informing the practical steps needed to affect organizational change. Additionally, nursing science and theory was researched to identify an appropriate approach to use as a guide for implementing the proposed practice change. Ultimately, the Technology Acceptance Model (TAM) was chosen to provide the theoretical underpinnings for the project, which led to the development of a workflow intended to enhance the delivery of care at the project site.

Essential II, *Organizational and System Leadership for Quality Improvement and Systems Thinking*, is intended to ensure that the DNP student is prepared to ensure accountability for the safe care of patient and evaluate care delivery approach (AACN, 2006). Within this essential is the importance of employing principles of business and finance, developing and monitoring budgets, and analyzing cost effectiveness of practice initiatives (AACN, 2006). The Financing and Budget Systems course prepared students to meet all of these objectives and culminated in a final project in which I utilized principles of strategic and financial planning to propose the integration of telehealth services in a small rural health clinic. Furthermore, I was able to translate the lessons gleaned from this coursework to create a budget for materials needed to complete the DNP project interventions and calculate the cost-effectiveness of the practice change. Having this solid background knowledge not only allowed for the project budget to be approved by the clinic owner and office manager, but also resulted in demonstrating that the practice change by the DNP student ultimately saved the clinic over $5,000 in labor and training costs.

Essentials III, *Clinical Scholarship and Analytical Methods for Evidence-Based Practice* was mastered through the iterative process of completing the Evidence Based Practice Courses I and II, Translational Research, and the precursor course to the DNP project, Scholarly Writing. Completing in-depth clinical appraisals of research and using this skill to develop a translational research project on implementing best practices in the diagnosis and treatment of osteoporosis solidified the process of evaluating research in designing an evidence-based intervention. In the Scholarly Writing course, this was taken a step further as evidence was analyzed and reviewed to write the initial chapters of a theoretical DNP project. All of these courses facilitated the process

of thinking on a macro level and designing an approach to an existing clinical practice problem through the eventual completion of the DNP project. The skills for utilizing best evidence for practice to develop methodologies to promote efficient and patient-centered care are hallmarks of Essential III and were thoroughly grasped by the end of the DNP project.

When reflecting on my experiences and assignments throughout the program, I feel I have particularly mastered the competencies aligned with Essential IV, *Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care*. This essential focuses on the importance of DNP graduates playing a role in the use of information systems and technology to enhance patient care and provide leadership within a healthcare system (AACN, 2006). The groundwork for information systems was laid in the Healthcare Informatics course, in which a comprehensive five-part Health Information Technology project was proposed to address a key patient safety issue through the use of technology. After analyzing the processes of an inpatient labor and delivery unit, I was able to determine that a significant threat was posed to patients through the disjointed health information systems that were in use. Although patients were seen in the same setting for both prenatal visits and delivery, two separate health information systems were in use. Inpatient staff had to transcribe documents from the prenatal visits and if information was missed or incorrectly transferred, significant safety events were possible. Ultimately, I proposed a comprehensive implementation plan involving the transition to an interoperable EHR which would ensure all patient information was accurate during their inpatient stay. The thorough understanding of information technology systems gleaned through this project translated directly to the goals of the DNP project. This knowledge also assisted me in effectively leading an interdisciplinary

team through a workflow designed to integrate a novel form of healthcare technology within the clinical site.

Finally, Essential VIII, *Advanced Nursing Practice*, was fulfilled through the completion of the DNP project as systems thinking as well as designing and evaluating areas for evidence-based care were intentionally carried out in the planning and implementation stages. I was able to successfully educate and guide an interdisciplinary group through the transition to a new workflow that facilitated a change that would meet federal regulatory expectations and provide a new resource for patients. In this way, I analytically linked the practice to organizational, fiscal, and policy issues by identifying the need for the intervention and carrying out a successful practice change addressing the issue. This essential also integrates experiential components in the DNP curricula, which help to prepare the DNP student to be well rounded for clinical practice. The development of therapeutic relationships with patients and other professionals is crucial to advanced practice and was met through the immersive experience of conducting the DNP project. Relationships were sustained and trust was established through the pre-implementation actions, adjustments made during the implementation phase, and debrief with the intervention team at the end of the intervention period. In conclusion, the DNP project was truly the culmination of the expansive knowledge garnered throughout the program. This application of knowledge resulted in a product which positively impacted the organization and the lessons learned will serve as the groundwork and stepping off point for my future scholarly practice.

REFERENCES CITED

21st Century Cures Act of 2016, H.R. 34, 114th Cong. §2(a) (2016).

21st Century Cures Act: Interoperability, Information Blocking, and the ONC Health IT Certification Program, 2020. https://www.federalregister.gov/documents/2020/05/01/2020-07419/21st-century-cures-act-interoperability-information-blocking-and-the-onc-health-it-certification

Ackerman, S. L., Sarkar, U., Tieu, L., Handley, M.A., Schillinger, D., Hahn, K., … & Lyles, C. (2017). Meaningful use in the safety net: A rapid ethnography of patient portal implementation at five community health centers in California. *Journal of the American Medical Informatics Association (JAMIA), 24*(5), 903-912. https://doi.org/10.1093/jamia/ocx015

Al-Emran, M. & Granic, A. (2021). Recent advances in technology acceptance models and theories. *Studies in Systems, Decision, and Control, 335*, 1-10. https://doi-org/10.1007/978-3-030-64987-6_1

Amazing Charts (2019). *An EHR Built by Physicians, For Physicians*. https://amazingcharts.com/

American Academy of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing practice*. https://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf

The American Recovery and Reinvestment Act, 2009. http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf

Ancker, J. S., Osorio, S. N., Cheriff, A., Cole, C. L., Silver, M., & Kaushal, R. (2014). Patient activation and use of an electronic patient portal. *Informatics for Health and Social Care, 40*(3), 1-13. https://doi.org/10.3109/17538157.2014.908200

Antonio M., Petrovskaya, O., & Lau F. (2020). The state of evidence in patient portals: Umbrella review. *Journal of Medical Internet Research, 22*(11). https://doi.org/10.2196/23851

Avdagocska, M., Menon, D., & Stanfinski, T. (2020). Capturing the impact of patient portals based on the quadruple aim and benefits evaluation frameworks: Scoping review. *Journal of Medical Internet Research, 22*(12). https://doi.org/10.2196/24568

Avdagovska, M., Ballermann, M., Olson, K., Graham, T., Menon, D., & Stafinski, T. (2020). Patient portal implementation and uptake: Qualitative comparative case study. *Journal of Medical Internet Research, 22*(7). https://doi.org/10.2196/18973

Bauer A.M., Rue, T., Munson, S.A., Ghomi, R.H., Keppel, G.A., Cole, A.M., … & Katon, W. (2017). Patient-oriented health technologies: Patients' perspectives and use. *Journal of Mobile Technology in Medicine, 6*(2), https://doi.org/10.7309/jmtm.6.2.1

Bodenheimer, T. and Sinsky, C. (2014). From triple to quadruple aim: Care of the patient requires care of the provider. *Annals of Family Medicine, 12*(6). https://doi.org/ 10.1370/afm.1713

California Health Care Foundation (2013). *Patient portals in the safety net: Phase 2: Implementation*. Lessons from the Field. https://www.chcf.org/wp-content/uploads/2018/01/PatientPortalsSafetyNetPhase2Implementation.pdf

Centers for Medicare & Medicaid Services (2021). *Quality payment program*. https://qpp.cms.gov/mips/overview

Clarke, M. A., & Karls, K. C., (2019). Determining patient's interest in patient portal use in a primary care clinic to improve portal adoption. *Advances in Intelligent Systems and Computing, 957*, 97-106. https://link.springer.com/chapter/10.1007/978-3-030-20451-8_10

Coughlin, S. S., Stewart, J. L., Young, L., Heboyan, V., & De Leo, G. (2018). Health literacy and patient portals. *International Journal of Medical Informatics, 113*, 43-48. https://doi.org/10.1016/j.ijmedinf.2018.02.009

Crockett, S., & Carter-Templeton, H. (2020). A portal adoption program to enhance patient satisfaction in primary care. *Computers, Informatics, Nursing, 38*(8), 402-407. https://doi.org/ 10.1097/CIN.0000000000000605

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3). https://www.jstor.org/stable/249008

Emani, S., Peters, E., Desai, S., & Karson, A.S. (2018). Perceptions of adopters versus non-adopters of a patient portal: An application of diffusion of innovation theory. *BMJ Health & Care Informatics, 25*(3). https://doi.org/10.14236/jhi.v25i3.991

Fatehi, A., Gonzalez, A., Ring, D. C., & Queralt, M. (2020). Psychosocial factors are associated with electronic portal registration. *Clinical Orthopedics and Related Research, 478*(9), 2079-2084. https://doi.org/ 10.1097/CORR.0000000000001278

Final Rule Medicare and Medicaid Programs; Electronic Health Record Incentive Program, 42 C.F.R. § 412, 413, 422 (2010).

Fix, G. M., Hogan, T. P., Amante, D. J., McInnes, K., Nazi, K., & Simon, S. (2016) Encouraging patient portal use in the patient-centered medical home: Three stakeholder perspectives. *Journal of Medical Internet Research, 18*(11). https://doi.org/10.2196/jmir.6488

Fraccaro, P., Vigo, M., Balatsoukas, P., Buchan, I. E., Peek, N., & van der Veer, S. N. (2017). Patient portal adoption rates: A systematic literature review and meta-analysis. *Studies in Health Technology and Informatics, 245*. https://doi.org/10.3233/978

Gettinger, A., & Zayas-Cabán, T. (2021). Hitech to 21st-century cures: Clinician burden and evolving health IT policy. *Journal of the American Medical Informatics Association (JAMIA), 28*(5), 1022–1025. https://doi.org/10.1093/jamia/ocaa330

Goel, M. S., Brown, T. L., Williams, A., Cooper, A. J., Hasnain-Wynia, R., & Baker, D. W. (2011a). Patient reported barriers to enrolling in a patient portal. *Journal of the American Medical Informatics Association, 18*(Supplement 1), i8-i12. https://doi.org/10.1136/amiajnl2011-000473

Goldzweig, C. L., Orshansky, G., Paige, N. M., Towfigh, A. A., Haggstrom, D. A., Miake-Lye, I., ... & Shekelle, P. G. (2013). Electronic patient portals: Evidence on health outcomes, satisfaction, efficiency, and attitudes: A systematic review. *Annals of Internal Medicine, 159*(10), 677-687. https://doi.org/0.7326/0003-4819-159-10-201311190-00006

Henricks, W.H. (2011). "Meaningful use" of electronic health records and its relevance to laboratories and pathologists. Journal of Pathology Informatics, 2(7). https://doi.org/ 10.4103/2153-3539.76733

H.R. 1- 111th Congress (2009-2010): The American Recovery and Reinvestment Act. (2009, February 17). https://www.congress.gov/bill/111th-congress/house-bill/1

H.R. 34- 114th Congress (2015-2016): 21st Century Cures Act. (2016, December 13). https://www.congress.gov/bill/114th-congress/house-bill/34

Irizarry, T., DeVito Dabbs, A., & Curran, C. R. (2015). Patient portals and patient engagement: A state of the science review. *Journal of Medical Internet Research, 17*(6), e148. https://doi.org/10.2196/jmir.4255

Irizarry, T., Shoemake, J., Nilsen, M. L., Czaja, S., Beach, S., & DeVito Dabbs, A. (2017). Patient portals as a tool for health care engagement: A mixed-method study of older adults with varying levels of health literacy and prior patient portal use. *Journal of Medical Internet Research, 19*(3), e99. https://doi.org/10.2196/jmir.7099

Jensen, R. E., Gummerson, S. P., & Chung, A. E. (2016). Overview of patient-facing systems in patient-reported outcomes collection: Focus and design in cancer care. Journal of Oncology Practice, 12(10), 873–875. https://doi.org/10.1200/JOP.2016.015685

Johnson, R. (2016). A comprehensive review of an electronic health record system soon to assume market ascendancy: EPIC®. *Journal of Healthcare Communications, 1*(4). https://doi.org/10.4172/2472-1654.100036

Ketterer, T., West, D. W., Sanders, V. P., Hossain, J., Kondo, M. C., & Sharif, I. (2013). Correlates of patient portal enrollment and activation in primary care pediatrics. *Academic Pediatrics, 13*(3), 264-271. https://doi.org/10.1016/j.acap.2013.02.002

Kilbourne., A.M., Neumann, M.S., Pincus, H.A., Bauer, M.S., & Stall, R. (2007). Implementing evidence-based interventions in health care: Application of the replicating effective programs framework. *Implementation Science 2*(42). https://doi.org/ 10.1186/1748-5908-2-42

Kim, H., & Xie, B. (2017). Health literacy in the eHealth era: A systematic review of the literature. *Patient Education and Counseling, 100*(6), 1073-1082. https://doi.org/ 10.1016/j.pec.2017.01.015

Krist, A. H., Woolf, S. H., Bello, G. A., Sabo, R. T., Longo, D. R., Kashiri, P., ... & Cohn, J. (2014). Engaging primary care patients to use a patient-centered personal health record. *Annals of Family Medicine, 12*(5), 418-426. https://doi.org/10.1370/afm.1691

Lafata, E. J., Miller, C. A., Shires, D. A., Dyer, K., Ratliff, S. M., & Schreiber, M. (2018) Patients adoption of and feature access within electronic patient portals. *The American Journal of Managed Care, 24*(11), 352-357. https://pubmed-ncbi-nlm-nih-gov.proxybz.lib.montana.edu/30452203/

Langley, G. J., Moen, R. D., Nolan, K. M., Nolan, T. W., Norman, C. L., & Provost, L. P. (2009). *The improvement guide* (2nd ed.). Jossey Bass Wiley.

Latulipe, C., Gatto, A., Nguyen, H. T., Miller, D. P., Quandt, S. A., Bertoni, A. G., … & Arcury, T. A. (2015). Design considerations for patient portal adoption by low-income, older adults. *Human Factors in Computing Systems, April*(2015). 3859-3868. https://doi.org/10.1145/2702123.2702392

Lazard, A. J., Watkins, I., Mackert, M., Xie, B., Stephens, K., & Shalev, H. (2016). Design simplicity influences patient portal use: The role of aesthetic evaluations for technology acceptance. *Journal of the American Medical Informatics Association (JAMIA), 23*(e1) e157-e161. https://doi.org/10.1093/jamia/ocv174

Lengyel-Gomez, B. (2018). *21st Century Cures Act—A summary*. Healthcare Information and Management Systems Society, Inc. (HIMSS). https://www.himss.org/resources/21st-century-cures-act-summary

Marcotte, L., Seidman, J., Trudel, K., Berwick, D., Blumenthal, D., Mostasharis, F., & Jain, S. (2012). Achieving Meaningful Use of Health Information Technology: A Guide for Physicians to the EHR Incentive Programs. *Archives of Internal Medicine, 172*(9), 731–736. https://doi.org/10.1001/archinternmed.2012.872

Melnyk, B. M., & Fineout-Overholt, E. (2005). *Evidence-based practice in nursing & healthcare: A guide to best practice*. Lippincott Williams & Wilkins.

Moran, K. J., Burson, R., & Conrad, D. (2020). The Doctor of Nursing practice project: A framework for success. Jones & Bartlett Learning.

Nagykaldi, Z., Aspy, C. B., Chou, A., & Mold, J. W. (2012). Impact of a wellness portal on the delivery of patient-centered preventive care. Journal of the American Board of Family Medicine, 25(2), 158–167. https://doi.org/10.3122/jabfm.2012.02.110130

Nahm, E., Diblasi, C., Gonzales, E., Silver, K., Zhu, S., Sagherian, K., & Kongs, K.(2017). Patient-centered personal health record and portal implementation toolkit for ambulatory clinics: A feasibility study. Computers, Informatics, Nursing, 35(4), 176-185. https://doi.org/ 10.1097/CIN.0000000000000318

Nambisan P. (2017). Factors that impact Patient Web Portal Readiness (PWPR) among the underserved. International Journal of Medical Inform*atics, Jun*(102), 62-70. https://doi.org/10.1016/j.ijmedinf.2017.03.004

National Institutes of Health, National Cancer Institute. (2021). *Trends and disparities in patient portal use* (Health Information National Trends Survey (HINTS) No. 45). https://hints.cancer.gov/docs/Briefs/HINTS_Brief_45.pdf

Neuner, J., Fedders, M., Caravella, M., Bradford, L., & Schapira, M. (2014). Meaningful Use and the patient portal: Patient enrollment, use, and satisfaction with patient portals at a later-adopting center. *American Journal of Medical Quality, 30*(2), 105-113. https://doi.org/10.1177/1062860614523488

Office of the National Coordinator for Health Information. (2021). Health IT legislation. U.S. Department of Health & Human Services. https://www.healthit.gov/topic/laws-regulation-and-policy/health-it-legislation

Office of the National Coordinator for Health Information Technology. (2021). *What is interoperability?* The Office of the National Coordinator for Health Information Technology (ONC). https://www.healthit.gov/topic/interoperability

Office of the National Coordinator for Health Information Technology. (2021). *ONC Cure's Act Final Rule*: About ONC's Cures Act Final Rule. https://www.healthit.gov/curesrule/overview/about-oncs-cures-act-final-rule

Ose, D., Kunz, A., Pohlmann, S., Hofmann, H., Qreini, M., Krisam, J., Uhlmann, L., Jacke, C., Winkler, E. C., Salize, H.-J., & Szecsenyi, J. (2017). A personal electronic health record: Study protocol of a feasibility study on implementation in a real-world health care setting. *JMIR Research Protocols, 6*(3). https://doi.org/10.2196/resprot.6314

Pew Research Center (2021, April 7). Mobile Fact Sheet. https://www.pewresearch.org/internet/fact-sheet/mobile/

Physicians Advocacy Institute (2021). *2021 Merit-Based Incentive Payment System (MIPS) scoring overview*. http://www.physiciansadvocacyinstitute.org/Portals/0/assets/docs/MIPS-Pathway/MIPS%20Scoring%20Overview.pdf

Portz, J. D., Bayliss, E. A., Bull, S., Boxer, R. S., Bekelman, D. B., Gleason, K., & Czaja, S. (2019). Using the technology acceptance model to explore user experience, intent to use, and use behavior of a patient portal among older adults with multiple chronic conditions: Descriptive qualitative study. *Journal of Medical Internet Research, 21*(4). https://doi.org/10.2196/11604

Poussard, K., Elkins, C., & Gilbert, G. E. (2021) Can you hear me now? A patient portal initiative program to increase patient engagement in an outpatient primary care setting. *Online Journal of Nursing Informatics, 25*(1). https://www.himss.org/online-journal-nursing-informatics-volume-25-spring-2021

Ramsey, A., Lanzo, E., Huston-Paterson, H., Tomaszewski, K., & Trent, M. (2018). Increasing Patient Portal Usage: Preliminary Outcomes From the MyChart Genius Project. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine, 62*(1), 29–35. https://doi.org/10.1016/j.jadohealth.2017.08.029

Rosario, C. (2021). What is the 21st Century Cures Act Final Rule, and why is it important? Advanced Data Systems Corporation. https://www.adsc.com/blog/what-is-the-21st-century-cures-act-final-rule

Shi, Y., Amill-Rosario, A., Rudin, R., Fischer, S., Shekelle, P., Scanlon, D., & Damberg, C. (2020). Health information technology for ambulatory care in health systems. *The American Journal of Managed Care, 26*(1), 32–38. https://doi.org/10.37765/ajmc.2020.42143

Stewart, M. T., Hogan, T. P., Nicklas, J., Robinson, S. A., Purington, C. M., Miller, C. J., … & Shimada, S. L. (2020). The promise of patient portals for individuals living with chronic illness: Qualitative study identifying pathways of patient engagement. *Journal of Medical Internet Research, 22*(7). https://doi.org/10.2196/17744

Tao, D., Yuan, J., Shao, F., Li, D., Zhou, Q., & Qu, X. (2018). Factors affecting consumer acceptance of an online health information portal among young internet users. *Computers, informatics, nursing, 36*(11), 530-539. https://doi.org/10.1097/CIN.0000000000000467

Tavares, J. & Oliveira, T. (2018). New integrated model approach to understand the factors that drive electronic health record portal adoption: Cross-sectional national survey. *Journal of Medical Internet Research, 20*(11). https://doi.org/10.2196/11032

Tavares, J., & Oliveira, T. (2016). Electronic health record patient portal adoption by health care consumers: An acceptance model and survey. *Journal of Medical Internet Research, 18*(3). https://doi.org/ 10.2196/jmir.5069

Tavares, J., Goulao, A., Oliveira, T. (2018) Electronic health record portals adoption: Empirical model based on UTAUT2. *Informatics for Health and Social Care, 43*(2). https://doi.org/10.1080/17538157.2017.1363759

Tieu, L., Sarkar, U., Schillinger, D., Ralston, J. D., Ratanawongsa, N., Pasick, R., & Lyles, C. R. (2015). Barriers and facilitators to online portal use among patients and caregivers in a safety net health care system: A qualitative study *Journal of Medical Internet Research, 17*(12), e275. https://doi.org/10.2196/jmir.484

Turvey, C., Klein, D., Fix, G., Hogan, T. P., Woods, S., Simon, S. R., Charlton, M., Vaughan-Sarrazin, M., Zulman, D. M., Dindo, L., Wakefield, B., Graham, G., & Nazi, K. (2014). Blue Button use by patients to access and share health record information using the Department of Veterans Affairs' online patient portal. *Journal of the American Medical Informatics Association: JAMIA, 21*(4), 657–663. https://doi.org/10.1136/amiajnl-2014-002723

Updox. (2021). *A single, unified inbox from Updox*. https://www.updox.com

Vreugdenhil, M. M. T., Ranke, S., Man, Y. de, Haan, M. M., & Kool, R. B. (2019). Patient and health care provider experiences with a recently introduced patient portal in an academic hospital in the Netherlands: Mixed methods study. *Journal of Medical Internet Research, 21*(8), 13743. https://doi.org/10.2196/13743

Watson, P. J. (2006). *Electronic health records: Manual for developing countries.* World Health Organization [WHO]. https://apps.who.int/iris/bitstream/handle/10665/207504/9290612177_eng.pdf

Wildenbos, G. A., Horenberg, F., Jaspers, M., Peute, L., & Sent, D. (2018). How do patients value and prioritize patient portal functionalities and usage factors? A conjoint analysis study with chronically ill patients. *BMC Medical Informatics and Decision Making, 18*(1), 108. https://doi.org/10.1186/s12911-018-0708-5

Wildenbos, G. A., Maasri, K., Jaspers, M., & Peute, L. (2018). Older adults using a patient portal: Registration and experiences, one year after implementation. *Digital Health, 4*(1). https://doi.org/10.1177/2055207618797883

Wildenbos, G. A., Peute, L., Jaspers, M. (2017). Facilitators and barriers of electronic health record patient portal adoption by older adults: A literature study. *Studies in Health Technology and Informatics, 245*. https://doi.org/10.3233/978-1-61499-753-5-308

Wilson, J., Heinsch, M., Betts, D., Booth, D., & Kay-Lambkin, F. (2021). Barriers and facilitators to the use of e-health by older adults: A scoping review. *BMC Public Health, 21*(1), 1556. https://doi.org/10.1186/s12889-021-11623-w

Woods, S. S., Forsberg, C. W., Schwartz, E. C., Nazi, K. M., Hibbard, J. H., Houston, T. K., & Gerrity, M. (2017). The Association of Patient Factors, Digital Access, and Online Behavior on Sustained Patient Portal Use: A Prospective Cohort of Enrolled Users. *Journal of Medical Internet Research, 19*(10). https://doi.org/10.2196/jmir.7895

World Health Organization. (2021). Global strategy on digital health 2020-2025. Geneva: World Health Organization. https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf

Zhao, J.Y., Song, B., Anand, E., Schwartz, D., Panesar, M., Jackson, G. P., & Elkin, P. L. (2018) Barriers, Facilitators, and Solutions to Optimal Patient Portal and Personal Health Record Use: A Systematic Review of the Literature. *AMIA Annual Symposium Proceedings, 2018*. https://pubmed-ncbi-nlm-nih-gov.proxybz.lib.montana.edu/29854263/

Zhong, X., Liang, M., Sanchez, R., Yu, M. Budd, P.R., Sprague, J.L., Dewar, M.A. (2018). On the effect of electronic patient portal on primary care utilization and appointment adherence. BMC Medical Informatics and Decision Making, 18(84). https://doi.org/10.1186/s12911-018-0669-8

APPENDICES

APPENDIX A

PROJECT COST ANALYSIS

Projected Direct Costs

Marketing Costs:

- Brochures (Average weekly patients: 40 x 6 weeks = 240). Estimate for 250 brochures = $105.00 (canva.com)
- Poster for reception and fliers for three exam rooms (1 mounted 12x18 poster = $28.00) (3 laminated fliers = $9.99)= $37.99 (Staples print center total)

Total Projected Expenses: $247.99

Cost Savings due to DNP Student Contributions

EHR Training for Updox add-on services: Estimated average= $500.00 for three-hour individualized session
Printing of Updox Manual for clinic use = $40.00
Average labor costs provided by DNP student (RN salary of $19/hr x 270 hrs) = $5,130.00

Break Even Visit Quantity

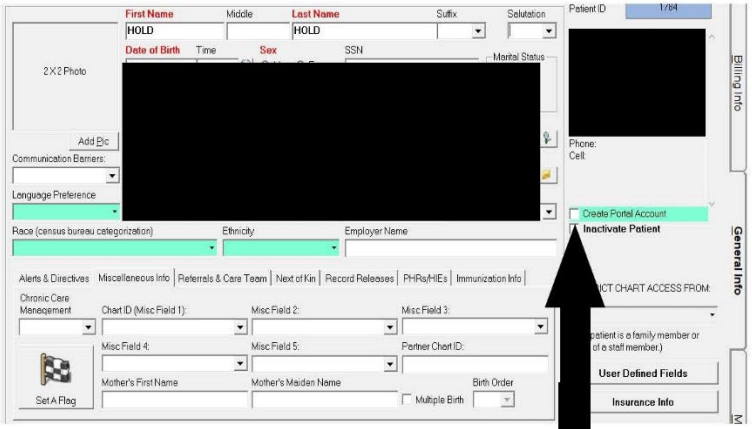
Projected Costs: $247.99

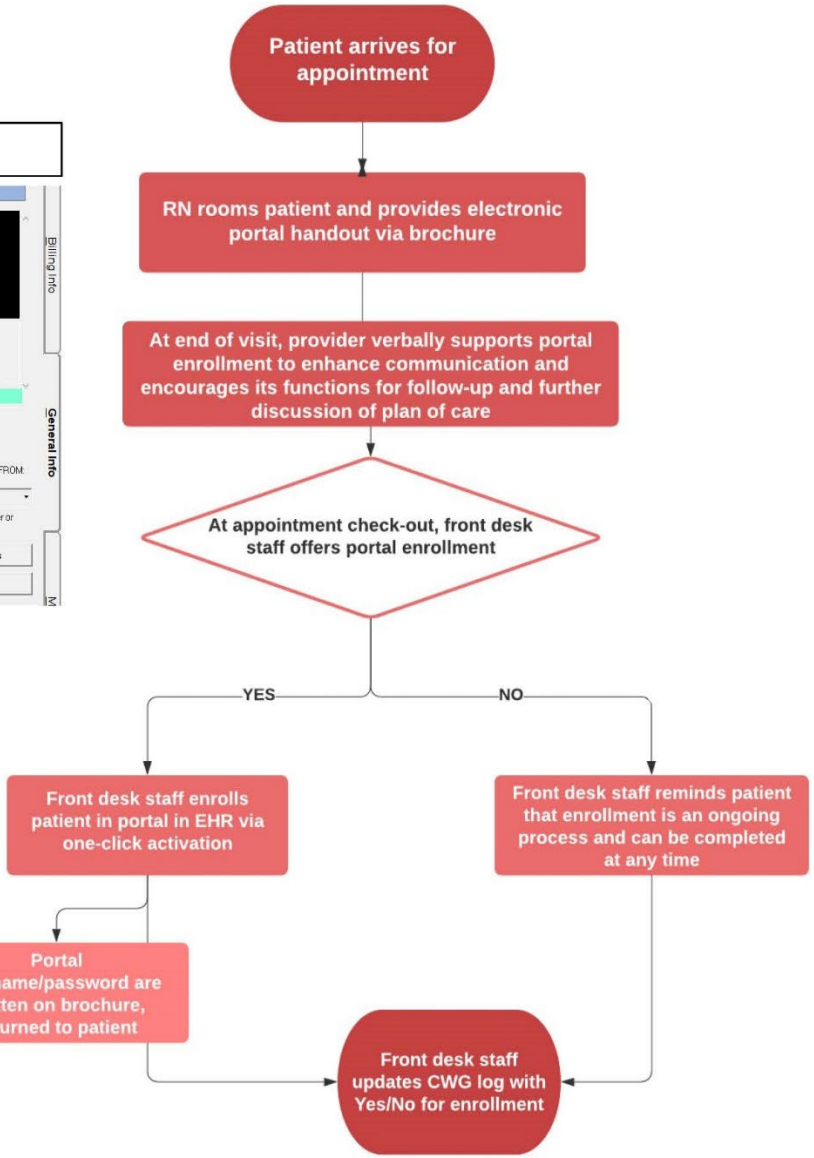
$5,670.00 - $247.99 = **$5,422.01** in cost savings to the clinic

APPENDIX B

PROCESS MAP

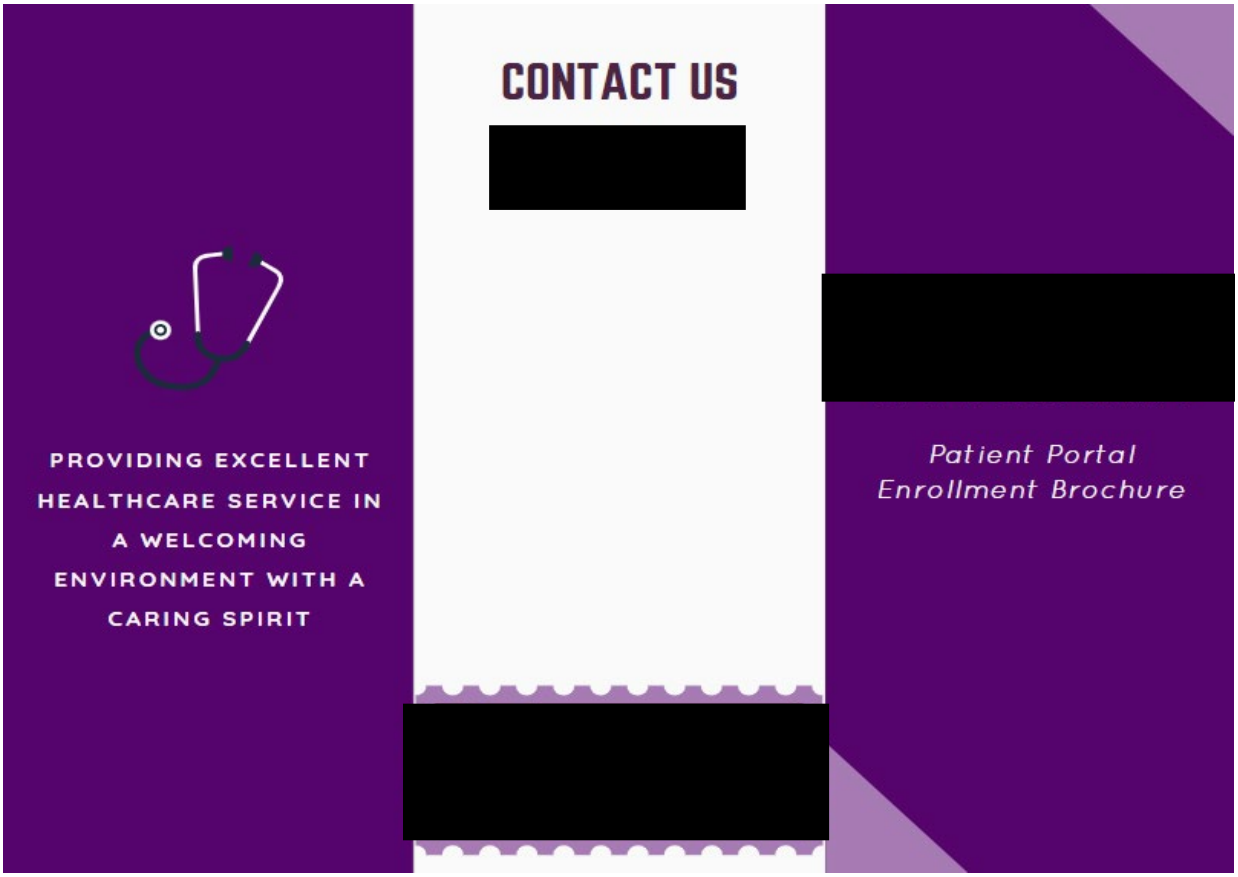
Single-Click Patient Portal Activation Instruction

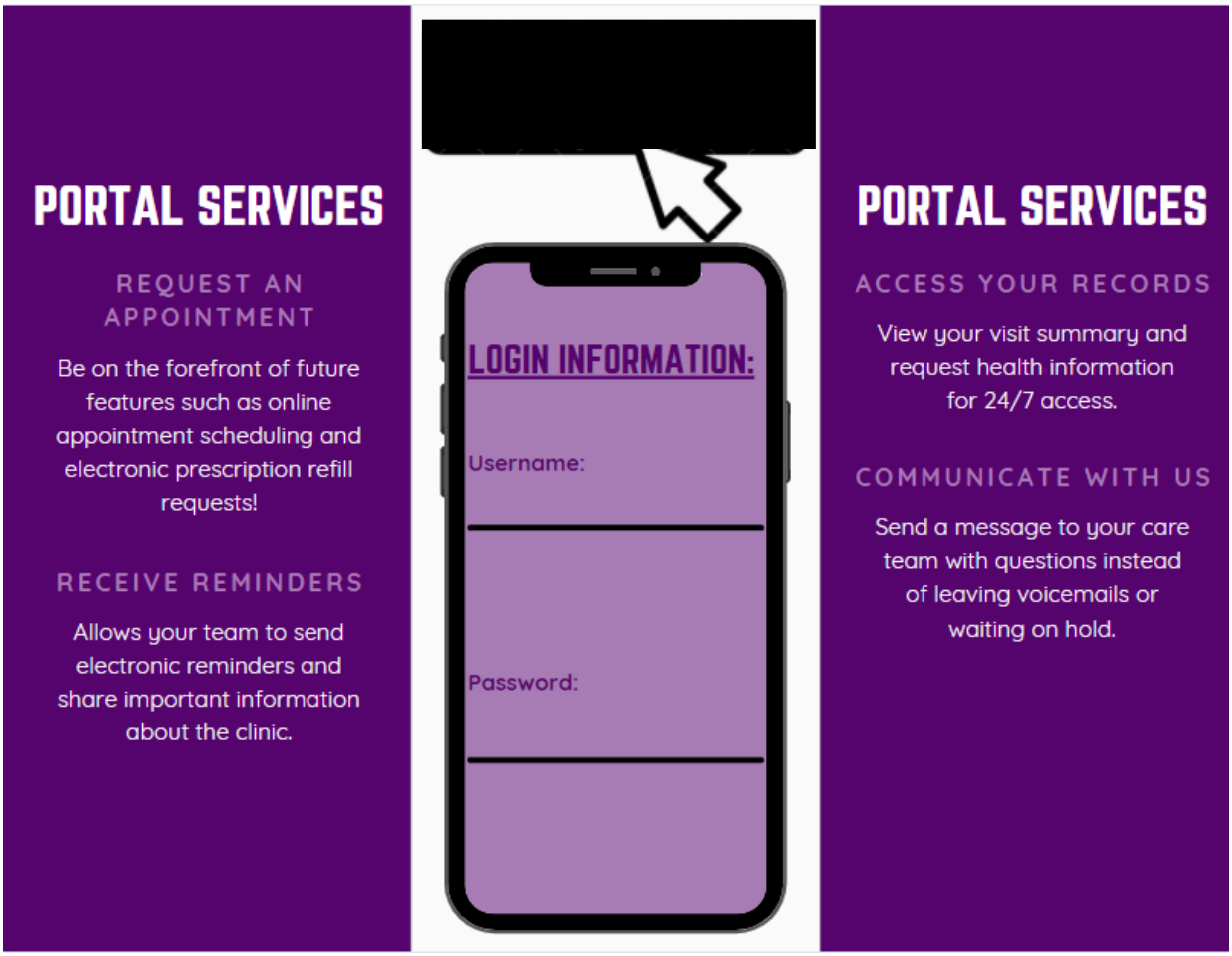




APPENDIX C

ELECTRONIC PATIENT PORTAL BROCHURE TEMPLATE


CONTACT US
[redacted]
PROVIDING EXCELLENT HEALTHCARE SERVICE IN A WELCOMING ENVIRONMENT WITH A CARING SPIRIT
[redacted]
[redacted]
Patient Portal Enrollment Brochure


PORTAL SERVICES
REQUEST AN APPOINTMENT
Be on the forefront of future features such as online appointment scheduling and electronic prescription refill requests!
RECEIVE REMINDERS
Allows your team to send electronic reminders and share important information about the clinic.
LOGIN INFORMATION:
Username:
Password:
PORTAL SERVICES
ACCESS YOUR RECORDS
View your visit summary and request health information for 24/7 access.
COMMUNICATE WITH US
Send a message to your care team with questions instead of leaving voicemails or waiting on hold.