INCREASING COLORECTAL CANCER SCREENING IN A RURAL PRIMARY CARE SETTING: A QUALITY IMPROVEMENT PROJECT

by

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ABSTRACT

Background: Colorectal cancer (CRC) is the second leading cause of cancer-related deaths in the United States. Early detection significantly improves survival, yet screening rates remain low particularly among individuals younger than 50, though the exact reason remains unclear. Barriers to CRC screening are influenced by numerous factors. The most commonly cited barriers included limited patient knowledge of CRC and screening options, as well as limited knowledge of CRC screening guidelines and options among providers.

Local Problem: In Montana, CRC is the third most common type of cancer diagnosis, as well as cancer-related deaths. Despite the vast information supporting the benefits of CRC screening, the rates of screening continue to be low at the state and national level leaving many individuals at higher risk for CRC. In 2022, 62.6% of Montana residents aged 45 to 75 were up to date with CRC screening recommendations, which is below the national screening goal of 68.3%. The purpose of this project is to increase CRC screening and decrease CRC incidence and mortality.

Methods: This quality improvement project used the Plan Do Study Act tool to test a standardized workflow for CRC screening education and referrals.

Interventions: Implementation of developed education on CRC and screening guidelines for patients and providers, a referral guide for recommended CRC screenings as well as nearby locations available for testing, and a standardized workflow for CRC screening at wellness visits. This process was tested weekly over eight weeks to evaluate the fit with clinic workflows.

Results: CRC screening education was delivered to 100% project team, (n=6). Twenty-four patients out of 26 accepted CRC screening education averaging 84% meeting project goal of 70%. CRC screening documentation in EHR met goal of 100% all but one week. Of the 24 patients who accepted CRC screening, seven orders were placed (four colonoscopies and three Cologuards). Of those seven orders one colonoscopy and one Cologuard were completed.

Conclusions: The results of this project demonstrated that-improved patient and provider education on CRC and CRC screening guidelines led to higher CRC screening rates.

Key Words: *barriers to CRC screening and primary care.*

CHAPTER ONE

REVIEW OF THE LITERATURE

Introduction

Colorectal cancer (CRC) is the second-leading cause of cancer-related deaths worldwide, with the rate of CRC deaths greater than 930,000 and more than 1.9 million new cases in 2022 (World Health Organization, 2024). In the United States, CRC is the second-leading cause of cancer-related deaths in both men and women. The United States reported 141,902 new cases of CRC and 52,967 deaths from CRC in 2022, with higher incidence and death rates in males versus females (Centers for Disease Control and Prevention, 2024a). The average age of colorectal cancer diagnosis is 66 for both men and women in the United States (Colorectal Cancer Alliance, 2024). In Montana, CRC is the third most common type of cancer diagnosis, as well as cancer-related deaths (Montana Department of Health and Human Services [MDHHS], 2022). From 2015 to 2019, there were approximately 500 new cases of CRC diagnosed at the localized stage each year, with the average age of diagnosis being 67 for men and 68 years old for women (MDHHS, 2022).

Risk factors for CRC include first-degree relative with a history of colorectal cancer, family history of adenomas or polyps, history of Lynch syndrome, cigarette smoking or history of cigarette smoking, obesity, diet high in processed foods, and red meats (Siegel et al., 2020). Often, CRC begins as polyps or growths in the inner lining of the colon or rectum, but polyps do not always turn cancerous and can be benign, producing little to no symptoms (Duan et al., 2022). With regular screening, most polyps can be identified and removed before becoming

cancerous, making CRC screening a key opportunity to detect and reduce the risk of CRC (CDC, 2024b). Despite the vast information supporting the benefits of CRC screening, the rates of screening continue to be low at the state and national level leaving many individuals at higher risk for CRC.

Background and Significance

While CRC screening has proven to be effective, CRC rates continue to rise, specifically among individuals younger than fifty (Rawla et al., 2019). Although the exact reason for this rise remains unclear, studies over the past two decades have shown an annual increase of CRC of 1-2% in adults 55 and younger in the United States (Siegel et al.,2020). In Montana, for adults aged 45 years old and less, the rates of CRC since 2001 have increased by 3.3%, while for those aged 65 years and older, the incidence has decreased by 3.7% each year (MDHHS, 2022). This trend prompted the United States Preventative Services Task Force (USPSTF), to lower the recommended screening age for CRC from age 50 to 45 (USPSTF, 2021). For patients aged 75 and older, CRC screening is often less emphasized. This is because the potential risks of screening procedures may outweigh the benefits at this age, as complications can be more severe.

Colorectal cancer screening is a crucial element of standard healthcare because if CRC is detected at early-onset stages, meaning it has not spread to other organs, the survival benefit is significant compared to individuals diagnosed with late-stage CRC (Cheng et al., 2021). According to the Journal of Clinical Medicine (Marcellinaro et al., 2023), the five-year survival rate for CRC is about 90% when the cancer is found at an early stage. There are several evidence-based options for routine colorectal cancer screening for individuals with low to no risk factors, including stool deoxyribonucleic acid- fecal immunochemical test (sDNA-FIT), high

sensitivity guaiac fecal occult blood test (gFOBT), fecal immunochemical test (FIT), sigmoidoscopy, computed tomography (CT) colonography, and colonoscopy (USPSTF, 2021). Despite the vast availability of CRC screening tools, the screening rates in the Unites States are continually below the national goal of 68.3% for adults younger than 50 (U.S. Department of Health and Human Services, n.d.). From 2000 to 2021, 71.8% of adults aged 50 to 75 in the United States were up to date with CRC screening, and fewer than 20% of adults aged 45 to 49 were up to date with CRC screening (CDC, 2021). Relevant to these statistics, many Montana residents have yet to be screened, and according to the MDPHHS in 2022, 62.6% of those aged 45 to 75 were up to date with CRC screening recommendations. CRC screening barriers are complex and varied based on numerous factors, including the implementation process, provider education, time, patient factors, sociodemographic characteristics, and the cost of CRC screening tests (Zhu et al., 2022). Improving routine CRC screening is essential to reduce CRC incidence and mortality. This literature review further examines the barriers to CRC screening in outpatient primary care settings.

Method

Search Strategy

A review of databases, including PubMed, Web of Science, and CINAHL, was conducted to identify articles. The research focused on barriers to CRC screening using key search terms “barriers to CRC screening” AND “primary care." Articles identified for this review were independently screened and refined by title and abstract following the Preferred Reporting Items for Systemic Reviews and Meta-Analysis (PRISMA) guidelines (Page et al., 2021). Duplicate articles were removed, and articles were excluded based on the following criteria: (1) published

before January 2014, (2) not published in English, (3) duplicate articles in systematic reviews, (4) low-quality appraisal studies, (5) conducted outside of outpatient settings, (6) conducted outside the United States (7) focused on a specific type of CRC screening test, (8) intervention studies to promote CRC screening, (9) and studies focused on patients who already have CRC.

The search was filtered by peer-reviewed articles published in English between January 2014 to September 2024, focusing on CRC screening and barriers. After applying the inclusion criteria, articles were independently assessed for quality using Rapid Critical Appraisal tools by Melnyk and Fineout-Overholt (2015). The initial electronic search through all three databases yielded 809 results. After reviewing the criteria, 153 articles were considered, and 16 ultimately met the criteria for inclusion, see PRISMA in Appendix A.

Results

Literature Search

The articles included in this scoping review of literature included four systematic reviews (Agunwambi et al., 2023; Kim, 2018; Puli et al.,2023; Wang et al., 2018a), one national survey with 900 participants (Zhu et al., 2022), one mixed-method survey with 60 participants (Wainwright et al., 2022), one multi-level analysis with 15,866 participants (Wang et al., 2018b), one retrospective cohort study with 166 participants (Weiss et al., 2017), one randomized control trial (RCT) with ten clinics (Katz et al., 2018), one cross-sectional design with 197 surveys (Nagelhout et al., 2017), one cross-sectional study having 25, 611 participants (Bayly et al., 2024), and five qualitative studies with a total number of 797 participants (Alpert et al., 2022; Byrd et al., 2018; Mueller et al., 2021; Warren et al., 2023; Won et al., 2020).

Synthesis of Literature

Of the 16 studies analyzed, all were reviewed and conducted from outpatient settings in the United States. Rurality was addressed in Wang et al. (2018a), while one study specified both rural or urban locations (Wang et al. 2018b), three stated they were in an urban location (Wainwright, et al., 2022; Weiss et al., 2017; Alpert et al., 2022), and 11 studies did not specify if location was primarily rural or urban (Agunwamba et al., 2023; Bayly et al., 2024; Byrd et al., 2018; Katz et al., 2018; Kim, 2018; Mueller et al., 2021; Nagelhout et al., 2017; Puli et al., 2023; Warren et al., 2023; Won et al., 2020; Zhu et al., 2021). Age varied in study inclusion criteria in each study. While most studies focused on adults over the age of 50 (Byrd et al., 2018; Katz et al., 2018; Kim, 2018; Puli et al., 2023; Nagelhout et al., 2017; Wainwright et al., 2022; Wang et al., 2018a; Weiss et al., 2017; Won et al., 2020) or aged 40 and older (Alpert et al., 2022; Mueller et al., 2020; Bayly et al., 2024; Warren et al., 2023; Zhu et al., 2022), one study by Agunwamba et al., (2023) included participants 18 and older, and several studies included in one review did not specify the age range of their samples (Wang et al., 2018a). Five studies focused on minority populations (Byrd et al., 2018; Kim, 2018; Puli et al., 2023; Alpert et al., 2022; Won et al., 2020). The population of focus varied. Five studies sampled populations of providers (Zhu et al., 2021; Weiss et al., 2017; Wang et al., 2018b; Alpert et al., 2021; Wang et al., 2018a) and 11 studies sampled patient population (Katz et al., 2018; Byrd et al., 2018; Won et al., 2020; Nagelhout et al., 2017; Wainwright et al., 2022; Agunwamba et al., 2023; Mueller et al., 2021; Kim, 2018; Warren et al., 2023; Puli et al., 2023; Bayly et al., 2024). One studied sampled electronic medical records (Wang et al., 2018a).

Avoidance of CRC Screening Test

Multiple studies identified various factors that contributed to avoiding CRC screening, including fear, embarrassment, privacy concerns, and lack of trust. Fear emerged as one of the most prevalent barriers across ten studies (Alpert et al., 2022; Kim et al., 2018; Byrd et al., 2018; Katz et al., 2018; Puli et al., 2023; Nagelhout et al., 2017; Wainwright et al., 2022; Wang et al., 2018b; Warren et al., 2023; Won et al., 2020). Some participants expressed fear of pain of the screening process, particularly colonoscopy, as well as fear of sedation (Wainwright et al., 2022; Katz et al., 2018; Warren et al., 2023; Kim et al., 2018; Won et al., 2020), while other participants specifically feared that the bowel preparation for a colonoscopy was an uncomfortable process with associated pain (Alpert et al., 2022; Warren et al., 2023; Katz et al., 2018). Not only were patients apprehensive about emotional and physical aspects of CRC screening procedures and preparations, but participants also expressed fears regarding potential health complications from chemotherapy treatment after a positive result (Wainwright et al., 2022), associations of fatality and infection with colonoscopy and sigmoidoscopy procedure (Kim et al., 2018; Won et al., 2020), and anxiety about receiving a CRC diagnosis (Byrd et al., 2018; Wang et al., 2018b; Nagelhout et al., 2017; Wainwright et al., 2022). These factors highlighted how the perceived fears participants experience regarding the negative effects of cancer, as well as the CRC screening process, may contribute to avoidance obtaining CRC screening.

Similarly to fear, patients reported embarrassment related to CRC screening as a barrier (Agunwamba et al., 2023; Wainwright et al.,2022; Byrd et al., 2018; Won et al., 2020; Wang et al., 2018b; Kim, 2018). Feelings of embarrassment associated with CRC involve the bowel preparation and the procedure that can delay or cause patient to avoid CRC screening. Various

patients expressed embarrassment with the bowel preparation, as often frequent bathroom visits can occur, the procedure involved in a colonoscopy due to the involved colon and rectum (Wainwright et al., 2022; Wang et al., 2018b; Kim, 2018), and a level of discomfort was involved with handling stool with home CRC screening kits, specifically that this was an unsanitary process (Wainwright et al., 2022; Kim et al., 2018; Alpert et al., 2022). Providers perceived patient reluctance to CRC screening was associated with a feeling of uncomfortableness of the offered CRC screening methods (Zhu et al., 2022; Won et al., 2020). Additionally, for patients in rural areas, there was an additional layer of embarrassment for CRC testing options, as they feared the tests might be administered by familiar staff in their primary doctor's office (Wang et al., 2018b).

Embarrassment concerns significantly impact CRC screening adherence among various ethnic groups. For some participants, specifically Asian Americans and Hispanics, discussions about CRC health were viewed as culturally "taboo" (Byrd et al., 2018; Kim et al., 2018). Korean Americans reported feeling considerable embarrassment even when simply discussing CRC, particularly due to the nudity involved in colonoscopies (Won et al., 2020). Similarly, Latino participants expressed embarrassment with providers explaining CRC screening methods, as they regarded the rectum and colon as private areas (Alpert et al., 2022).

Lack of privacy was an additional barrier that compounded feelings of embarrassment, further discouraging CRC screening adherence (Wang et al., 2018a). Some participants expressed a loss of privacy during colonoscopies and worried about potential body exposure (Alpert et al., 2022).

A lack of trust in the healthcare system was identified as a significant barrier to CRC screening in some studies, with some patients avoiding screening due to the general mistrust of the healthcare system and providers, questioning the intentions behind CRC screening recommendations (Puli et al., 2023; Nagelhout et al., 2017; Wang et al., 2018b; Won et al., 2020). This mistrust extended to doubts about the competence and motives of providers, leading patients to question CRC treatment plans, decreasing their likelihood of screening (Wainwright et al., 2022).

Similarly, some studies highlighted the impact of mistrust among various ethnic populations. For instance, a lack of trust in providers was found to lower CRC screening rates among Latino patients, while increased trust in the provider improved screening adherence (Alpert et al., 2022). Healthcare providers acknowledged this dynamic and recognized that building trust and rapport with Latino patients positively influenced CRC screening participation (Alpert et al., 2022). Additionally, many immigrant groups also reported general mistrust toward the healthcare system, which, along with low provider-patient rapport and inadequate communication, reduced CRC screening acceptance (Puli et al., 2023). Some immigrant populations also indicated a preference for gender-concordant providers, while others felt more comfortable with female providers, further influencing their willingness to undergo CRC screening (Puli et al., 2023).

Lack of Resources

Patient resources play a crucial role in CRC screening, impacting accessibility, quality, and effectiveness of care. Cost was identified as a resource-related obstacle to CRC screening, with studies reporting that high screening cost, both for home-based tests and colonoscopies,

along with lack of health insurance, deterred patients from screening (Kim, 2018; Won et al., 2020; Wang et al., 2018a; Wang et al., 2018b; Byrd et al., 2018; Katz et al., 2018; Agunwamba et al., 2023). For some participants, the need to work and rely on daily income further limited their ability to leave work for screening appointments and test completion (Nagelhout et al., 2017; Agunwamba et al., 2023). Participants with higher income and insurance coverage were more likely to adhere to CRC screening guidelines, highlighting the role of financial stability in promoting screening adherence (Agunwamba et al., 2018).

Additionally, certain ethnic groups, particularly those on fixed incomes, faced financial instability that discouraged them from paying for CRC screening (Puli et al., 2023; Byrd et al., 2018). Among immigrant populations, some were reluctant to participate in CRC screening due to limited knowledge about how insurance could help cover the costs of screening tests (Puli et al., 2023).

In relation to lack of resources, rurality was evaluated in two studies that linked limited access to specialist and screening facilities in rural areas with lower screening adherence compared to urban populations (Wang et al., 2018a). Some participants in one study found that closer proximity to primary care providers (PCP) was positively associated with CRC screening, though it did not specify urban or rural setting (Agunwamba et al., 2023).

Similarly to rurality, transportation challenges hindered some ethnic groups' ability to reach healthcare facilities, further reducing CRC screening rates and completion of testing (Puli et al., 2023; Alpert et al., 2022). Interestingly, access to home-based stool collection was noted to increase screening uptake, emphasizing the importance of accessibility in promoting CRC screening adherence (Puli et al., 2023).

Lack of Knowledge of CRC Screening

Low levels of knowledge about CRC and screening options are consistently identified as major barriers to CRC screening (Agunwamba et al., 2023; Katz et al., 2018; Kim, 2018; Byrd et al., 2018; Mueller et al., 2021; Wang et al., 2018a; Alpert et al., 2022; Nagelhout et al., 2017; Puli et al., 2023, Wang et al., 2018b). Many patients are unaware of available CRC screening options (sDNA, gFOBT, FIT, colonoscopy, sigmoidoscopy, computed tomography (CT) colonography), the importance of regular screenings, or guidelines for completing tests, especially if they are asymptomatic and do not perceive themselves as at risk (Kim, 2018; Mueller et al., 2021; Wang et al., 2018b; Alpert et al., 2022; Puli et al., 2023; Byrd et al., 2018; Won et al., 2020; Katz et al., 2018). Additionally, some patients hold misconceptions about CRC, such as the belief that there is no cure, CRC mainly affects men, or that symptoms are required for the disease to be present. Some even mistakenly think that CRC is caused by spending too much time sitting resulting in hemorrhoids (Byrd et al., 2018; Wang et al., 2018b).

Healthcare providers similarly identify low patient knowledge of CRC as a significant barrier in screening adherence. Patient's unawareness and lack of understanding regarding the need for screening lowers their willingness to participate (Zhu et al., 2022; Won et al., 2020). However, gaps in provider knowledge can also hinder screening efforts. Providers who are unaware of the full range of screening options, screening, protocols, or common patient barriers may be less likely to discuss CRC screening with patients, negatively impacting adherence (Alpert et al., 2022; Zhu et al., 2022; Won et al., 2020; Wang et al., 2018b). In contrast, providers knowledgeable about these barriers and solutions tend to achieve higher screening rates, highlighting the importance of education on CRC screening completion (Weiss et al., 2017).

Physician-Related Behaviors

Physician related barriers are vast and cited in multiple studies as a significant factor in low CRC screening adherence (Alpert et al., 2022; Byrd et al., 2018; Bayly et al., 2024; Katz et al., 2018; Kim, 2018; Wang et al., 2018b; Nagelhout et al., 2017). Common barriers include a lack of provider recommendation for CRC screening options to patients (Bayly et al., 2018; Nagelhout et al., 2017; Katz et al., 2018), limited time during patient visits to adequately discuss CRC and screening options (Byrd et al., 2018; Alpert et al., 2022; Kim, 2018; Won et al., 2020), and the tendency to prioritize other health concerns or preventative screenings over CRC (Zhu et al., 2022; Won et al., 2020; Alpert et al., 2022). Additionally, patients often felt that their concerns were not fully heard, with some reporting that providers did not listen attentively to their needs (Kim, 2018).

Cultural Barriers

Studies on CRC screening among cultural minority groups highlighted several barriers. Language obstacles are a primary challenge, with limited English proficiency reducing CRC screening adherence (Won et al., 2020) and decreasing patient confidence in communicating with healthcare providers or clinical staff inhibiting patients from asking questions or concerns regarding CRC and CRC screening (Alpert et al., 2022). Higher English proficiency, as well as access to bilingual physicians, is associated with improved CRC screening (Kim, 2018; Agunwamba et al., 2023). For example, Spanish speaking patients with limited English proficiency were less likely to be up to date with CRC screening compared to those with high proficiency (Bayl et al., 2024).

Beyond language, cultural beliefs also affect CRC screening adherence. Some of the immigrant population believe CRC screening will not improve health outcomes, or, due to religious beliefs, may reject medical interventions after a cancer diagnosis (Puli et al., 2023). Others perceive themselves at a lower risk for CRC compared to Americans, viewing their health and recovery as being in "the hands of God," which leads to a lower perceived need for screening (Puli et al., 2023).

Discussion and Conclusion

This scoping review identified multiple patient and provider barriers to CRC screening, revealing a complex interplay of factors. These barriers included financial constraints, lack of CRC knowledge among patients and providers, fear of screening procedures, pain and embarrassment, privacy concerns, distrust in the healthcare system, limited time for the patient and provider, absence of PCP, and cultural factors. The most consistently identified barrier discovered across studies was a lack of patient and provider knowledge regarding CRC screening and available screening options.

Geographic location was also considered in this review, though many studies did not specify whether they focused on rural or urban settings. This makes it difficult to determine the full impact of geography on CRC screening adherence. Future research should examine rural-urban location differences more thoroughly to assess their influence on CRC screening.

To address some of the barriers, a few policy changes are recommended to improve CRC screening. One policy change would be to improve access to non-invasive CRC screening options, such as the FIT, gFOBT, and sDNA. Since cost and lack of insurance were common barriers to CRC screening, expanding access to these less invasive, lower-cost tests could help

reduce financial burdens, enhance privacy, and minimize travel expenses (Cordero et al., 2024). Another beneficial policy change would involve increasing community-wide education on CRC screening through public health departments. Utilizing flyers, social media, educational sessions, or videos tailored to specific communities could effectively raise awareness and address gaps in knowledge (Luque et al., 2021).

Many of the common barriers for CRC screening can be remedied through provider education. Increasing healthcare providers' understanding of different CRC screening tests, costs, and cultural sensitivities can improve patient-provider trust and communication, address fears and misconceptions, and boost overall patient knowledge. Research shows that implementing educational protocols for providers and clinical staff on CRC screening options (FIT, gFOBT, sDNA) led to higher CRC screening rates in primary care settings (Frissora et al., 2021). Educated providers are more likely to be motivated in engaging patients in meaningful discussions, tailoring communications with the patient's level of understanding, which is crucial for enhancing screening adherence (Frissora et al., 2021). Regular screening is essential for reducing incidence and mortality rates, potentially preventing CRC altogether (Kim, 2018). Addressing the barriers identified in this review through clinical training and patient education can help bridge knowledge gaps, mitigate other key obstacles, and ultimately decrease CRC rates.

CHAPTER TWO

QUALITY IMPROVEMENT PROPOSAL

Introduction

Colorectal cancer (CRC) worldwide is the second leading cause of cancer-related deaths (World Health Organization [WHO], 2024), the fourth most common cancer in men and women in the U.S., as well as the second leading cause of cancer-related deaths in the U.S. (Colorectal Cancer Alliance, 2024). In Montana CRC is the third most commonly diagnosed cancer in men and women, with 170 deaths each year (Montana Department of Health and Human Services [MDHHS], 2023). Over the past two decades, the rates of CRC have increased in adults younger than 50 years of age, but the reasons why are not fully understood (Siegel et al., 2020). U.S. data shows that since the 1990s the CRC rates have been increasing by 1-2% each year for adults 55 and younger (National Cancer Institute, 2024b). Due to the rising rates, the United States Preventative Services Task Force (USPSTF) recommended updating the age of CRC screening to age 45 to 75 years old in 2021 (National Cancer Institute, 2024a). The purpose of CRC screening is to detect early signs of cancer or precancerous polyps in the colon or rectum, enabling timely intervention that can prevent cancer from advancing and significantly reduce mortality. Although the benefits of CRC screening are known, adults aged 45 to 75 are below the United States Healthy People's 2030 national screening goal of 68.3% (U.S. Department of Health and Human Services, n.d.). The purpose of this paper is to propose a quality improvement project to improve screening for CRC, with the goal of reducing morbidity and mortality associated with CRC.

Problem & Aim Statements

The national percentage of CRC screening completion in both men and women aged 45 to 75 was 58.7% in 2021 (USDHHS, n.d.), and in Montana, 62.6% of adults aged 45 to 75 in 2022 were up to date with CRC screening (Center for Disease Control and Prevention [CDC], 2023). Despite the recommendations and the availability of multiple options for CRC screening, a significant portion of eligible adults remain unscreened (CDC, 2024b).

A scoping review identified a common barrier to CRC screening adherence: limited knowledge of CRC and screening options among patients, and limited knowledge of CRC screening guidelines and options among providers (Alpert et al., 2022; Agunwambi et al., 2023; Puli et al., 2023; Zhu et al., 2022; Won et al., 2020; Warren et al., 2023; Wang et al., 2018b). Based on the findings from the literature and a needs assessment at the project site, implementation of a standardized, streamlined workflow for CRC screening is proposed. This strategy includes enhanced CRC screening education for patients and providers, as well as an improved referral process for CRC screening tests. Together, these interventions aim to increase CRC screening rates and reduce CRC incidence. This project aims to increase CRC screening education to 70% for patients during their annual wellness exams and increase CRC screening completion to 70% by March 5th, 2025.

Context

The practice site is a Rural Health Clinic (RHC) in Montana that offers primary care services and low acuity urgent care services to an underserved, rural population. From January to September 2024, data from the electronic medical record (EMR) revealed that approximately 107 patients visited the clinic for annual wellness exams. Classified as medically underserved

due to its rural location and low population, the clinic operates as a non-profit facility, owned by the local hospital, and governed by a board of trustees. The practice site accepts patients with Medicare, Medicaid, private insurance, and self-pay options.

The RHC serves a diverse patient population, including pediatrics, adults, and geriatric patients across four exam rooms, each equipped with a secure door to ensure privacy for CRC screening education. With nine employees, the clinic is supported by a dedicated team that includes a receptionist, a registered nurse/clinic manager (RN), a medical assistant (MA), and three providers; a family nurse practitioner, two physician assistants, and the chief executive officer (CEO) who plays critical roles in patient preventative care and decision-making processes for project approval.

Data analysis through the EMR identified that out of 30 patients aged 45 years and older seen for annual wellness visits over two and a half months, only five had documentation confirming whether they were up to date on CRC screening. Data analysis on the EMR confirmed that the 25 patients who were not up to date on CRC screening, also did not have any documentation in their clinical note in the EMR of any type of CRC screening discussion, nor previously scanned completed screening tests. This represents 16% of patients, which is significantly below the national goal of 68.3%. At present, only the provider documents CRC screening status, diagnosis codes, and CRC screening orders in the patient's clinic note in the EMR during patient visits. Further discussion with the CEO revealed that, due to the clinic's low patient volume, it is not involved in benchmark reporting through the Centers for Medicare & Medicaid (CMS) for quality and reimbursement purposes. However, the project site aims to participate in the Merit-based Inceptive Payment Systems (MIPS) to enhance patient outcomes

and improve Medicare reimbursement. Given that the clinic's CRC screening rates are below the national goal, a practice revision is necessary to better align with quality care standards and improve patient outcomes.

Quality Improvement Model

This quality improvement project employed the Institute for Healthcare Improvement Model of Improvement (IHI), Plan, Do, Study, Act (PDSA) framework (Figure 1), to guide implementation aims, measures, changes, and process improvements (Agency for Healthcare Research and Quality, 2024).

The PDSA cycle began with the "Plan" phase, which focused on identifying problems, areas for improvement, examining workflow processes, pinpointing necessary modifications, and development of a change-testing plan. Analysis of EMR data revealed a lower-than-standard metric for CRC screening completion. Observation of the process revealed inconsistent team workflow related to CRC screening. Through literature review, needs assessment, stakeholder discussions, and direct observations of workflow and documentation processes, an implementation plan was developed. For patient education, a CRC screening education form created by the primary investigator (PI) included USPSTF (2021) guideline recommendations and screening options, CRC cancer statistics from the National Cancer Institute (2024a), and directory of the nearest facilities that offer screening options that are not provided at the project site including computed tomography (CT) colonography, sigmoidoscopy, and colonoscopy. The primary investigator is a registered nurse with a bachelor's degree and nine years of nursing experience. Additionally, the PI completed two levels of evidence-based practice courses, gaining skills in identifying and appraising credible research as well as in selection of

appropriate screening, assessment, and outcome measurement tools. A pre-implementation education session, created by the PI, with the project team providers, will deliver up to date, peer-reviewed clinical recommendations for CRC screenings from the USPSTF (2021). The primary investigator (PI) also developed a data tracking tool, and a workflow process map to streamline the intervention.

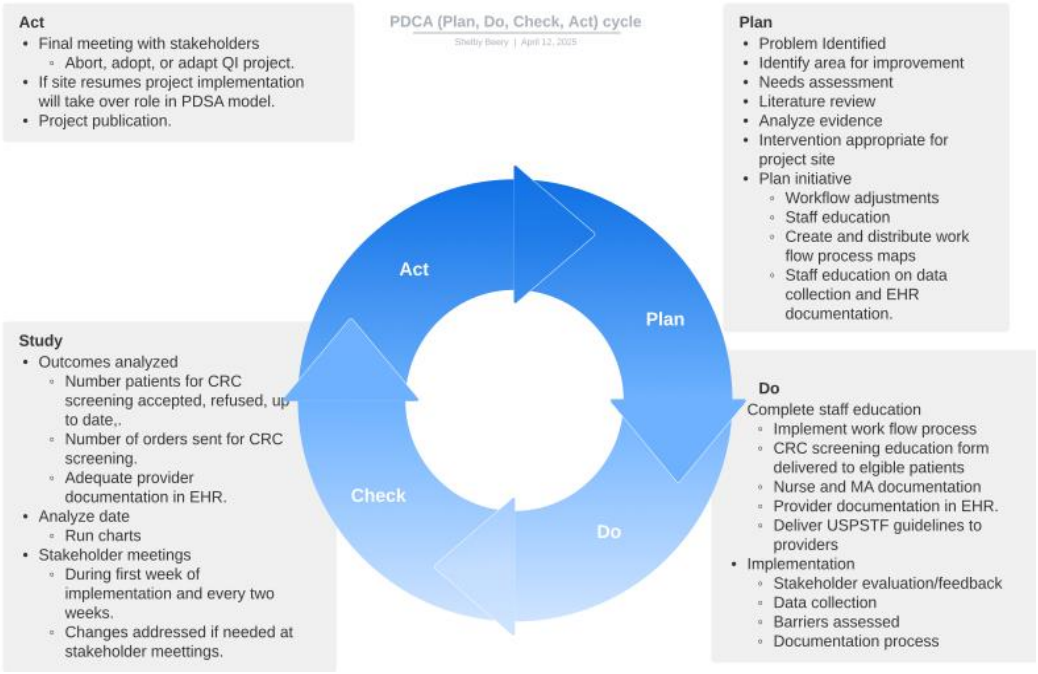
In the "Do" phase, the project implementation will begin with staff education on CRC and CRC screening, the introduction of workflow process change, and provider-driven education for patients on CRC and available screening options. The staff education will consist of two separate sessions, one educational session with the nurse, MA, and receptionist to go over the workflow process, and another meeting will take place with the providers to discuss CRC education and screening guidelines. Data will be collected on CRC screening education delivered to patients, provider documentation in the patient's chart (including CRC education provided, screening referrals made, and screening status), and the number of patients referred and completing CRC screenings.

During "Study" phase, initial data will be collected weekly, each Tuesday, for the first month of implementation, and then collected biweekly thereafter. Metrics will include the number of patients receiving and refusing CRC screening education discussion from providers, age of patient, gender, referrals made, reason for not sending CRC referral, CRC screenings completed, and provider chart documentation regarding CRC education and screening status. Weekly meetings with provider, MA, clinic nurse, receptionist, and PI during the first month of implementation will occur to decrease workflow errors and address why errors are occurring. Staff feedback will also be gathered to identify barriers to the intervention, the framework model,

or workflow that requires adjustments. Based on feedback from staff, a second "Do" phase will be initiated to implement necessary adjustments.

The "Study" phase will continue with ongoing data collection, outcome analysis, and biweekly meetings with providers, MA, clinic nurse, receptionist, and PI, to assess intervention efficacy, workflow, and potential barriers. In the final stage of the PDSA model, "Act," overall intervention outcomes will be evaluated through data analysis, reflection, and result comparison with project goals. Findings will be reviewed with site representative and project team (providers, MA, clinic nurse, receptionist, and PI) in a post intervention meeting against preliminary expectations. Per each "Act" phase, this meeting will give the site representative and project team the chance for discussion of the implementation's outcomes, barriers, and success and reach consensus about whether to adopt, adapt, or abandon implementation.

Figure 1. Implementation of the PDSA Cycle

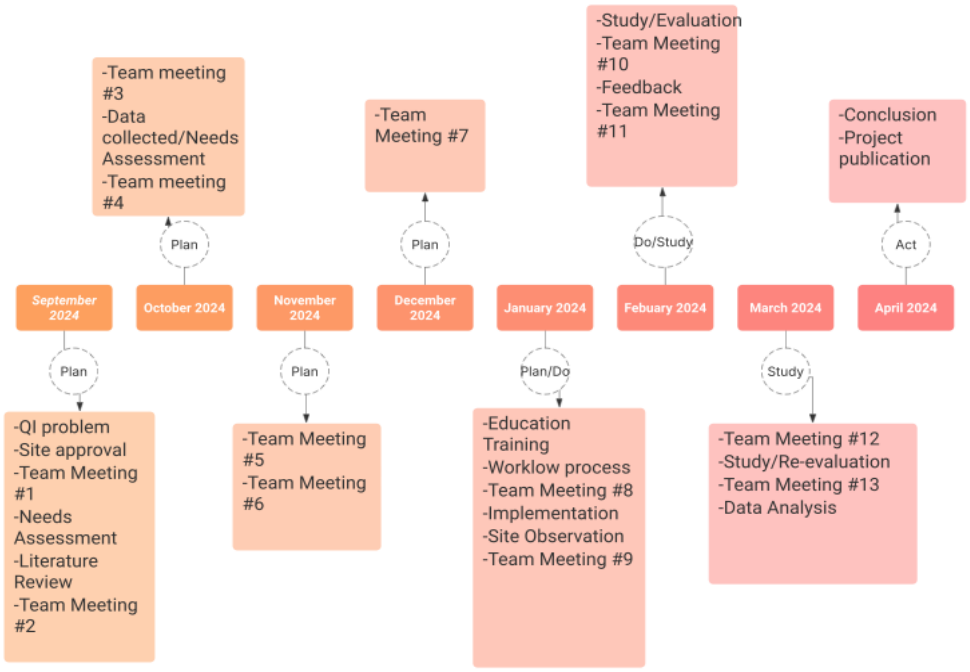


Methods

Implementation Summary

This Doctor of Nursing Practice (DNP) quality improvement (QI) project will be implemented over an eight-week period in a Rural Health Clinic in Montana, which provides primary care across the lifespan and low acuity urgent care services. The aim of this QI initiative is to promote a practice change by increasing CRC screening education among providers and patients, improving CRC screening rates, and ultimately reducing CRC incidence. Eligible patients for participation include adults aged 45 and older who are seen by a provider for annual wellness exam. The proposed intervention will begin on January 8th, 2025, and conclude March 5th, 2025. The PI will collect data at the project site weekly, every Tuesday, during the first month of implementation, and biweekly thereafter. The PI will assess outcomes, barriers, and needed adjustments that will be reviewed with project team. Ongoing evaluation and adjustments will take place with each PDSA cycle, but after eight weeks of implementation, an additional final evaluation of the QI initiative, will occur at the project site with site representative and project team (MA, clinic nurse, receptionist, providers, and PI) to identify if project aim has been met, if further adjustments are needed, or if the QI initiative will be abandoned.

Figure 2. Implementation Timeline



Implementation Plan

The QI project aims to increase CRC screening rates by implementing a standardized workflow, enhancing CRC screening education for patients and providers, and improving the referral process for CRC screening tests made by providers. This aim is supported by a literature review, site assessment, and stakeholder discussions. Patient education will cover screening options, risks, and benefits (Frissora et al., 2021; Peterson et al., 2016), while provider education will focus on available screening options and current guidelines (Slyne et al., 2017; Dougherty et al., 2018). The site representative and project team (MA, clinic nurse, receptionist, and providers) will approve a CRC screening handout (Appendix B) for patients aged 45 and older

attending annual wellness visits, in line with USPSTF guidelines (2021) and CRC statistics with generalized information from the National Cancer Institute (2024a). Created by the principal investigator, the handout includes CRC information, screening options, and contact information for nearby facilities offering CRC screening not available at project site including CT colonography, sigmoidoscopy, and colonoscopy. The handout also produces a Flesch Reading Ease Score of 60% representing a standard readability level, appropriate for the target population. Lack of CRC screening knowledge and available screening options were barriers identified in the literature (Alpert et al., 2022; Agunwambi et al., 2023; Puli et al., 2023), underscoring the need for accessible CRC information. The handout guides providers to discuss key points in a timely manner, addressing another barrier; limited time during appointments (Byrd et al., 2018; Alpert et al., 2022; Kim, 2018). Patients will then be free to take the educational handout home for review of the information.

A process map (Appendix D) was created to provide site representative and project team (MA, clinic nurse, receptionist, and providers) with a clear, visual workflow before implementation, aiding in understanding and adoption of the intervention (Antonacci et al., 2021). Prior to launch, the principal investigator will lead two separate education sessions to discuss project aims, the educational handout, and CRC screening based on USPSTF guidelines. One educational session will be held with the MA, receptionist, and clinic nurse, and another educational session will be held with providers, where each session will give project team members the opportunity to ask questions before the eight-week QI initiative begins on January 8, 2025.

At the start of the workflow, patients check in at the reception desk. The receptionist informs the nurse or medical assistant (MA) of the patient's arrival and appointment type (e.g., annual wellness, episodic). The nurse or MA then assesses whether the patient qualifies for CRC screening education (ages 45 and older with an annual wellness visit). Because the EMR system lacks preventive screening reminders, the workflow map serves as a reminder for eligible patients. If eligible, the nurse or MA gathers the CRC screening education handout. After check-in, the patient waits in the waiting room until the nurse or MA escorts them to the exam room. There, the nurse or MA provides the CRC screening education handout, explaining that the provider will review it with them, but they also have the option to refuse the education. The patient is given time to read the handout before the provider enters the exam room. The nurse or MA will exit the exam room and inform the provider that an eligible patient has received the CRC screening education handout and is ready to see the provider. The provider will enter the eligible patient's exam room, and as part of their annual wellness visit, will discuss the CRC screening education form, allowing the patient the choice to refuse the CRC education discussion. The provider will determine if the patient is up to date with CRC screening, and if appropriate will communicate with the nurse or MA to send an order for the specified CRC screening test (gFOBT, FIT, sDNA-FIT, colonoscopy, CT colonography, flexible sigmoidoscopy, flexible sigmoidoscopy with FIT). The patient leaves the clinic. The nurse or MA documents, on the data collection form provided by the primary investigator (Appendix E), the eligible patient that was seen, their age, medical record number, gender, acceptance or refusal of CRC screening education, the reason for refusal, the CRC screening that was ordered, or the reason that an order was not placed. The nurse or MA will place this data tracking form in a folder provided by PI in

a secure location in a cabinet at the nurse's and MA's office desk. After the provider has seen the patient, they will document in the patient's chart under 'clinical note' if CRC screening education was delivered or refused, the reason for refusal, if a CRC screening test was ordered and if it was not, the reason why. The PI will visit the project site weekly, every Tuesday, for the first month and then every two weeks to collect data, as the average number of patients seen in a week for annual appointments was one to three patients. At that time the PI will also discuss with stakeholders any barriers or changes that need to be made to the implementation process for the next PDSA cycle.

During the first month of implementation, the PI will visit the project site weekly, every Tuesday, to observe the workflow process, collect data, and discuss with team members (providers, MA, receptionist, and clinic nurse) any concerns or adjustments that need to be made. Thereafter, the PI will visit the project site every two weeks to collect data and assess the implementation process. Project team members are aware of PI's contact information and will be encouraged to reach out via email if concerns occur sooner than scheduled site visits. At week three an in-person meeting will occur with team members to discuss the workflow process, documentation, and data collection. At this time feedback or concerns also will be addressed.

Barriers that could potentially occur during implementation process are fewer number of wellness visits or errors identifying eligible patients. Fewer wellness visits are a potential barrier due to the rurality of the RHC where the average number of patients seen a week for annual wellness visits is approximately one to three patients. There is a chance that the three providers that are part of the project team could be absent requiring locum coverage. Locum providers at the RHC are not allowed to see annual wellness visits as their coverage is short and some may

not return to the RHC. Also, the PI will examine the providers' schedule the prior month of project implementation to evaluate if any locum coverage is expected during project implementation to identify if annual visit may be lower that week during locum coverage. If annual visits are lower than expected on the schedule, the PI and project team may need to discuss expanding the implementation to include all patients aged 45 and older who are being seen at the RHC.

Errors in the new workflow process may arise as staff adjust to changes in their daily routines (Schoonover, 2020). These errors could include the nurse or MA not identifying eligible patients for CRC education, which may lead to the provider overlooking CRC discussions and screening orders. To mitigate this, visual cues in each exam room will help staff focus on essential CRC screening steps (Hafner et al., 2022). Weekly meetings with the project team and PI during the first month will also reduce workflow errors; once processes are established, these meetings will shift to a biweekly schedule.

Budget

The project site was already equipped with essential resources, including an exam room, EMR capabilities, internet access for ordering fecal immunochemical testing (FIT), and Cologuard order forms, incurring no additional cost to the RHC. The PI created and will print the CRC screening education form. Given the rural setting and lower patient volume, the PI will print thirty colored copies from a personal computer. Similarly, the provider education from the USPSTF guidelines, will be a verbal presentation provided by the PI at no cost to the project site as no forms were needed. Additionally, the PI created a workflow process map using the software Drawio and developed a data tracking form in Excel. These materials required minimal

printing and were provided to the project site at no cost. Stakeholders will also receive verbal instructions on accessing the CRC screening guidelines for continued use if desired.

Evaluation and Analysis

The data tracking form includes patient details such as age, gender, patient medical record number, and records whether the patient accepted CRC screening education, reasons for refusal, whether CRC screening education was provided, reasons for omitting screening education, the patient's current CRC screening status, and whether a CRC screening order was placed (Appendix E).

During the first month, the PI will directly observe the workflow process and gather feedback from team members on a weekly basis. After the first month, feedback evaluation, error assessment, and any needed adjustments will continue biweekly. The PI will also conduct a biweekly chart review, until the end of project implementation, to determine if patients who received CRC screening orders completed the tests, the type of CRC screening test performed, and the results of that test for data evaluation. The data collection form, along with data extracted by the PI, will be used to monitor the team's progress towards the four specific, measurable, achievable, relevant, and time-bound (SMART) goals outlined in Tables 1 to 4. The PI will generate descriptive statistics and run charts to analyze and visually present the data. Results will be reviewed biweekly in-person meetings at the project site with stakeholders. These meetings will cover adjustments, project changes, feedback, and requests; the site representative and the project team also will have access to the PI's contact information if errors occur prior to or in between meetings. At the conclusion of the QI initiative, the PI, site representative and project

team, will meet in-person to review outcomes, discuss barriers, and consider the need for any further adjustments or adoption strategies.

Table 1. Smart Goal # 1

SMART Goal #1: By January 8th, 2025, 100% of the health care team will be educated on CRC screening: 1.Screening options recommended by USPSTF. (Age 45 and older, considered low risk, may be screened for CRC using FIT, FOBT, stool DNA, CT colonography, sigmoidoscopy, or colonoscopy will be delivered to providers and discussed at the provider educational session prior to implementation (Appendix C). 2. Patients eligible for Screening (Receptionist, MA, RN). Will be discussed at an education session with receptionist, MA, & RN prior to implementation. 3. Workflow for distribution of education handouts (Receptionist, MA, RN, Providers). 4. Use of the CRC education form (MA, RN, Providers) 5. General workflow (all staff) 6. Tracking of patients who accepted CRC screening education and who refused (MA, RN). 7. Where to store data after collected (MA, RN)
Description of strategies to be utilized to accomplish goal including any needed resources. The PI: 1. Developed an education form listing CRC screening options and workflow process map to be distributed to project team (Appendix B, D).

Table 1. Continued

2. Print education form, track data of patient's screened and those who refuse and store them in a designated area. 3. Feedback from providers after provider education session, and feedback from receptionist, MA & RN after separate education session, form presentation, and presentation given for project improvement. Feedback will be collected by PI and consist of a verbal face to face conversation that the PI will record on a paper and keep for evaluation. Qualitative data will be analyzed by the PI on an Excel sheet on PI personal computer.

Data to be collected	Collection Process	Planned data analysis
(Numerator) Nurse, MA, receptionist, providers, that are part of the project team. (Denominator) All Rural Health Clinic Staff.	The principal investigator will distribute a sign in sheet to track attendance via quantitative data.	The principal investigator will calculate the percentage of staff who attended education sessions.

Table 2. Smart Goal # 2

SMART Goal #2: By March 2025, 70% of eligible patients will accept CRC screening education.
Description of strategies to be utilized to accomplish goal including any needed resources. 1. Nurse and MA determined eligible patient to receive CRC screening education.

Table 2. Continued

2. Nurse and MA give CRC screening education form to eligible patients. 3. Providers deliver CRC screening education to patients. 4. Provider is to report to MA or nurse if patient refused or accepted CRC screening education, and if CRC screening ordered.		
Data to be collected Numerator: Number of eligible patients who received CRC screening education. Denominator: Number of eligible patients.	Method of Collection and who is responsible. 1. The provider reports to MA or nurse if patient receives or refuses CRC screening education. 2. Nurse or MA document refusal or acceptance of CRC screening education on data tracking form placed in folder as well as age, gender, and reason for refusal.	Planned data analysis 1. The principal investigator will gather data from data collection folder every two weeks and calculate number of patients who received and refused CRC screening education. 2. Results presented to staff every 2 weeks during project team meetings.

Table 3. Smart Goal # 3

SMART Goal #3: 100% providers at clinic will document in their clinic note if CRC screening education was accepted or refused by patient and if CRC screened ordered by March 5, 2025.		
Description of strategies to be utilized to accomplish goal including any needed resources. 1. Completion of goals one & two 2. Provider document in clinic note in EHR acceptance or denial of CRC screening education and if CRC screening ordered.		
Data to be collected	Method of Collection and who is responsible	Planned data analysis
Numerator: Number of patients who have documented acceptance of discussing CRC screening education or refusal in EHR. Denominator: Total number of patients eligible for CRC cancer screening.	1. The primary investigator will monitor and track providers who document acceptance or denial of CRC screening education through EMR analysis every 2 weeks in the	The primary investigator will document the number of patient charts that have documented acceptance or refusal of CRC screening education from provider seen in patient EHR in clinic note.

Table 3. Continued

	2. Clinic note as well as under clinical scanned documents as that is where the CRC screening information is documented.	

Table 4. Smart Goal # 4

SMART Goal #4: By March 2025, 70% of patients 45-75 years old completed CRC screening.		
Description of strategies to be utilized to accomplish goal including any needed resources. 1. Nurse of MA delivered CRC screening education to eligible patient. 2. Provider discussed CRC screening education and options with patient. 3. Provider ordered CRC screening. 4. Patient completed the CRC screening. 5. Results of screening sent		
Data to be collected	Method of Collection and who is responsible.	Planned data analysis

Table 4. Continued

Numerator: Number of eligible patients who received CRC screening. Denominator: Number of eligible patients.	1. The nurse or MA kept track of patients who were sent CRC screening orders on data tracking form. 2. PI at 2-week project site evaluations examined the EHR, via patient MRN, of patients sent CRC screenings to see if CRC screening completed and kept track of data.	3. The PI will gather data from data collection folder every two weeks and evaluate the number of patients who were screened for CRC every 2 weeks until project completion. 4. Results presented to staff every 2 weeks during project team meetings.

Safety and Confidentiality

Prior to implementation, approval will be sought from the Montana State University Institutional Review Board (IRB). As the project site does not have its own IRB board, a site-specific review was not conducted. The project site representative, who is the chief executive officer of the RHC and the hospital who owns the RHC, signed consent for the QI project implementation to occur. All RHC staff involved in the project voluntarily participated and were given the option to decline. They were informed that the QI Project was evidence-based practice

based on USPSTF guidelines, with the focus on increasing CRC education, which will present minimal risk of harm.

Patient safety and confidentiality will be prioritized and closely observed throughout the project. Patients will be informed about Health Insurance Portability and Accountability Act (HIPPA) regulations and the options to decline education discussion and CRC screening. Data tracking forms will be securely stored at the clinic in a cabinet at the nurse's and MA's desks, located in a private, locked area separate from the patient waiting room. When the office is closed, the entire area will remain locked for additional security. The PI will also maintain a copy of de-identified information on a password protected personal computer via an Excel worksheet that will be stored on a hard drive and password protected only by the PI. Not only will the Excel worksheet be password protected exclusively by the PI, but the personal computer also has an additional passcode to access the computer, only occupied by the PI. This data will include patient gender, age, whether the patient received CRC education, if not received, why, the type of CRC screening test ordered, and if not ordered, why? This setup is intended to facilitate data analysis and serve as a backup storage method. The paper data tracking form contains personal identifiable information, specifically the medical record number. However, the medical record number will only appear on the paper data tracking form utilized for secondary data collection and will not be uploaded to the PI's personal computer.

CHAPTER THREE

QUALITY IMPROVEMENT MANUSCRIPT

Contribution of Authors and Co-Authors

Manuscript(s) in Chapter(s) 3

Author: Shelby Charmaine Beery, BSN, RN

Contributions: Study conceptualization, original draft, and visualization

Co-Author: Ruth Tretter, PhD, RN, LSSGB

Contributions: Content review, editing, and supervision

Co-Author: Benjamin Miller, PhD, APRN, FNP-C, ACNPC, ENP-C, FAANP

Contributions: Second reader for content review, editing, and supervision

Manuscript Information

Shelby Charmaine Beery, BSN, RN, Ruth Tretter, PhD, RN, LSSGB, Benjamin Miller, PhD, APRN, FNP-C, ACNPC, ENP-C, FAANP

Increasing Colorectal Cancer Screening in a Rural Primary Care Setting: A Quality Improvement Project.

Status of Manuscript:
☒ Prepared for submission to a peer-reviewed journal
☐ Officially submitted to a peer-reviewed journal
☐ Accepted by a peer-reviewed journal
☐ Published in a peer-reviewed journal

Clinical Problem

Colorectal cancer (CRC) continues to be a significant problem in the United States ranking as the second most common cause of cancer-related deaths in the U.S. (Colorectal Cancer Alliance, 2024). This is comparable to Montana, where CRC is the third most diagnosed cancer in men and women (Montana Department of Health and Human Services, 2023). Since the 1990s the CRC rates in the United States have been increasing by 1-2% each year for adults 55 and younger, but the reason why is not fully understood (National Cancer Institute, 2024b). Due to the rising CRC rates, the USPSTF recommended reducing the age of the first CRC screening from 50 to 45. Screening is recommended until the age of 75, when the risk of the procedure may outweigh the health benefits to the individual (National Cancer Institute, 2024a).

Colorectal cancer is a common cancer diagnosis, making screening essential for early detection and prevention. The primary goal of CRC screening is to detect early signs of cancer or precancerous polyps in the colon or rectum, allowing for timely intervention that can prevent cancer progression and significantly reduce mortality. The five-year survival rate for CRC is about 90% when the cancer is found at an early stage (Marcellinaro et al., 2023). Despite the proven benefits of CRC screening, the screening rates are not at the goal of 68.3% set by Healthy People 2030 (U.S. Department of Health and Human Services, n.d.). The national percentage of CRC screening completion in both men and women aged 45 to 75 was 58.7% in 2021 (U.S. Department of Health and Human Services, 2021) and in Montana in 2022, 62.6% of adults aged 45 to 75 were up to date with CRC screening (Center for Disease Control and Prevention [CDC], 2023). Given the importance of CRC screening and persistently low screening rates, increasing CRC screening is crucial to reducing CRC incidence and mortality.

Review of the Literature

A scoping review was completed to identify common barriers to CRC screening adherence. Articles reviewed for the quality improvement project included systematic reviews, a national survey, a mixed-method study, a multi-level analysis, a retrospective cohort study, cross-sectional studies, and qualitative studies. Articles that met the inclusion criteria identified barriers associated with CRC screening adherence. These barriers included financial constraints, lack of CRC knowledge among patients and providers, fear of screening procedures, pain and embarrassment, privacy concerns, distrust in the healthcare system, limited time for the patient and provider, absence of a primary care provider, and cultural factors (Wang et al. 2018b; Wainwright, et al., 2022; Weiss et al., 2017; Alpert et al., 2022; Agunwamba et al., 2023; Bayly et al., 2024; Byrd et al., 2018; Katz et al., 2018; Kim, 2018; Mueller et al., 2021; Nagelhout et al., 2017; Puli et al., 2023; Warren et al., 2023; Won et al., 2020; Zhu et al., 2021). This review found that limited knowledge of CRC and screening options among patients, and limited knowledge of CRC screening guidelines and options among providers were the most common barriers related to CRC screening completion.

Many of the common barriers for CRC screening can be remedied through provider education. Increasing healthcare providers' understanding of different CRC screening tests, costs, and cultural sensitivities can improve patient-provider trust and communication, address fears and misconceptions, and boost overall patient knowledge. Current CRC screening tests include both non-invasive and invasive testing with varying cost. Non-invasive testing includes Fecal Immunochemical Testing (FIT) and stool deoxyribonucleic acid (sDNA) (known as Cologuard), guaiac Fecal Occult Blood Test (gFOBT), and computed tomography (CT) colonography (United States Preventative Services Taks Force, 2021). Cologuard involves a home stool kit, ordered by

the patient's health care provider, which is sent to the patient's home where the patient follows kit instructions to leave a stool sample and mail the stool sample back to the designated Cologuard facility. FOBT requires the patient to collect a stool samples (typically from three different stool samples) by smearing a small amount of stool onto an occult card, provided by patient's health care provider. The patient will then bring the occult card or cards back to the health care provider where the laboratory will further test the stool for the presence of blood. CT colonography, also known as virtual colonoscopy, uses computed tomography (CT) to examine the colon and rectum. Similar to a colonoscopy, a bowel preparation is needed to cleanse the bowel for adequate imaging. The non-invasive stool testing options are relatively affordable and typically covered by insurance, whereas the CT colonography may not be covered cost can range anywhere from $300 to $800 (Sawhney et al., 2018). Invasive testing includes sigmoidoscopy and colonoscopy. Both require the patient to take a bowel preparation to cleanse the bowel for adequate visualization and are covered by most insurances. Without insurance the cost can range from $2,000 to $5,000.

Research showed that implementing educational protocols for providers and clinical staff on various CRC screening options (FIT, gFOBT, sDNA) led to higher CRC screening rates in primary care settings (Frissora et al., 2021). These non-invasive tests, which can be completed at home, are often more acceptable to patients. Their ease of collection helps address common barriers such as financial constraints, travel costs, time off work, and fear of invasive procedures like colonoscopies. An 8-week intervention was tested to enhance CRC screening education for patients and providers and improve the CRC screening workflow and referral process for CRC

screening tests to increase CRC screening rates and decrease CRC incidence as well as CRC morbidity and mortality.

Conceptual Framework

This quality improvement project utilized the Institute for Healthcare Improvement Model of Improvement (IHI), Plan, Do, Study, Act (PDSA) framework, to guide implementation aims, measures, changes, and process improvements (Agency for Healthcare Research and Quality, 2024). This framework was chosen particularly for this QI project as small-scale changes with refined testing can be completed before full implementation of the chosen intervention.

During the planning at the project site, analysis of electronic medical record (EMR) data revealed that 16% of eligible patients for CRC completed CRC screening. This represents a lower-than-standard metric for CRC screening completion. Observation of the process revealed inconsistent team workflow related to CRC screening. Based on these findings, a strategy was constructed by project team to enhance CRC screening education for patients and providers by distributing a CRC screening education handout to eligible patients (age 45 years and older), conducting a one-time CRC educational meeting with clinical staff and providers prior to implementation of the project, as well as an improved referral process for CRC screening to increase CRC screening rates and reduce CRC incidence. The CRC screening education handout was created by the PI and included USPSTF (2021) guideline recommendations and screening options, CRC cancer statistics from the National Cancer Institute (2024a), and a directory of the nearest facilities that offer screening options that are not provided at the project site, including CT colonography, sigmoidoscopy, and colonoscopy.

During the “do” phase of the PDSA cycle, staff received education on CRC and CRC screening, the introduction of the workflow process change, and provider-driven education for patients on CRC and available screening guidelines. This training occurred one day prior to project implementation. The following day, implementation began, incorporating the new CRC workflow process and distribution of the CRC education handout for the first PDSA cycle. Eight PDSA cycles were conducted throughout the project. Weaknesses of project were assessed weekly during this 8-week period. During each “study” phase data and staff feedback were collected to identify areas for improvement and guide any necessary workflow modifications. The final “act” stage consisted of analyzing data findings and presenting these findings verbally as well as visually through run charts and comparing them to project goals. This evaluation allowed the project team to determine whether the process met expectations or required further revisions, or if implementation should continue or be abandoned.

Purpose

The purpose of this project was to improve CRC screening rates in a Rural Health Clinic in Montana through the implementation of a standardized, streamlined, workflow enhancing CRC screening education for patients and providers, as well as improving the referral process for CRC screening tests. The goal was to improve CRC screening rates, and reduce CRC incidence, morbidity, and mortality.

Methods

Context

The project site was a rural health clinic (RHC) with a primary care focus as well as low acuity urgent care. The RHC served a diverse patient population, including pediatrics, adults, and geriatrics. Eligibility requirements for participation in this project included patients aged 45 years and older being seen for annual wellness visits. This RHC was staffed with nine employees, but for the purpose of the QI project seven employees were included in the project team. This team included a receptionist, a registered nurse (clinic manager), a medical assistant (MA), and three providers: a family nurse practitioner (FNP), two physician assistants (PA), and the chief executive officer (CEO). The project team members utilized an EMR system that was initiated in 2013 and did not have several of the updated electronic capabilities compared to other EMR systems such as electronic reminders for patient appointments, a patient portal, preventative screening checklists or reminders, or benchmark reporting for preventative screening due to their rural classification. Due to the rural location of the RHC, the nearest facility for a colonoscopy or sigmoidoscopy was forty-five minutes away and the nearest CT colonoscopy was two hundred forty-one miles away. The RHC was able to offer FOBT as well as Cologuard (sDNA & FIT) testing.

Intervention

Pre-implementation of the intervention began with staff education on CRC and CRC screening, the introduction of the workflow process change, and provider-driven education for patients on CRC and available screening options as well as nearest locations for available CRC testing and their contact information. The staff education consisted of two separate sessions, one

educational session with the nurse, MA, and receptionist to go over the workflow process, and another meeting with the providers to discuss CRC education and screening guidelines per the USPSTF (2021). At the start of the workflow, patients checked in at the reception desk. The receptionist informed the nurse or medical assistant (MA) of the patient's arrival and appointment type (e.g., annual wellness, episodic). The nurse or MA then assessed whether the patient qualified for CRC screening education (ages 45 and older with an annual wellness visit). If eligible, the nurse or MA gathered the CRC screening education handout. After check-in, the patient waited in the waiting room until the nurse or MA escorted them to the exam room. There, the nurse or MA provided the CRC screening education handout, explaining that the provider would review it with them, but they also had the option to refuse the education. The patient was given time to read the handout before the provider entered the exam room. The nurse or MA then exited the exam room and informed the provider that an eligible patient had received the CRC screening education handout and was ready to see the provider. The provider then entered the eligible patient's exam room, and as part of their annual wellness visit, would discuss the CRC screening education form, allowing the patient the choice to refuse the CRC education discussion. The provider then would determine if the patient was up to date with CRC screening, and if appropriate, communicated with the nurse or MA to send an order for the patient's preferred CRC screening test (gFOBT, FIT, sDNA-FIT, colonoscopy, CT colonography, flexible sigmoidoscopy, flexible sigmoidoscopy with FIT). The nurse or MA documented, on the data collection form provided by the primary investigator (Appendix E), the eligible patient that was seen, their age, medical record number, gender, acceptance or refusal of CRC screening education, the reason for refusal, the CRC screening that was ordered, or the reason that an order

was not placed. The nurse or MA placed this data tracking form in a folder provided by the PI in a secure location in a cabinet at the nurse's and MA's office desk. After the provider had seen the patient, they documented in the patient's chart under 'clinical note' if CRC screening education was delivered or refused, the reason for refusal, if a CRC screening test was ordered and if it was not, the reason why.

Measures

Four goals were measured and included three process measures: (1) By January 8th, 2025, 100% of the health care team would be educated on CRC screening; (2) By March 4th, 2025, 70% of eligible patients would accept CRC screening education; 3) 100% providers at RHC would document in their clinic note if CRC screening education was accepted or refused by the patient and if CRC screening was ordered by March 5th, 2025; and an outcome measure; (4) By March 5th, 2025, 70% of patients 45 years and older would complete CRC screening. To adequately measure if the goals were achieved, data was tracked on a form by the nurse and/or MA including patient age, gender, patient medical record number, and whether the patient accepted CRC screening education, reasons for refusal, whether CRC screening education was provided, reasons for omitting screening education, the patient's current CRC screening status, and whether a CRC screening order was placed.

Analysis Plan

Originally the PI planned to observe weekly for the first month and then biweekly until project conclusion, but due to the short duration of the project implementation and an adjustment in screening applications at five weeks, the project was observed weekly for the entire eight-week course. The PI directly observed the workflow process and gathered feedback from team

members weekly. The PI also conducted a biweekly chart review, until the end of project implementation, to determine whether patients who received CRC screening orders completed the tests, the type of CRC screening test performed, and the results of that test for project evaluation. After the first month of implementation, data results were verbally discussed with project team members as well as visually presented via bar charts in the form of percentages. The values displayed included the number of patients who accepted CRC screening education, and the number with adequate documentation in the providers clinic note. A separate bar chart was created that displayed the number of CRC orders sent and the type of orders sent (Cologuard, colonoscopy, sigmoidoscopy, CT colonography, FIT, and gFOBT). At the eight-week project conclusion, data results were again verbally discussed and visually presented.

Ethical considerations

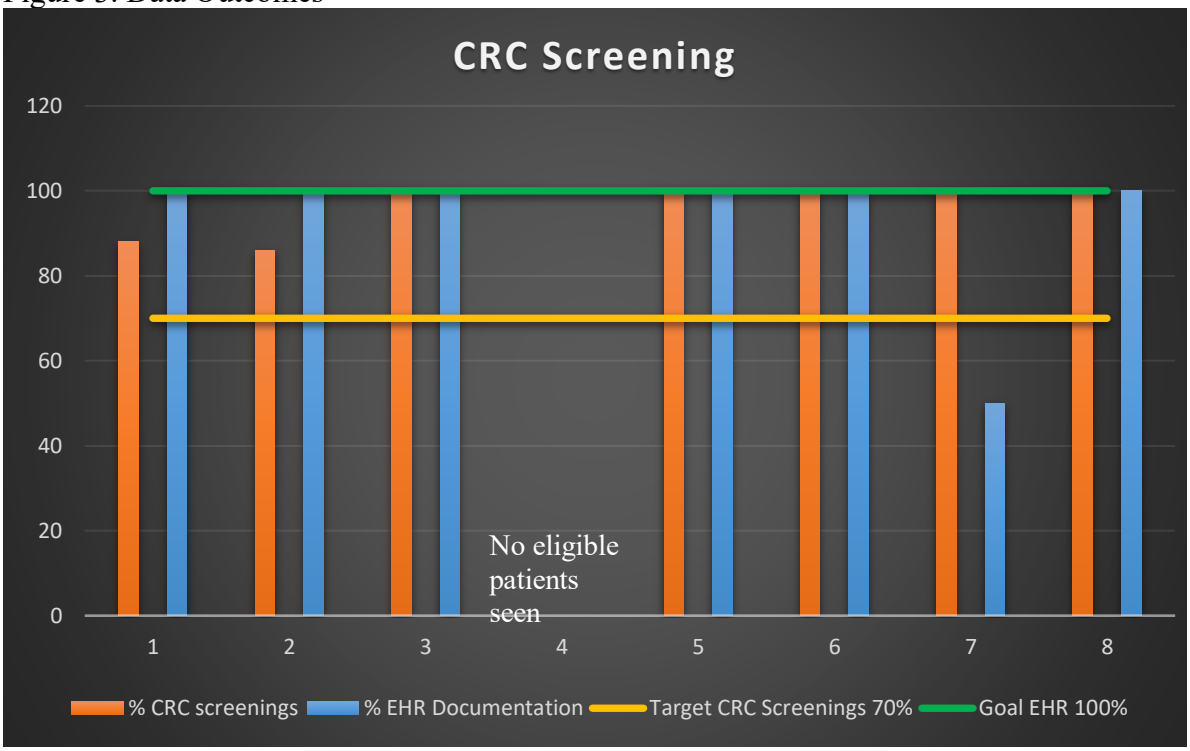
Prior to project implementation, the IRB reviewed the QI project proposal and determined this project was not considered "Human Subject Research." During the planning phase, a review of USPSTF guidelines confirmed that CRC screening was recommended for individuals aged 45 to 75. Beyond the age of seventy-five, the risks of invasive CRC screening tests may outweigh the benefits, leaving the decision to the patient and their provider based on patient's health status and co-morbidities. However, the project team decided that excluding patients aged 75 and older from the educational component and screening protocol of the QI project could be unethical. Therefore, for the purposes of this QI project all patients aged 45 and older were included in the CRC screening protocol.

Results

In the eight-week testing period, 26 patients were seen for annual wellness visits at the RHC and were eligible for CRC screening. Twenty-four of 26 patients accepted the CRC screening education. Of the two patients who refused, one patient, a 93-year-old stated, “It is not necessary,” while the other, a 76-year-old said, “I don’t believe in it.” 100% of health care team (n=6), received CRC screening education, meeting goal #1. Over the eight-week period, the average number of patients who accepted CRC screening education was 84%, meeting goal #2 (70% eligible patients will accept CRC screening education). It is important to note that one week during project testing (week four), the project site did not have any eligible patients seen in their RHC. All CRC screenings were charted, meeting goal #3, except for week #7. Only two patients were eligible for screening in week seven, so one missed patient resulted in 50% completion during this week. The provider responsible for documentation this week, stated he forgot to chart as the patient had multiple co-morbidities to document on. Out of the 24 patients who accepted CRC screening education, seven patients had CRC screening orders sent, four included colonoscopies and three Cologuards. However, only two patients received their CRC test results back during project, leading to the incomplete achievement of goal #4. The two results that came back included one colonoscopy and one Cologuard. The colonoscopy showed that a few polyps were removed and recommended a repeat colonoscopy in five years, and the Cologuard result was negative. Thirteen of the patients who accepted CRC screening education were up to date with screening. Overall, the project team reported increased satisfaction with an improved workflow process for CRC screening as well as improved CRC education to patients and providers and improved EHR documentation.

After five weeks of implementation, the PI again revisited the idea to provide the CRC screening education handout to all eligible patients being seen vs patients being seen for annual appointments only. The receptionist, MA, and clinic nurse felt that with a better understanding of the CRC screening workflow, they could distribute the CRC education handout to all patients aged 45 and older. Despite this, the PA opposed introducing CRC education during episodic visits, believing it should be reserved for annual appointments. However, he stated that if a patient in an episodic visit inquired about CRC screening after viewing the distributed CRC education handout, he would provide the education and proceed with screening if the patient was interested. After this conversation, no patients seen for episodic visits discussed with the provider an interest in completing CRC screening.

Figure 3. Data Outcomes



Discussion

The results of this project aligned with the literature, demonstrating that by addressing barriers of limited patient and provider CRC knowledge and awareness of screening guidelines through improving patient and provider education on CRC screening, the CRC referral process can be improved increasing CRC screening rates with the intention to lower CRC incidence. Pre-project implementation, CRC screening rates and documentation stood at 16% over a three-month period. Post-project implementation, CRC screening education reached 84% over an eight-week period, with EHR documentation achieving 100%, except for one missed entry in week five. The projects' goal of increasing CRC screening was successfully achieved, leading the team to adopt the process change. While the timeline limited the ability to assess screening completion, a system was previously established by project team to track outstanding CRC orders and ensure proper follow-up on pending test results.

Limitations

Barriers to implementation included an electronic health record (EHR) that was incompatible with current technological advances, a small population to capture data, staff participation, and limited timeline for intervention. The EHR at the RHC did not have the capability to have electronic reminders for preventative screenings, such as CRC, nor was there an adequate place such as a procedure list or preventative screening checklist to document completed CRC screenings. Due to this technological limitation, CRC screening reminders relied on project team staff. Fortunately, during project implementation staff were able to screen each individual patient, but also had a workflow process map posted at the MA's and nurse's desk to serve as a visual reminder.

Prior to implementation, the project team was asked if CRC screening education could be provided to all patients aged 45 and older, regardless of visit, rather than limiting it to annual wellness visits. This suggestion aimed to increase the sample size, as many patients in the community do not schedule annual wellness visits, making episodic visits a key opportunity for screening. At that time, the project team decided against including episodic visits, believing it was not appropriate to screen patients who were coming in for episodic visits, and thought it could constrain time between the patient and provider.

The last limitation involved with the project implementation was the fact that it took place over an 8-week period. It is difficult to adequately gain a sample size sufficient to generalize to other populations due to the rural project site's small number of wellness visits over that duration. The RHC involved was a rural community with a county population of 1,676 people. On average over a typical three-month period, the RHC will see roughly thirty patients for annual wellness visits. The small sample size of the project population was expected but is important to mention when evaluating the data.

Recommendations

Based on the findings, it is recommended that all healthcare facilities, urban or rural, to have preventative screenings in place, specifically with some type of electronic reminder, as paper reminders can easily be forgotten, misplaced, or lost. The project site would also benefit from updating their EHR to one that can provide electronic reminders to facilitate staying up to date with current standard guidelines for preventative screenings.

In addition to updating the EHR, it is also recommended to report to Merit-Based Incentive Payment System (MIPS), not only to monitor performance benchmarks, but also to qualify for potential reimbursement incentives.

Incorporating community-wide education on CRC screening through public health departments such as utilizing flyers, social media, educational sessions, or videos tailored to specific communities could also effectively raise awareness and address gaps in knowledge in regard to CRC screening (Luquie et al., 2021). Since many patients in this community do not regularly come in for annual wellness visits, increasing awareness through public health initiatives is vitally important.

A longer duration of an implementation plan is also recommended to effectively evaluate data from a larger sample size to generalize to other populations. The duration would be of benefit if it was at least 6 months to a year of data.

Conclusion

The implementation of a standardized workflow process and an educational protocol for CRC screening demonstrated that enhancing awareness regarding CRC screening can increase the overall number of CRC screenings and potentially decrease CRC incidence. This project highlighted the value of educating both patients and the project team while establishing a structured CRC screening workflow. These efforts not only benefited the project team, but also had a positive impact on the broader community. Moreover, the findings emphasized that sustained implementation and ongoing monitoring can help identify trends, address barriers to screening, and further improve CRC screening rates. Ultimately this approach contributes to

reducing the morbidity and mortality associated with CRC, reinforcing the importance of proactive screening and education that should be implemented in all primary care facilities.

CHAPTER FOUR

ADVANCED NURSING ESSENTIALS REFLECTION

A key component of Doctorate Nurse Practitioner (DNP) programs, specifically at Montana State University (MSU), is the completion of a quality improvement (QI) project that addresses systematic issues in healthcare, aiming to enhance efficiency, reduce costs, and improve patient outcomes (Puri et al., 2023). The implementation of this QI project integrates eight DNP core essentials established by the American Association of Colleges of Nursing (AACN). These DNP essentials provide the advanced knowledge necessary for professional nurses to deliver high quality patient care and safe outcomes (American Association of Colleges of Nursing, 2006). In this final chapter, I will reflect on how five of these DNP essentials have been achieved through this QI project.

Essential I: Scientific Underpinning for Practice

The Scientific Underpinnings for Practice encompass various scientific disciplines that guide advanced nursing practice, forming the basis for evidence-based practice. These include nursing science, biological and physical sciences, ethics, philosophy, and systems theories and organizational science (AACN, 2006). During the DNP program at MSU I met this essential through multiple courses, including *Evidenced-Based Practice (EBP) I and II*, *Ethics, Law & Policy, Statistical Applications, Design of Healthcare Systems, Nursing Leadership, Advanced Pathophysiology, Program Planning & Evaluation, Writing for Scholarly Project,* and *DNP Scholarly Project*. For example, in the courses *Evidence-Based Practice (EBP) I and II,* I learned how to interpret data and input that data into software applications to calculate statistical values

such as the median, p-value, and confidence interval. Additionally, I completed a research paper that required me to identify credible evidence-based articles, interpret research findings, and critically appraise the scholarly work. Through these experiences I gained foundational skills in data collection and interpretation, as well as the ability to identify and appraise credible scholarly evidence appropriate for my QI project. The knowledge obtained from *EBP I and II* was a valuable tool while gathering evidence to support evidence-based interventions for my QI project. Similarly, *Advanced Pathophysiology* deepened my understanding of disease processes, and the biological and physical sciences, enabling me to design interventions aligned with the goals of my QI project. Since my QI project focused on improving CRC screening, it was critical that I understood how CRC affects the body, its underlying causes, and contributing factors.

The skills and knowledge I have gained throughout these courses have prepared me to integrate evidence-based practices directly into clinical rotations as well as apply to my QI project. For example, after gaining an understanding of how to identify evidence-based practice guidelines, I was able to apply screening guidelines to direct patient care such as cervical cancer and CRC screening. Understanding the evidence supporting CRC screening, such as the updated age guidelines, I was able to apply these best practices into my interventions for my QI project. Moving forward, I will continue to apply these principles to enhance patient outcomes and improve the quality of care delivery.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

Essential II highlights the importance of advance nursing professionals understanding not only of practice policies, but also the principles, procedures, and quality improvement strategies

necessary to create and sustain change at an organizational level (AACN, 2006). I met this essential through the knowledge gained in courses such as *Design of Healthcare Systems, Ethics, Law, Policy & Healthcare, Program Planning & Evaluation,* and *Finance & Budget of Healthcare Systems.* Specifically, *Design of Healthcare Systems* introduced various flow charts applicable to different healthcare fields, enabling me to assess system processes, identify inefficiencies, analyze potential issues, and target improvements. At the start of my QI project involving colorectal cancer screening in a primary care clinic, I utilized a fishbone diagram to identify potential barriers and roles of each team member involved with colorectal cancer screening. This process facilitated brainstorming interventions to enhance colorectal cancer screening at my project site.

Additionally, not only did I gain a deeper understanding of how the healthcare system operates, but I also learned all the financial components it takes to run that system. *Finance & Budget of Healthcare Systems* course provided me with the skills and knowledge to effectively manage costs and allocate resources within a healthcare system. Evaluating the financial operations and available resources at my QI project site was a critical step in designing an effective intervention.

Essentials III: Clinical Scholarship and Analytical Methods for Evidenced-Based Practice

Core essential III of the DNP program focuses on developing strong analytical skills necessary for interpreting data, conducting research, and completing quality improvement (QI) projects at a scholarly level. I accomplished this essential in courses, *Evidence-Based Practice I & II, Statistical Applications,* and *Scholarly Writing*. Specifically, *Evidence -Based I & II*, as previously mentioned in Core Essential I, provided me with the foundational skills in data

collection and interpretation, identifying and appraising credible scholarly evidence, designing evidence-based interventions, and conveying findings from evidence-based practice and research to improve healthcare outcomes (AACN, 2006). In the course, *Scholarly Writing*, I learned how to effectively synthesis research at a scholarly level, enhancing my ability to integrate and communicate evidence clearly.

The skills gained from these courses proved invaluable during my quality improvement project, which focused on improving colorectal cancer (CRC) screening in a rural health clinic. This project required extensive research on current CRC screening tools, barriers to screening, and effective interventions to enhance patient care. Through a comprehensive literature review, I was able to successfully identify and appraise scholarly articles aimed at improving CRC screening, thereby fulfilling the competencies outline in DNP Core Essential III.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

The American Association of Colleges of Nursing (2006), states that core essential VII prepares DNP graduates to apply practice models, guidelines, and standards of care while demonstrating leadership and collaborative skills within interprofessional teams through effective communication. Successful healthcare delivery relies on teamwork, involving professionals such as nurses, medical assistants, physicians, nurse practitioners, physician assistants, receptionists, etc.

For my QI project on improving CRC screening, my team included a registered nurse, receptionist, medical assistant, two physician assistants, one nurse practitioner, and a chief executive officer (CEO). To initiate the project, I met with the CEO at my project site to discuss implementation strategies, staff involvement, and the necessary resources. Additionally, after

observing the workflow, I met with other members of my project team to review the intervention, address concerns, and provide education on current practice guidelines relevant to the project. After completing the course, *Nursing Leadership*, I found communicating with my QI project less of a challenge as the course provided valuable insights into professional and effective communication.

Through core essential VII, I successfully implemented strategies to improve CRC screening while leading a multidisciplinary team in understanding and adopting this practice change. This process required strong communication and leadership skills, which I developed throughout the DNP program.

Essential VIII: Advanced Nursing Practice

Core essential VIII is a critical component of the DNP program, which I feel is one of the most important, preparing the advance practice nurses to provide care across various patient settings, including hospitals, long-term care, home health, community health, and outpatient clinics. This essential emphasizes the development of advanced assessment skills, clinical judgement, diagnostic reasoning, and the application of evidence-based practice. Additionally, it requires effective communication with interprofessional healthcare members to improve patient outcomes.

I successfully met this core essential through multiple courses including *Advance Pathophysiology, Advanced Health Assessment, Diagnostic Reasoning, Advanced Pharmacology I &II, Advance Clinical I, II, III, IV, Advanced Primary Care Diagnostics*, and *DNP Scholarly Project.* These courses provided me with a strong foundation in understanding various health conditions, diagnostic procedures, standards of care, and treatment plans.

Beyond coursework, my clinical experience further reinforced these skills. Through direct patient care, I applied my knowledge in assessment, diagnostic reasoning, and evidence-based treatment planning to improve patient health outcomes. Additionally, I effectively communicated with my preceptor to refine assessment and patient plan of care. For example, after evaluating a patient and developing a list of differential diagnoses along with different plans of care for each differential, my preceptor would discuss these differentials with me, helping determine the most appropriate diagnosis based on the patient's symptoms. Without the coursework I have completed, I would not have been able to successfully make a differential list or have a professional conversation with my preceptor regarding those differentials.

Moving forward, I will continue to apply these competencies in my role as an advanced practice nurse by providing evidence-based care, advocating for patients, collaborating with interdisciplinary teams, engaging in research, and refining my clinical judgement and diagnostic skills to delivery patient-centered high-quality care. My commitment to improving patient outcomes, staying current with evidence-based practices and guidelines, and enhancing communication skills will ensure effective collaboration within an interprofessional healthcare team.

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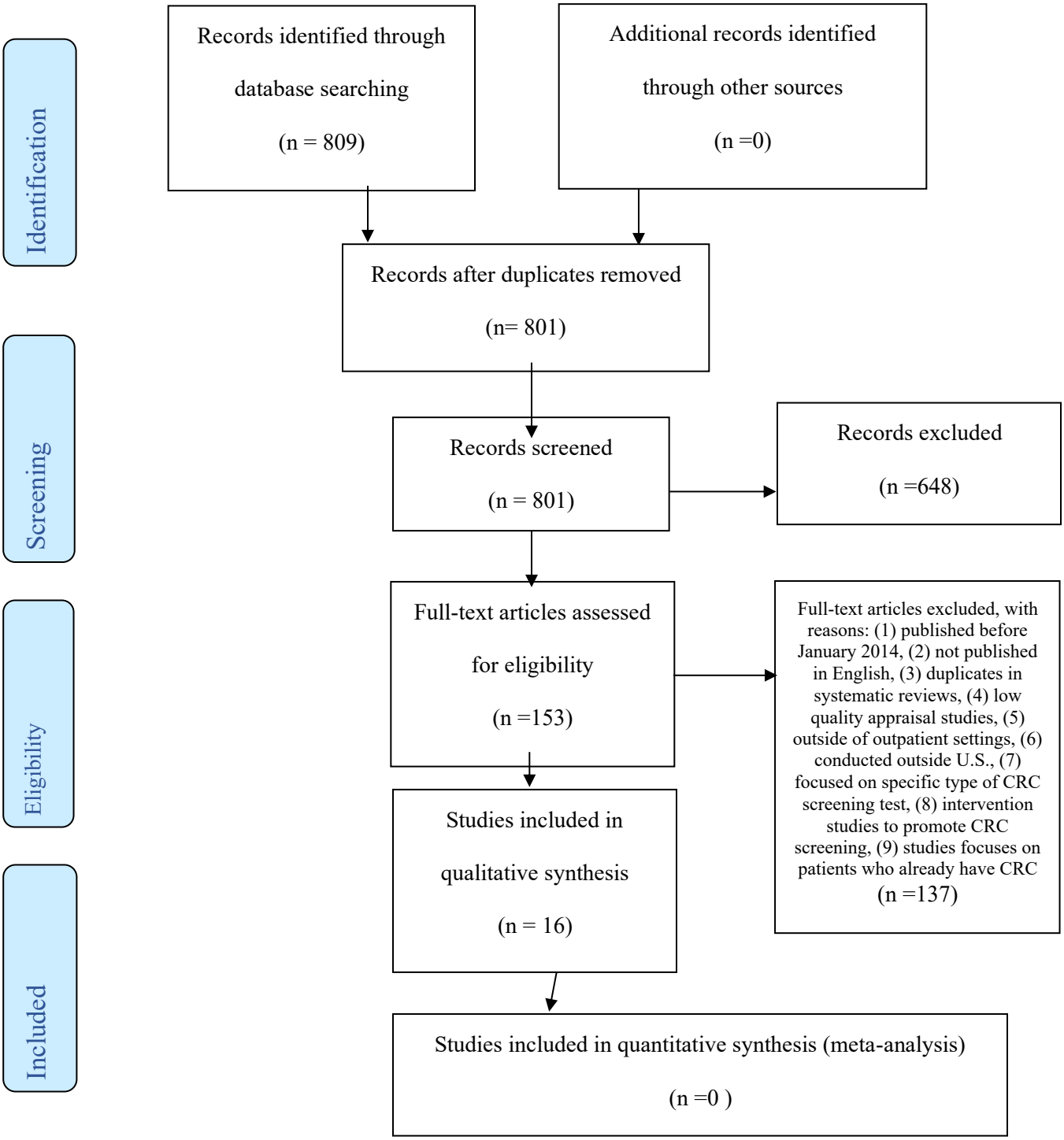
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APPENDICES

APPENDIX A

PRISMA DIAGRAM

Appendix A: PRISMA Diagram



APPENDIX B

CRC EDUCATION FORM

Appendix B: CRC Education Handout

Colorectal Cancer (CRC) Information

- Colorectal cancer is a disease in which malignant (cancer) cells form in the tissue of the colon or the rectum.
- CRC often begins as a polyp that can later become cancerous.
- It takes approximately 10 years for a poly to become cancerous.
- 2nd leading cause of cancer-related deaths worldwide.
- 2nd leading cause of cancer related deaths in U.S.
- In Montana, it is the 3rd most commonly diagnosed cancer with 170 deaths each year.
- Common risk factors: Age, family history of CRC, personal history, inherited risk, history inflammatory bowel disease, alcohol and tobacco use, diabetes, race (American Indian and Alaska Natives highest risk and African Americans second highest risk), and obesity.

Why and When to Screen?

- CRC often doesn't present symptoms until its advanced.
- Rates of CRC have been increasing 1-2% each year in adults younger than 50.
- Screening can identify cancer in its early stages, when treatment is most effective.
- Early detection of CRC can increase the five-year survival rate to over 90%.

- United States Preventative Services Task Force recommends regular screening for lower risk adults at age 45. Those who are determined to have risk factors may need to start earlier.
- CRC is a preventative service that many health insurances are required to cover.

Screening Options

Non-Invasive Home Stool Tests

- **Guaiac fecal occult blood test (gFOBT): test annually.**
    - Use stool cards provided by health care facility to test blood in stool with 3 different bowel movements.
- **Fecal immunochemical test (FIT or gFOBT): test annually.**
    - Test for antibodies to blood in stool that may indicate CRC via single bowel movement, per kit recommendations.
- **Multitarget stool DNA testing (sDNA-FIT): test every 3 years.**
    - Detection of abnormal stool DNA markers and the presence of blood in stool via single bowel movement, per kit instructions.

Direct Visualization

- Colonoscopy: test every 10 years.
- Virtual colonoscopy (CT colonography): every 5 years.
- Sigmoidoscopy: test every 5 years.

Screenings offered at RHC

- Cologuard (sDNA-FIT) in stock
- Ordered ~~of~~ gFOBT or FIT testing

Nearby facilities that offer CRC screenings

- Glendive Medical Center (406) 345-8930: Sigmoidoscopy & colonoscopy
- Intermountain Health Miles City (406) 233-2600: Sigmoidoscopy & colonoscopy
- Sidney Health Center (406)-488-2100: Sigmoidoscopy & colonoscopy
- Billings Clinic Billings (406)-435-3411: Sigmoidoscopy, colonoscopy, CT colonography
- Intermountain Health Billings (406)- 238-6380: Sigmoidoscopy, colonoscopy, CT colonography.

Screening tests to detect colorectal cancer and polyps. (2024). National Cancer Institute. https://www.cancer.gov/types/colorectal/screening-fact-sheet.

U.S. Preventive Services Task Force. (n.d.). *Final recommendation statement: Screening for colorectal cancer*. https://www.uspreventiveservicestaskforce.org/uspstf/announcements/final-recommendation-statement-screening-colorectal-cancer.

APPENDIX C

USPSTF GUIDELINES

Appendix C: USPSTF Guidelines

Importance

- Colorectal cancer (CRC) is the 3rd leading cause of cancer-related deaths in the United States causing approximately 52,980 deaths.
- 10.5% new CRC cases occur in persons younger than 50 years.
- Adults aged 40-49 CRC has increased by almost 15% from 2000-2002 to 2014-2016.
- In 2016, 26% of eligible adults in the U.S. had never been screened for CRC and in 2018, 31% were not up to date with screening.

Recommendation for CRC Screening

- Asymptomatic adults aged 45 years old, low risk (i.e., no prior diagnosis of CRC, adenomatous polyps, or inflammatory bowel disease; no personal diagnosis or family history of known genetic disorders that predispose them to high lifetime risk of CRC, such as Lynch syndrome or familial adenomatous polyposis.

- USPSTF, with high certainty that screening for CRC in adults 50-75 years old has substantial net benefit. (Type A recommendation)

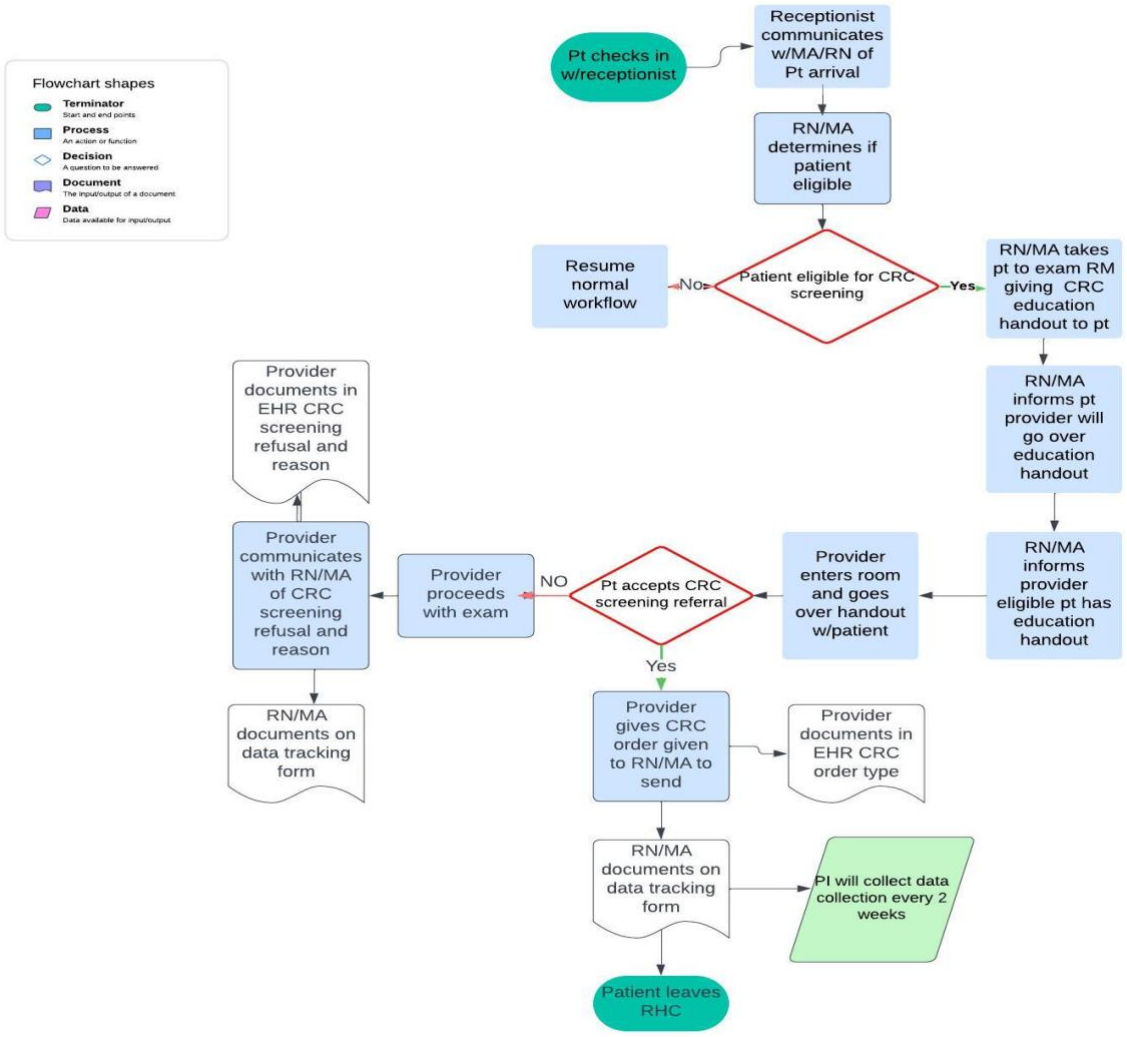
- The USPSTF, with moderate certainty recommends screening for CRC in adults aged 45-49 has moderate net benefit. (Type B recommendation)

- The USPSTF, with moderate certainty, recommends that screening for CRC in adults aged 76-85 who have been previously screened has small net benefit. (Type C recommendation)

APPENDIX D

WORKFLOW PROCESS MAP

Appendix D: Workflow Process Map



APPENDIX E

DATA TRACKING FORM

Appendix E: Data Tracking Form

Please Circle Appropriate Answer, unless asked to write answer Patient MRN:
Gender M F
AGE
Did Patient Accept CRC Education Yes No
Why did patient not receive CRC education? Refused If refused, why did they refuse? Please write reason why Up to date
Was CRC screening Ordered? Yes No If not, why?
What type of CRC screening ordered? Cologuard Sigmoidoscopy FIT gFOBT Colonoscopy CT Colonography