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**Addressing Barriers to Colorectal Cancer Screening in a Federally Qualified Health  
Center: A Quality Improvement Project**

Tania Centra

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Date of Submission: April 15, 2022

### Abstract

**Background:** Colorectal cancer (CRC) is a leading cause of death from cancer in the United States, despite the availability of several high-quality screening options. Multiple barriers to CRC screening have been identified, including cost (non-insured), younger age, racial or ethnic minority, recent immigration to the U.S. (non-English speaking), fear or distrust of the healthcare system and rural residence. Addressing health equity within underserved populations requires improved access to CRC screenings per evidence-based guidelines.

**Local Problem:** The mean CRC screening rate for the designated Federally Qualified Health Center (FQHC) was 33.7% for the 5 months preceding this quality improvement (QI) project. The Community Health Access Network Unified Data System (CHAN UDS) benchmark target for CRC screening was 60.1%.

**Methods:** Multiple targeted interventions were implemented over a 4-month period that emphasized a strong provider recommendation, a team-based approach to identify and offer CRC screening options to patients who were overdue for testing, and accurate documentation of results in the electronic medical record (EMR). A chart audit was followed by a mailed fecal immunochemical test (FIT) and colonoscopy reminder letter initiative.

**Results:** The CHAN UDS performance metric for CRC screening reached 40% within 4 months. The second chart audit (2 months after the first) confirmed the CRC screening rate improved to 41.5% among FQHC patients aged 50 to 75 years. An overall 55% return rate was achieved with the mailed FIT initiative within 2 months.

**Conclusions:** Despite an improvement in the CRC screening rate, continued quality improvement initiatives are needed to achieve the CHAN UDS benchmark target for this FQHC. The global aim of this QI project, to reduce or remove barriers to CRC screening test completion,

was demonstrated in the results. These team-based interventions can be utilized within other underserved patient populations to improve health equity for CRC screening.

*Keywords:* colorectal cancer screening, FIT, colonoscopy, health equity, federally qualified health center

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**Addressing Barriers to Colorectal Cancer Screening in a Federally Qualified Health  
Center: A Quality Improvement Project**

**Introduction**

**Problem Description**

Colorectal cancer (CRC) was the second most common cause of death from cancer and the fourth most prevalent cancer diagnosis among men and women in the United States (U.S.) between 2014 and 2018 (CDC, 2020). Approximately one third of adults over age 50 years or 38 million Americans, are not receiving their CRC screenings as recommended (NCCRT, 2019). According to the National Cancer Institute's SEER Program, CRC accounted for 149,500 new diagnoses and over 52,900 deaths in 2021. The mean age at diagnosis is 66 years in men and 69 years in women and the lifetime risk is 4.3% (1 in 23) for men and 4.0% (1 in 25) for women (ACS, 2020; Siegal et al., 2021). CRC expenditures accounted for \$24.3 billion in healthcare spending in 2020 and was the second most expensive cancer by treatment cost in the US (National Cancer Institute, 2021). This figure does not include indirect expenses due to lost productivity and supportive care needs (Bone et al., 2020).

The removal of pre-cancerous polyps through routine colonoscopy can prevent progression to CRC in the future. When detected at an early stage, CRC is associated with a 90% survival rate, as opposed to a 14.2% survival rate when diagnosed at late stage with metastatic disease. Survival rates in patients over the age of 50 years have increased from 50% in the mid-1970s to 64% between 2009 and 2015, primarily due to the widespread recommendation of CRC screenings and improved treatment options. Unfortunately, over this same period, mortality rates in patients under the age of 50 years have increased in both males and females (Siegal et al.,

2020). This concerning trend contributed to guideline changes which lowered the recommended age to begin CRC screenings for average risk adults (Wolf et al., 2018; USPSTF, 2021).

In the U.S., differences between population groups will have a significant impact on CRC screening completion rates. These factors include the patient's age, socio-economic status, health insurance type (cost), racial/ethnic group, sociocultural beliefs, and geographic location of residence (Gupta et al., 2014; Siegal et al., 2020). In 2018, the lowest CRC screening rates were reported in patients aged 45 to 49 years (20.7%). In persons over the age of 50 years, lower screening rates were associated with recent immigration (26%), lack of health insurance (30%) and Medicaid insurance (53%). Screening rates for those over age 50 years with private insurance or Medicare coverage ranged from 65 to 74% in 2018 (Siegal et al., 2020). These significant differences in screening rates will impact incidence and mortality from CRC. Health equity is "defined as achieving the absence of avoidable, unfair, or remediable differences among groups of people, including racial/ethnic groups" (Demb & Gupta, 2020, p. 1691). Addressing barriers to the completion of CRC screenings can prevent future disease, improve survival rates, and reduce health care expenditures over the long term.

Another factor which has impacted CRC screening rates since March 2020 is the Covid-19 pandemic, which caused the postponement or cancellation of elective colonoscopies across the U.S. A study by London et al. (2020), concluded that there was an 84.5% decline in CRC screenings between February and April 2020 when compared with the 2019 rates over the same period. Although most elective procedures resumed by the summer of 2020, the long-term effect of missed or delayed colonoscopies on CRC incidence and mortality rates is unknown.



### **Available Knowledge**

Colorectal cancer usually develops over time from pre-cancerous polyps, also called adenomas, in the colon or rectum which can appear 10 years before their progression to cancer (Bone et al., 2020). Adenomas do not cause symptoms and are only detected with specific types of CRC screenings. Colonoscopy or the less commonly used flexible sigmoidoscopy (FS) are considered direct visualization methods. Colonoscopy and FS (area within reach of scope) have a sensitivity rate of 75-95% for the detection of small to large adenomas which is superior to other current methods of screening (Zauber et al., 2015). Removal of adenomas can prevent the patient from developing CRC in the future. This is the major benefit of colonoscopy or FS over other screening options. According to Meester et al., mortality rates from CRC could be reduced up to 63% by optimizing colonoscopy screenings in the United States (2015). Yet, there are also harms and limitations associated with these tests including prohibitive cost (underinsured or uninsured), risk of perforation or bleeding, and the screening process which requires time off work, bowel preparation, sedation, and transportation to and from the procedure (USPSTF, 2021). CT colonography (CTC) is another direct visualization screening method with a sensitivity of 57% to 84% for medium to large adenomas (Zauber et al., 2015). CTC is considered a non-invasive procedure; sedation and transportation are not necessary. CTC does require bowel preparation, incidental findings occur in 1.3% to 11.4% of scans, it does not detect smaller adenomas and a positive lesion must be referred for colonoscopy (USPSTF, 2021). Due to these limitations, CTC is a less commonly utilized method of CRC screening.

Even without the removal of pre-cancerous polyps or adenomas, the early detection of localized CRC will have a significant impact on long-term patient outcomes. When CRC is diagnosed at stage 1 or 2, the 5-year survival rate is as high as 90%, whereas detection at stage 4

with metastatic disease carries a 14.2% survival rate after 5 years. Contributors to later stage diagnosis and poor outcomes include a “lack of access to healthcare, underuse of CRC screening, and poor adherence to established clinical practice screening guidelines” (Bone et al., 2020, p. 1). Although colonoscopy has long been the preferred screening method due to superior sensitivity in detecting both adenomas and CRC, there are risks and limitations as previously discussed. According to Gupta et al, “we currently do not have overall national capacity to deliver colonoscopy screening to all eligible individuals, so in some settings, focusing only on colonoscopy for CRC screening is impractical” (2014, p. 3). Reliance on colonoscopy does not take into consideration patient preferences and barriers to healthcare, especially in underserved populations. Offering a variety of CRC screening options to patients can increase the likelihood that the test will be accessed and completed. A popular phrase which summarizes this shift in guidance states, “the best test is the test that gets done” (NCCRT, 2019). Colonoscopy is just one of several tests recommended by the USPSTF for average risk patients over 45 years of age.

Of the stool-based testing options, multi-targeted stool DNA testing (mt-sDNA) has the highest sensitivity and specificity for CRC and is completed every 3 years. It “quantifies 11 biomarkers, including 10 DNA markers and fecal hemoglobin (FIT), and it generates a single composite negative or positive” (Bone et al., 2020, p. 5). The only FDA approved mt-sDNA test currently available in the U.S. is Cologuard®, by Exact Sciences. Once the test kit is ordered by the provider, it is shipped directly to the patient’s home address, 24/7 support is available by phone and automatic reminders are sent until the sample is returned by mail (Exact Sciences, 2021). The fecal immunochemical test (FIT) detects tiny amounts of blood in the stool and is recommended yearly. The fecal occult blood test (gFOBT) is the least sensitive and specific screening option. The benefits of stool-based testing include cost-effectiveness (FIT or gFOBT),

high specificity for CRC, patient convenience (completed at place of residence), and they are non-invasive. The limitations include the inability to detect adenomas, lower sensitivity for CRC (FIT & gFOBT), increased frequency of testing (every 1 to 3 years dependent on test), and the need to perform follow-up colonoscopy for any positive stool-based test (USPSTF, 2021).

Comparisons of the sensitivity and specificity for USPSTF recommended CRC screening tests can be found on Table 1.

Table 1. Characteristics of CRC screening tests

<b>Screening Test</b>	<b>Frequency</b>	<b>Sensitivity for CRC</b>	<b>Specificity for CRC</b>
<b><i>Direct visualization tests</i></b>			
Colonoscopy	Every 10 years	95%	86%
Flexible sigmoidoscopy	Every 5 years	95% (area within reach of scope)	87% (area within reach of scope)
CT colonography	Every 5 years	84%	88%
<b><i>Stool-based tests</i></b>			
mt-sDNA or Cologuard®	Every 3 years	92.3%	89.9%
FIT	Every year	73.8%	96.4%
gFOBT	Every year	70%	92.5%

(Zauber et al., 2015)

Persons over the age of 20 years who are considered high-risk for CRC should automatically be referred for colonoscopy and surveillance by gastroenterology. This includes a personal or family history of CRC, previous adenomatous or advanced polyp, inflammatory bowel disease, previous cancer with radiation to the abdomen or pelvic area, and familial genetic conditions (Lynch syndrome or familial adenomatous polyposis) which increase the risk of developing colon cancer (Wolf et al., 2018).

The overall incidence rate of CRC in both men and women increased through the mid-1980's, when rates began to decrease year over year. Before the early 2000's, the declining rates were thought to be the result of lifestyle changes and the introduction of the screening

colonoscopy. Since the early 2000's, decreases in CRC incidence has been attributed to widespread access to screening colonoscopies for individuals aged 50 years and older, rising from 20% in 2000 to 61% in 2018. This growth has been associated with changes in the federal legislature which led to medical coverage for screening colonoscopies in persons with Medicare insurance beginning in 2001 (Siegal et al., 2020). Expansion of CRC screening coverage (including colonoscopy) for all individuals with private and public health insurance became law with the adoption of the Affordable Care Act (ACA) in 2010. The ACA requires insurance plans to cover all A and B recommendations from the United States Preventative Services Task Force (USPSTF). In 2018, 30% of those who were uninsured and 53% of Medicaid recipients were up to date on their CRC screening after age 50 years (Siegal et al., 2020). In comparison, 71-74% of Medicare recipients and 60-65% of privately insured individuals received a recommended CRC screening after age 50 years (NCQA, 2021; Siegal et al., 2020). The significant difference between the list price cost of testing options (uninsured or private insurance) versus the reimbursement rate for public insurance plans is listed in Table 2. Private insurance companies usually negotiate lower reimbursement fees with each service provider. Uninsured patients are most severely impacted by the cost of testing.

Table 2. Cost comparison of CRC screening tests

CRC Screening Test	List Price or Price to Employer	Medicare reimbursement	NH Medicaid reimbursement
Colonoscopy	\$2300 - \$5100	\$1036	\$186 - \$318
Flexible sigmoidoscopy	\$1580 - \$1620	\$302	\$90 - \$150
CT Colonography	\$1330	\$439	Not covered
mt-sDNA or Cologuard®	\$649	\$512	\$315
FIT	\$15 - \$50	\$22	\$13
gFOBT	\$15 - \$50	\$4.50	\$3

(Bone et al., 2020; NH Medicaid, 2021)

When considering disparities in CRC screening among populations, a key factor is patient age. Older adults are more likely to have completed a CRC screening. In 2018, 71% of individuals over 65 years were up to date. In comparison, only 48% of adults aged 50-54 years had received a CRC screening and for those aged 45-49 years the rate was only 20.7% between 2018 and 2020 (Siegel et al., 2020). Younger adults have an increased risk for late-stage CRC diagnosis and the incidence in persons under 50 years is increasing (Moore et al., 2018; Murphy et al., 2017). The USPSTF concluded that lowering the age to initiate screening to 45 years will result in an estimated 286 to 337 years of life gained, 42 to 61 cases of CRC prevented, and 24 to 28 CRC deaths averted, per 1000 adults screened, based on type of testing utilized and completed (2021). According to Wolf et al., “lowering the starting age is expected to benefit not only segments of the population who suffer disproportionately from CRC – blacks, Alaska Natives, and American Indians – but also those individuals otherwise considered to be at average risk” (2018, p. 275). These findings led the American Cancer Society to lower the recommended age to initiate CRC screening in average risk adults to 45 years in 2018, followed by the USPSTF in 2021.

According to Siegel et al., “equity in care across the cancer continuum, from prevention to early detection, clinical trial participation and individualized treatment, is necessary to eliminate racial disparities” (2020, p.157). Colon cancer mortality rates between 2012 and 2016 were highest in non-Hispanic Blacks at 19%, followed by Indigenous Americans at 15.8% and non-Hispanic Whites at 13.8% (Siegal et al., 2020). In 2018, population-based factors associated with lower CRC screening rates for persons over age 50 years included recent immigration to the U.S. (26%), lack of health insurance (30%), education less than high school diploma (52%), Asian race (55%), and Hispanic ethnicity (59%) (Siegal et al., 2020). Other variables which can

impact the patient's decision to access a recommended CRC screening include religious or cultural beliefs, non-English speaking household, and mistrust of the medical profession (Gupta et al., 2014). For non-English speakers and patients with hearing impairments, comprehension of the multiple steps required to complete the test can be a significant barrier to care if not addressed with proper accommodations.

Environmental and geographic factors can have an impact on CRC screening rates. In the U.S., only 40.1% of patients receiving care at a Federally Qualified Health Center (FQHC) were up to date with their CRC screening in 2020 (NCCRT, 2021). When patients are faced with unstable housing, there are challenges to completing even the more convenient stool-based screening options, due in part to a lack of private bathrooms, clean water sources, and misplaced test kits. Low-income residents of states which expanded their Medicaid program (under the ACA), benefited from improved access to health insurance coverage. In 2018, there was a significant difference between the CRC screening rate in Wyoming (60%) versus Massachusetts (76%) in adults aged 50 to 70 years (Siegal et al., 2020). Twelve states have not yet expanded their Medicaid programs, and more than half of these states have the lowest levels of CRC screening, including Wyoming, Texas, Mississippi, and Kansas (KFF, 2021; Seigal et al., 2020). These states also have large rural populations, another factor associated with lower screening rates and higher mortality from CRC (Wolf et al., 2018).

Lastly, the Covid-19 pandemic severely disrupted routine office visits and CRC screenings across the U.S. beginning in mid-March 2020. Newly discovered variants of Covid-19 caused regional surges which continued to interrupt preventative care services through much of 2021. A study by London et al. (2020), of 20 healthcare networks which represent over 28 million patients, determined that colonoscopy rates decreased by 84.5% between the period of

January and April 2020, when compared to the rates from January to April 2019. These missed opportunities to screen patients for pre-cancerous polyps, adenomas or early-stage disease may result in higher rates of late-stage CRC diagnoses over the next several years (London et al., 2020). The disruption in preventative services caused by the Covid-19 pandemic will have a greater impact on underserved populations who already face multiple barriers to timely, cost-effective high-quality care.

### **Rationale**

At the FQHC chosen for this QI project, the mean CRC screening rate from April to October 2021 was 33.7%, as reported by the Community Health Access Network's Uniform Data System (CHAN UDS, 2021). The benchmark target for this FQHC was 60.1%. A visual display of the factors contributing to low CRC screening rates, called a cause-and-effect or "fishbone" diagram, can be viewed in Appendix A. The variables are organized into categories including People, Environment, Materials, Methods, and Equipment (IHI, 2017). Visualizing these factors is useful in gaining a better understanding of the scope of the problem and where processes can be put into place to reduce or remove barriers to screening.

The Model for Improvement (Appendix B) was utilized to answer three key questions which define the purpose and role of this QI project. First question, "What am I trying to accomplish?" (Langley et al., 2009). Improved health equity for CRC screening within an underserved patient population aged 45 to 75 years. Second question, "How will I know that a change is an improvement?" (Langley et al, 2009). By measuring the effectiveness of our protocol interventions on the CRC screening rates in our target population. Third question, "What changes can I implement that will result in an improvement?" (Langley et al., 2009). There are two critical processes that have been reported in the literature to improve CRC

screening rates in primary care. The first is a strong recommendation from the provider and a standardized process within the practice to order the chosen test. The second is accurate documentation in the electronic medical record (EMR) and a team-based approach to remind patients who have not completed their CRC screening (Gupta et al., 2014; Sarfaty, 2008; Wright et al., 2021). The Plan, Do, Act, Study or PDSA cycle was utilized to evaluate if the change created the intended outcome. The results then determined if it should be adapted, adopted, or discarded (Langley et al., 2009). The PDSA cycle was utilized throughout the intervention phase to assess small tests of change in the practice setting and determine their impact on the aim statement.

### **Specific Aim**

The specific aim of this QI project was to improve the CRC screening rate from the 5-month mean of 33.7% (June to October 2021) to above 40%, in adults between the age of 50 and 75 years who receive primary care services within a designated FQHC over a period of 4 months. The specific aim was chosen based on a 20% relative increase from the pre-intervention mean as a realistic goal for the time limitations of this project. A colorectal cancer screening was defined as a documented colonoscopy (every 10 years), flexible sigmoidoscopy or CTC (every 5 years), mt-sDNA or Cologuard® test (every 3 years), or FIT (every year) by CHAN UDS. At the time of this QI project, the FQHC benchmark target for CRC screening was 60.1%. Monthly performance metrics included preventative care data drawn from the EMR flowsheet of patients with a clinic visit in the calendar year (CHAN UDS, 2021).

The global aim of this QI project was to create sustainable, team-based processes which improve access to high quality CRC screenings and reduce or remove barriers to test completion within a designated FQHC. Gaining a better understanding of the facilitators of test completion



can lead to utilization of similar processes to improve health equity within other underserved populations and communities.

## **Methods**

### **Context**

The setting for the QI project was a FQHC in the northeastern United States. The organization provides a variety of healthcare services to over 2000 individuals who are homeless or at risk of becoming homeless. These services include primary care, mental health care, substance use treatment, recovery support, health education, community outreach and assistance with social service applications. Females make up 38% and males 62% of the patient population, there are no other gender categories described. Approximately 672 patients are aged 50 to 75 years, and 187 patients are aged 45 to 49 years. Description of race is 67% White, 19% Black or African American, 6% Asian, 3% multiple. Eight percent of patients identify as Hispanic. Primary language spoken in the home includes at least 12 different languages, with English as the most prevalent. Primary forms of insurance coverage include Medicaid (57%), private (14%), Medicare (9%) and 19% of clients are uninsured (HCH, 2021). Demographic breakdown of language spoken, and payment categories can be found in Appendix C.

The FQHC is located in an urban area with a population just over 112,000. Twelve percent of the population lives below the poverty line, 17.5% is foreign born and 77% of adults speak English in the home (US Census Bureau, 2019). The FQHC operates 2 clinics which are located 1.5 miles apart. The main clinic is within walking distance of a large refugee population. The second clinic was recently renovated and is located on the lower level of a homeless shelter. The FQHC includes a staff of 6 healthcare providers (full time and part time), nurses, medical

assistants (MA), care coordinators, mental health counsellors and receptionists. Most of the funding is provided through a U.S. Health Services and Resources Administration (HRSA) grant, followed by third party insurance reimbursements and a state grant. An associated healthcare system provides in-kind donations of office space, legal, professional and lab services. Patients are never turned away for inability to pay for services (HCH, 2021).

### **Cost-Benefit Analysis**

Based on a recent Medicare healthcare spending analysis, the estimated cost to treat one patient with CRC is between \$40,000 and \$80,000 depending on the stage at which the patient was diagnosed (CDC, 2021). The cost of colon cancer treatment in the US amounted to over \$23 billion in 2020, second only to breast cancer care (National Cancer Institute, 2021). The prevention of just one case of CRC could fund the implementation of multiple preventative screening initiatives. We consider \$50,000 per quality of adjusted life year (QALY) as a cost-effective threshold for demonstrating a reasonable benefit as a CRC screening modality versus non-screening (Doubeni, 2021). The colonoscopy every 10 years (\$15,000/QALY), FIT every year (\$14,300/QALY), and mt-sDNA test every 3 years (\$11,313/QALY), all fall below the cost-effective threshold for CRC screening based on several models (Bone et al., 2020). It is difficult to place a monetary value on 1, 5 or 10 years of life, but QALYs can help better understand the benefit versus cost of universal screening initiatives for CRC.

The costs associated with this QI initiative are summarized in Table 3. Labor costs included the practice mentor's (and medical provider) time spent on the QI project outside of their routine patient care schedule. The Cologuard® test is not billed to insurance until the sample is received at the Exact Sciences lab. FITs were provided by the affiliated hospital lab at no charge to the FQHC. Colonoscopy procedures were performed at an affiliated hospital and

were not factored into the cost of this project. Homeless patients were provided with a private room in the affiliated shelter to complete their bowel prep the evening before their colonoscopy. Transportation to and from the procedure was arranged by the outreach (or care) coordinator for patients as needed and the FQHC had an arrangement with a local pharmacy to assist with the cost of colonoscopy prep medications if the patient was unable to afford them (longstanding policy). The labor cost of the medical providers (other than practice mentor), clinical team, QI specialist and IT analyst were not factored into the budget as their contributions were part of their employment obligations. The project leader was a Doctor of Nursing Practice (DNP) student who completed their hours as part of the program requirements at no additional cost.

Table 3. Estimated costs for CRC screening QI project.

<b>Budget Item</b>	<b>Unit cost</b>	<b>Total Cost</b>
Practice mentor/APRN	\$55/hour x 15 hours	\$825.00
Paper products & laminating	\$100.00	\$85.00
Postage and Shipping	\$150.00	\$150.00
<b>Total Cost</b>		\$1060.00

## **Intervention**

### **Data Collection**

Several meetings with the FQHC Information Technology (IT) Analyst and Quality Improvement (QI) Specialist were instrumental in the collection of monthly CRC screening performance metrics from CHAN UDS (Appendix D). Data requested from the IT analyst included the FQHC patient demographics by age, gender, race, ethnicity, preferred language spoken and insurance coverage. Monthly performance metrics were reported through the CHAN UDS colon cancer screening compliance guidelines for patients aged 50 to 75 years. Data for patients aged 45 to 50 years and over 75 years were not available through the current reporting, and this was reflected in the specific aim statement. It is recommended that average risk adults

begin screenings no later than age 50 years and discuss the risks and benefits of testing over the age of 75 years with their healthcare provider (USPSTF, 2021).

The FQHC currently offers two CRC screening options to patients, colonoscopy or FIT. The addition of a third option, the mt-sDNA or Cologuard® test every 3 years, was evaluated for feasibility. The project leader performed outreach to product specialists and state health insurance plans to collect information and determine the compatibility of mt-sDNA testing for patients receiving care at the FQHC.

### **Protocol Development**

The current CRC screening protocol was evaluated through several meetings with the practice mentor, QI specialist and IT analyst. The project leader utilized performance metrics, QI team feedback, and evidence-based guidelines to create specific CRC screening tools and practice interventions. According to Sarfaty et al., the policy should take into consideration, “1) national screening guidelines; 2) realities of your practice; 3) patient history and risk level; 4) patient preferences and insurance coverage; and 5) local medical resources” (2008, p. 4). In addressing the realities of the practice, a nationwide healthcare staffing shortage was taken into consideration. Whenever possible, no additional responsibilities were placed on the clinic support team for the first 6 weeks of the intervention phase. Once staffing levels stabilized, the entire FQHC was included in facilitation of the QI project. It was important to incorporate sustainable team-based interventions, with collaboration between the providers and clinical staff to promote ownership and shared purpose (Wright et al., 2021).

The QI team consisted of a DNP student (project leader), a FQHC practice mentor (and medical provider), and a DNP program faculty member. The IT analyst and QI specialist also assisted the QI team with data collection and evaluation of outcomes as needed.

### **Protocol Implementation**

The project leader introduced the CRC screening project goals and guideline recommendations to the FQHC clinical team and providers through email several days prior to the launch date on November 3, 2021. The FQHC leadership team, including the medical director and practice manager, participated in a 20-minute PowerPoint presentation (given by the project leader) explaining the CRC screening project, followed by a group discussion. Informal meetings with the 4 full time medical providers took place in the first 2 weeks of November 2021. The project leader and practice mentor reinforced the importance of a strong provider recommendation for CRC screening for every patient aged 50 to 75 years. Patients aged 45 to 50 years received education on the risks and benefits, were offered testing and given time to consider their options. The provider specific resources, “Provider Guide to CRC Screening” and “5 Steps to Increase Colon Cancer Screening Rates” were discussed, emphasizing the most recent guideline recommendations (NCCRT, 2019; Sarfaty, 2008). These laminated resources were adhered adjacent to each computer workstation in both clinic locations (Appendix E). The project leader and practice mentor took the opportunity to speak with clinical team members in person, when possible, to garner support. Additional laminated patient education graphics were placed on the walls of the waiting and exam rooms. Each exam room in both clinics was stocked with 5 FITs and resupplied weekly. Bimonthly updates were sent by email to remind providers and clinical team members of the CRC screening goal, guideline recommendations, progress achieved and continued challenges.

Colonoscopy and FIT were the 2 methods of CRC screening offered to patients of the FQHC prior to November 2021. The clinical team and providers were introduced to a third option, mt-sDNA or Cologuard® every 3 years for average-risk patients over age 45 years. The

project leader and QI specialist met with the regional representative to discuss insurance coverage and test options for uninsured patients. They were provided with a confirmation letter from Exact Sciences of coverage under the 3 state Medicaid plans for patients aged 50 to 75 years beginning in March 2021. This was shared with the providers and clinical team. Clients without insurance could apply to a patient assistance program. Copies of the fax order form were provided to the clinical team in each location. The test kit would be shipped directly to the patient's home address. For patients who were unhoused or in transitional housing, the FQHC address was considered an alternative option for delivery. Exact Science sends regular reminders to the patient until they receive the completed test kit (2021).

The project leader was invited to deliver a 20-minute PowerPoint presentation to the clinical team in mid-December 2021. The presentation emphasized the importance of considering patient preference, testing options, insurance coverage, cost, and CRC risk level. The "Provider Guide to CRC Screening" was introduced to assist the clinical team in identifying average-risk versus high-risk adults and testing options for each (Appendix E). The project leader reinforced that a positive stool-based test result requires a follow-up colonoscopy (Wolf et al, 2018). When colonoscopy was ordered, the care coordinator would continue to assist the patient in scheduling the procedure and with insurance coverage approvals. Following the presentation, several nurses suggested identifying patients who were due for CRC screening (during the rooming process) and then notifying the provider in the EMR note. It was discussed and agreed upon as a group. If the patient had a colonoscopy, FS or CTC at another healthcare facility, the patient was asked to sign a release form to obtain the records. The project leader emphasized the importance of entering the colonoscopy results and next due date into the EMR preventative care flowsheet once they were signed by the provider. Several clinical team

members verbalized a lack of understanding regarding this process. The next clinical meeting agenda addressed this knowledge deficit, and the FQHC team was emailed step by step instructions for future reference.

Specific interventions were directed towards reducing barriers to colonoscopy. Unhoused patients who required a colonoscopy procedure were provided with a private room within the affiliated shelter to complete their bowel prep. The outreach (or care) coordinator assisted patients who needed transportation to and from the procedure (longstanding policy). A medical interpreter was provided to non-English speakers at each visit. A resource binder containing copies of patient education handouts in English, Spanish, French and Swahili, and Cologuard® fax order forms was provided to each FQHC location.

To identify patients who had missing or incorrect records, the first chart audit was performed by the project leader over several days in mid-December 2021. The report created by the IT specialist included patients aged 50 to 75 years with no history of colon cancer, and an office visit in 2021. The health records were reviewed for each patient without a current CRC screening (overdue). Previous CRC test results found in past medical records were recorded on the EMR flowsheet by the medical provider or practice mentor. The project leader created three lists from the chart audit: patients with expired FIT results (completed over one year prior), colonoscopy ordered but not completed and missing CRC screening results (per patient report). Missing records were requested from the specific healthcare facility through a patient release of information request completed by a designated clinic team member.

The results of the chart audit were shared with the leadership team along with recommendations for outreach to patients on the three lists described above. Grant approval was received from the leadership team for budgeted expenses (Table 3) and the practice mentor

committed additional clinic time towards facilitation of these targeted interventions. First, the project leader and practice mentor made corrections to the EMR flowsheet to enter missing CRC screening results. Afterwards, they completed three separate mail initiatives. Publicly available materials for FIT and colonoscopy outreach were utilized to create the template for patient letters (National Cancer Institute, 2017). The letter, instructions and a FIT were mailed to 20 average-risk patients. The FIT was mailed in a padded envelope to the home address on record. One week later, reminder letters were sent to 26 patients who had not completed their ordered colonoscopy procedure. These lists were also provided to the clinical lead registered nurse (RN) to follow up with patients as they came in for future appointments. Four weeks after the FIT mailings, a follow-up letter was sent to patients who had not returned their sample to either clinic location.

The CRC screening data points collected from the first chart audit were divided by provider. This data was shared confidentially with the full time FQHC providers along with an invitation to meet with the project leader to discuss their performance metrics. A second chart audit was performed in February 2022 for patients with a clinic visit after January 1, 2022. Missing CRC test results were then entered into the EMR flowsheet by the medical provider, or the practice mentor. Each exam room in both clinics remained stocked with FITs throughout the intervention phase. A box of FITs was requested for the mobile unit (street medicine and home visits), to distribute and later collect from average risk patients aged 45 to 75 years who were due for their CRC screening.

### **Study of the Intervention**

The project leader received CHAN UDS performance metrics for the months preceding the QI project launch and pre-pandemic reports from early 2020. The FQHC pre-pandemic and pre-intervention CRC screening rates were 31.6% and 32.2% respectively. The 5-month mean



was 33.7% (June to October 2021). The regional FQHC pre-intervention screening rates ranged from 32.2% to 54.6%, with a mean of 48.4% (Appendix D). This FQHC was ranked fifth among the five regional organizations. The CHAN UDS benchmark for CRC screening was 60.1%. The FQHC was consistently in the red category, with a >20% difference between the target and reported CRC screening rate, or “performance metric having serious problems” (CHAN UDS, 2021). The project leader and practice mentor met bimonthly throughout the 16-week intervention phase to discuss progress towards performance metric goals, suggested changes, and feedback from providers and clinical team members.

### **Measures**

The CHAN UDS performance metric for a completed CRC screening in individuals aged 50 to 75 years was used as the outcome measure for this QI project. A completed CRC screening was defined as a colonoscopy within 10 years, FIT or gFOBT within one year, mt-sDNA or Cologuard® within 3 years, CT colonography or FS within 5 years. CHAN UDS received preventative care data from the FQHC’s EMR flowsheet each month. The performance metric was reported as a percentage. The numerator was the total number of patients aged 50 to 75 years with a current and documented CRC screening. The denominator was the total number of patients aged 50 to 75 years (with a visit after January 1). The report excluded patients with a previous diagnosis of colon cancer. The validity of the data was ensured through the software system utilized by CHAN UDS and the defined CRC screening parameters. The reliability of the outcome measures was dependent upon the accuracy of data entry. If the CRC screening information in the EMR flowsheet was missing, incorrect or incomplete, it would impact the performance metric. Therefore, the reliability of the outcome measure was impacted by human error, a transient patient population and the accuracy of medical records.

**Analysis**

The CHAN UDS Colon Cancer Screening Compliance Report provided quantitative outcome measures for FQHC patients aged 50 to 75 years without a previous diagnosis of colon cancer. The CRC screening performance metrics obtained for the months preceding the QI project were compared with the monthly reports published after the launch date. Excel software was used to create a run chart which included 11 data points. A control chart would have been used if over 20 data points were collected. Comparing the outcome measure at different intervals in time identified random versus non-random variations in the data (IHI, 2019). The CRC screening performance metrics for January and February were compared over 3 years, from 2020 to 2022. By graphing pre-pandemic, post-pandemic and post-intervention rates over time, the effect of global events on this patient population was evaluated. Excel software was also utilized to create a bar chart which compared colonoscopy and FIT screening rates at the FQHC. This data was obtained from the chart audits completed two months apart. It would be extremely difficult to reach the benchmark with colonoscopy alone, therefore it was important to assess the data for each CRC screening option available to patients.

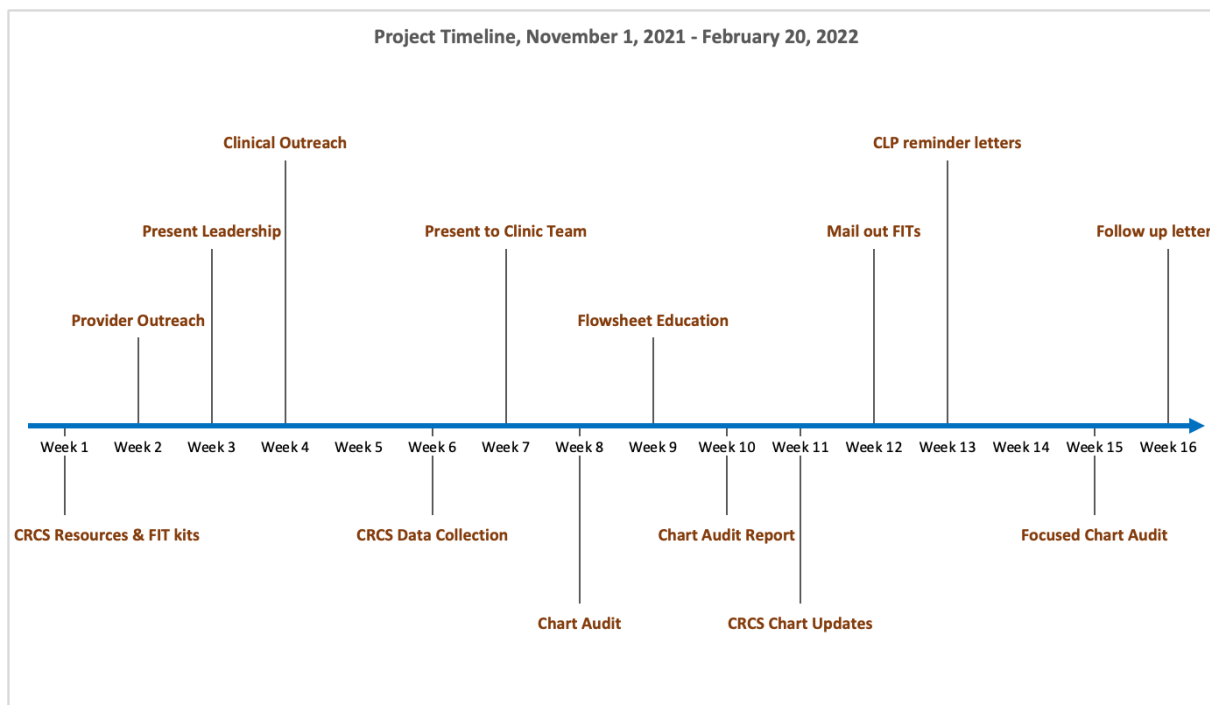
**Ethical Considerations**

This QI project was conducted in an ethical manner. Patient demographic data and performance metrics were aggregated, and de-identified for analysis. The DNP project proposal was determined to be a QI project and approved by the FQHC IRB committee and the University of New Hampshire Nursing Quality Review Committee. The author had no conflicts of interest to report.

## Results

The timeline of the 16-week intervention phase can be viewed in Diagram 1. Due to staffing shortages, the project leader was initially informed that the clinical support team would not participate directly in the QI project and the interventions could only be directed towards the medical providers. Approximately 6 weeks into the intervention phase, the project leader was invited to present the CRC screening project at the bimonthly clinical team meeting. This contributed to a team-based approach moving forward, with the providers and clinical team members collaborating on the project aim statement. A full-time provider and the QI specialist left employment with the FQHC in week 11 of the intervention phase. The patients assigned to the medical provider were distributed among the remaining 3 full-time providers. The IT analyst provided the project leader with the monthly performance metrics after the departure of the QI specialist. Grant funding specifically for CRC screening interventions was received after the data from the first chart audit was presented to the leadership team in week 10. This allowed the practice mentor to commit additional hours towards the targeted interventions in weeks 11 through 16. Three major holidays fell within the 16-week intervention phase. Covid-19 cases in the region were rising steadily from week 1 through 8, with a sharp surge from week 9 through 12, followed by a dramatic decline after week 12 (NH State, 2022). Routine services were not impacted and the FQHC locations remained open through the surge. Telehealth appointments were utilized by a minority of patients which eliminated the ability to distribute a FIT at the time of the visit, although referral for colonoscopy was not impacted.

Diagram 1. Timeline of CRC Screening QI Project.



The first chart audit included patients between age 50 and 75 years who had an office visit in the previous calendar year. Of the 421 patients, 134 (32%) were up to date on their CRC screening, 124 (29%) had a colonoscopy within 10 years, 18 (4%) had a FIT within the previous year. Of the patients without a current CRC screening, 38 (9%) had an open order for a colonoscopy procedure (not completed), 19 (4.5%) had an expired FIT screening, 35 (8%) were inactivated or deceased, 17 (4%) had complex medical problems and 22 (5%) were seen for acute care or behavioral health only. A total of 10 CRC screenings (9 colonoscopies and 1 FIT) were found in previous medical records but not recorded on the EMR flowsheet. A second chart audit completed in week 15, found 3 additional colonoscopy results in past medical records. The project leader and practice mentor prioritized corrections to the EMR flowsheet to incorporate these missing test results.

The chart audit was followed by a targeted mail campaign by the project leader and practice mentor. Twenty letters, instructions and FITs were sent to patients at average risk for

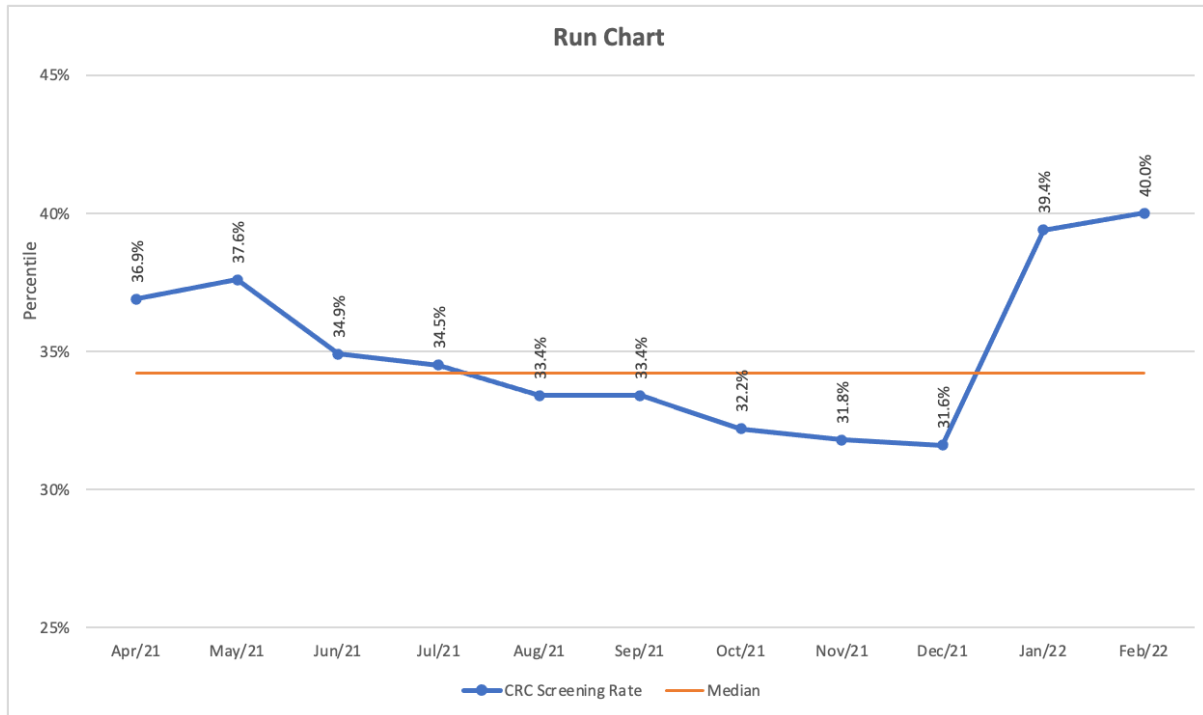
CRC, 18 of which had a previous negative result. Five patients (25%) returned their completed test within the first month. A follow-up reminder letter was sent to patients who had not returned their FIT after 4 weeks. An additional six FIT samples were returned within 2 months, for an overall return rate of 55%. Letters were sent to 26 patients who had been referred for a screening colonoscopy that was not completed within 3 months. Due to staffing shortages, it was not feasible to implement phone call reminders and mass mailings to patients aged 45 to 75 years who were due for CRC screening. Following the QI project presentation to the clinical team, the clinical lead RN began to identify and add pop-up reminders to the health record of patients without a recommended screening. When the patient came in for an appointment, the nurse or MA would remind the medical provider to also discuss CRC screening options at the visit. The clinical lead RN also began tracking FIT orders in Excel for follow-up with patients who did not return the completed test.

The CRC screening rate reported by CHAN UDS for this FQHC continued a downward decline in November and December of 2021, although at a slower pace than previous months. In January 2022, there was an absolute increase of 7.8% to 39.4%, with an additional 0.6% absolute increase in February 2022 to 40% (Diagram 2). The mean rate for the five regional FQHCs was 46% in February 2022, with a range of 32.6% to 50.3%. In November and December 2021, the FQHC ranked fifth overall, moving up to fourth place in January and February 2022. The CRC screening rate remained below the 60.1% benchmark target, although the difference improved from -28.5% in December 2021 to -20.1% in February 2022 (CHAN UDS, 2022).

The run chart in Diagram 2 includes the FQHC CRC screening rate reported by CHAN UDS, from April 2021 to February 2022. The median rate was 34.5%. The run chart was not significant for a shift, run, trend or astronomical data point. There are 5 declining data points

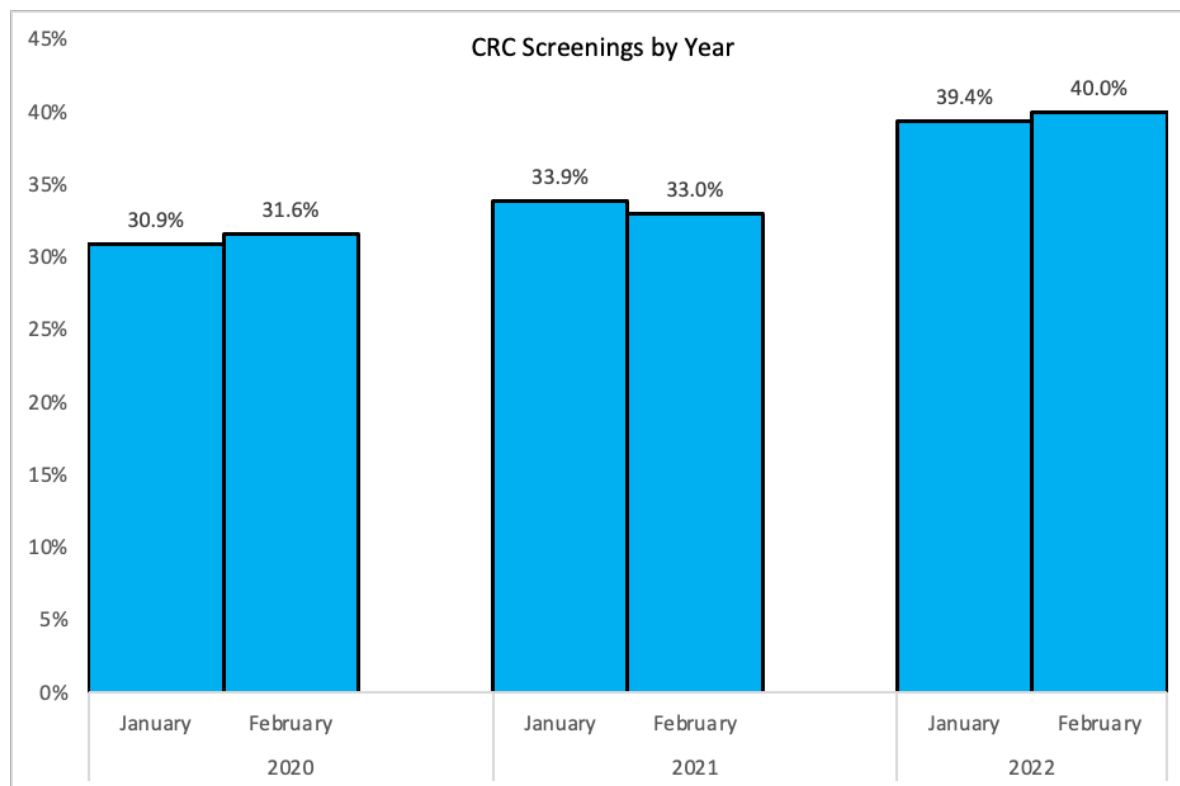
below the median line, but August and September are the same value and thereby only 4 of the data points are declining which does not qualify as a trend (IHI.org, 2019).

Diagram 2. Run Chart of CRC Screening Rates April 2021 to February 2022



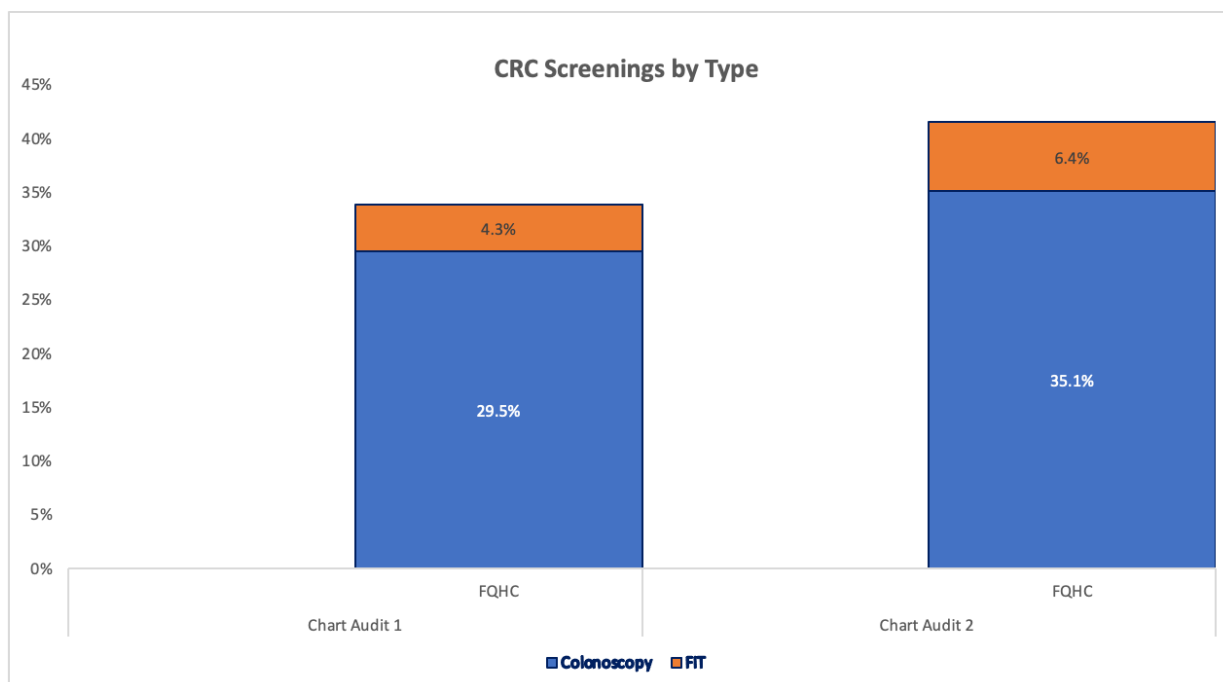
The CRC screening rate increases seen in January and February could be attributed to the method of preventative care data collection by calendar year, rather than rolling year. The monthly CHAN UDS reports included data from patients with a FQHC visit after January 1st. Therefore, an analysis of CRC screening performance metrics from the previous two years was completed for comparison of pre-pandemic, post-pandemic, and post-intervention data for the months of January and February (Diagram 3). The pre-pandemic rates in 2020 were slightly lower than post-pandemic rates in 2021. There was a 7% absolute increase in CRC screenings from post-pandemic rates in February 2021 to post-intervention rates in February 2022.

Diagram 3. Comparison of CRC Screening Rate by Year, 2020-2022



The type of CRC screening test was compared over time with data collected from each chart audit (Diagram 4). Additional FIT and colonoscopy test results were discovered from each chart audit which were not captured in the CHAN UDS reports. The true CRC screening rate for the FQHC was 33.8% in November 2021 and 41.5% in January 2022 when these missing CRC screenings were incorporated into the performance metrics. There was a 5.6% absolute increase in colonoscopy and a 2.1% absolute increase in FIT results over the 2-month period between chart audits. Data for only 2 types of screenings are reported, as mt-sDNA or Cologuard®, had not yet been completed by FQHC patients. The second chart audit included 94 patients (visits after January 1, 2022) compared with 421 patients in the first (visits after January 1, 2021). This led to further analysis of the CRC screening rates for the months of January and February over a period of 3 years (Diagram 3).

Diagram 4. Colonoscopy and FIT Screening Rate Totals



## Discussion

### Summary

The global aim of this QI project was to reduce or remove barriers to testing and improve access to high-quality CRC screenings within an underserved patient population receiving care from a designated FQHC. The monthly performance metrics reported by CHAN UDS were used as the outcome measure of the QI project. The specific aim, to improve the FQHC CRC screening rate from a 5-month pre-intervention mean of 33.7% to above 40% upon completion of the intervention phase was met. The CHAN UDS performance metric reached 40% within four months of the QI project launch (February 2022). The second chart audit demonstrated that the January 2022 CRC screening rate had reached 41.5%, by including additional FIT results that were not captured in the CHAN UDS report. These increases in the performance metrics represent an improvement over pre-intervention screening rates, despite not achieving the benchmark target of 60.1% for this FQHC. The value in the results of this QI project is the



ability to share methods that can be employed to reduce or remove barriers to CRC screening and improve reporting rates in other underserved patient populations.

### **Interpretation**

The PDSA cycle was utilized to create small tests of change and assess their impact on the outcome measure. Seeking out the medical providers early and often throughout the intervention phase through informal meetings and email, reinforced their essential role in this team-based project. A strong provider recommendation has been shown to be the most influential factor in improving CRC screening rates (Sarfaty, 2008). Two of the provider patient panels included a refugee population with access to stable housing. These providers had greater opportunities to prioritize preventative care during the clinic visit. A third provider split their time between the clinic, home visits and street medicine. Prioritizing preventative care along with the daily survival needs of the patient created a larger challenge. The project leader and clinic team discussed stocking the mobile unit with FITs to distribute to average risk patients during street medicine or home visits and picking up the sample at the next visit. Expanding the use of FIT by the mobile unit team would improve access to care for average risk patients who face multiple barriers to completion of colonoscopy screening.

The initial presentation to the leadership team was effective in producing buy-in as an organization. The leadership team offered access to resources, grant funding and data in support of the project. The presentation to the clinical team was delayed for 6 weeks due to staffing shortages, which may have negatively impacted the screening rates initially. Once incorporated into the project, the clinical team identified those in need of CRC screening (when rooming the patient), offered testing options for average risk adults and alerted the provider to enter the order in the EMR (following discussion with the patient). The clinical lead RN began adding pop-up

alerts to the charts of patients identified as missing a CRC screening result and tracking the FIT orders with Excel software. Evidence-based practice supports a standardized process for ordering the chosen CRC screening test and a team-based approach to improving quality measures and patient outcomes (Gupta et al., 2014; Sarfaty, 2008). In early April 2022, the project results were presented to the affiliated healthcare organization's Quality Management and Patient Experience Committee which consisted of nurses, physicians, practice managers and community members. There was strong support for the outlined recommendations among the medical providers during the discussion period and a collective desire to expand CRC screening initiatives at this FQHC and throughout the communities they serve.

A FQHC in Montana increased their CRC screening rate by 10% through a QI project which identified missing and incorrect test results in the EMR (CRCCP, 2021). The two chart audits completed by the project leader at this FQHC uncovered 13 missing CRC screenings, which account for less than 3% of the patient population aged 50 to 75 years. Although the total number of corrections to the EMR flowsheet were modest, they did contribute to the improvement in CRC screening rates in January and February 2022. More importantly, the clinical team and providers were educated on the correct method to enter CRC screenings into the EMR flowsheet through in-person meetings and emailed instructions.

Mail delivery of a FIT to patients has been shown to facilitate completion of CRC screenings in average risk adults (Gupta et al., 2014). Twenty patients, 18 with an expired negative result, were mailed an instruction letter and FIT. Five patients (25%) had returned their sample to the FQHC within 4 weeks. One of the FIT results was positive and the patient was referred for colonoscopy by their provider the same week. A study by Ylitalo et al. (2019), found that a phone call, email, or mail reminder facilitated an increased return rate for FIT. Patients

were sent a reminder letter 4 weeks after the original FIT mailing if the test was not returned. Six additional samples were brought to the FQHC over the next 4 weeks, for an overall return rate of 55%. Reminder letters were sent to patients who had an open colonoscopy order for over 3 months. One such patient made a follow-up appointment at the FQHC to discuss their insurance coverage for colonoscopy and decided afterwards to schedule the procedure.

Offering patients more than one option when it comes to CRC screening has been found to facilitate test completion and improve health equity (Demb & Gupta, 2020). Cologuard® every 3 years was promoted throughout the intervention phase as a third high-quality test option for average risk patients aged 45 to 75 years with health insurance coverage (approximately 80% of the FQHC population). The cost would be prohibitive for individuals without insurance unless they qualified under the patient assistance program. In addition, many adults cite fear and distrust of the healthcare system as reasons for not completing a CRC screening (NCCRT, 2019). As a high-quality, non-invasive testing option, Cologuard® could be offered to average risk patients with significant barriers to colonoscopy. Although this third option was not used during the intervention phase, the providers had received the knowledge and resources necessary to order this CRC screening test in the future.

### **Limitations**

There was an improvement in CRC screening rates for the FQHC in January and February 2022, based on the monthly CHAN UDS reports and chart audit results. Two data points do not demonstrate an upward trend or shift. Continuing the targeted interventions for an additional 3 to 6 months would provide the time required to create significant change. If there was an upward trend or shift in the data, it would further support the use of these QI project methods in underserved populations.

The project leader was not affiliated with the FQHC prior to the QI project, and this was a limitation. It took a significant amount of time to establish trust and buy-in among the clinical team and providers. Visits to the clinics were limited due to space constraints. The project leader was available by email or phone for consultation throughout the intervention phase to answer questions or receive feedback. The longevity of the intervention period provided the time needed to establish a trust relationship between the clinical team, providers, and the project leader.

Regional shortages in healthcare staffing limited the scope of the interventions. The clinical team could address the need for CRC screening if the patient were scheduled for an office visit, but they did not have the resources to outreach to patients who were overdue. When staffing levels normalize, utilizing text, email, or mail reminder letters is recommended for patients aged 45 to 75 years without a current CRC screening (annually or biannually). The FQHC should also consider a yearly mailed FIT campaign for patients at average risk, especially if they had previously returned a test. The QI specialist and one full time provider left employment with the FQHC midway through the intervention phase. The QI team was able to pivot and utilize the IT specialist to obtain key data measures and continue communication with the remaining medical providers. The newly hired QI specialist was debriefed on the project aims, methods, results, and future recommendations in March 2022.

The reliability of the performance metrics is subject to human error since colonoscopy results must be manually entered in the patient's EMR flowsheet. FIT results (from the affiliated healthcare system) automatically populate the flowsheet once signed by the provider. The majority of missing CRC screening results were colonoscopy reports found within past medical records. The clinical team and providers were educated on how to enter the colonoscopy results into the EMR flowsheet. If the clinical team and providers are not diligent about searching

through past medical records and entering results correctly in the flowsheet, omissions will continue to occur. The reliability of the CRC screening rate is dependent upon the effects of human error. With a transient patient population, it can be difficult to obtain accurate past medical records. Every effort must be made to obtain these past records, particularly colonoscopy results in high-risk patients.

Throughout most of the intervention phase, the region was impacted by a rapid surge in Covid-19 cases due to the Delta and Omicron variants. The clinical team had to prioritize vaccinating and boosting their patient population in addition to other responsibilities. This pulled resources from other areas and led to staffing shortages. Three major holidays fell within the intervention phase which reduced patient visits in those weeks. There was a rapid decline in Covid-19 cases by late January 2022, which improved staffing levels and resources for preventative care. The FQHC was able to remain fully operational throughout the surge, although some patients were seen by telehealth visit. In these cases, the average risk patient would not leave the visit with a FIT, if that method of CRC screening were chosen after discussion with the provider. The use of a mailed FIT would eliminate this barrier to care. The telehealth visit was not a barrier to referral for a colonoscopy.

## **Conclusions**

Colorectal cancer can be prevented through the removal of pre-cancerous adenomas with colonoscopy. Stool-based screening tests can detect colorectal cancers at their earliest stages, with 5-year survival rates above 90% for diagnosis at Stage 1. The survival rate drops to 14.2% when colorectal cancer is detected at Stage 4 with metastatic disease. Evidence supports the routine use of direct visualization or stool-based CRC screenings for the prevention or early detection of cancer in patients aged 45 to 75 years (or earlier if high-risk). Significant disparities

in health equity exist among patient populations based on socio-economic status, insurance coverage, age, race/ethnicity, and location of residence. The global aim of this QI project, to reduce or remove barriers to high-quality CRC screenings for patients aged 45 to 75 years, was achieved through targeted interventions, shared purpose, and collaborative teamwork. Although the specific aim statement was achieved, the screening rate remained below the benchmark for this FQHC. Each clinical team member and provider plays a key role in improving health equity for their patient population. Achieving the benchmark target of 60.1% will require a team-based focus on evidence-based strategies, such as offering the average risk patient several options for testing and reminding patients who are overdue for their CRC screening. Progress towards the FQHC benchmark will continue to be measured, and specific interventions should be adopted as a standardized process dependent upon their results.

Improving health equity for CRC screening requires thinking beyond the “one size fits all” approach to preventative care (Demb & Gupta, 2020, p. 1691). Multiple targeted interventions were implemented over a period of 4 months which resulted in a team-based effort to improve access to and completion of CRC screening tests. Patients overdue for screening received a strong provider recommendation, were offered more than one testing option when appropriate, were aided with insurance approvals, and provided with a medical translator when non-English speaking. FITs were mailed to patients who had an expired negative test (average risk) and reminder letters were sent to patients who had not completed their ordered colonoscopy. The clinical team and providers worked together to identify patients who were overdue for their CRC screening and assist them with test options, despite a surge in Covid-19 cases during the first three months of the intervention phase. A team-based QI project will only be successful if the members are engaged and invested in the process, as seen with this FQHC

clinical team. Continuous support from the leadership team was essential for access to the resources needed to implement the targeted interventions.

Recommendations for future practice include annual or biannual text, email or mail reminders to patients who are due for screening, incorporating a workflow process to send reminders for unreturned FIT, offering a third screening option such as Cologuard® to average risk patients, and a mailed FIT or Flu-FIT campaign initiative annually. Addressing health equity in a meaningful way requires the use of multiple targeted interventions and a team-based approach to preventative care. The clinical team have gained the knowledge and skills they need to break down barriers to CRC screening and save lives. These evidence-based interventions can be applied to other underserved populations to improve access to high-quality CRC screenings.

### **Funding for the Project**

Funding received from the Harvard Pilgrim Quality Grant was applied to the labor costs, paper products and shipping fees (Table 3) and reimbursed to the FQHC at the completion of the intervention phase. No other funding or assistance was received for this QI project.

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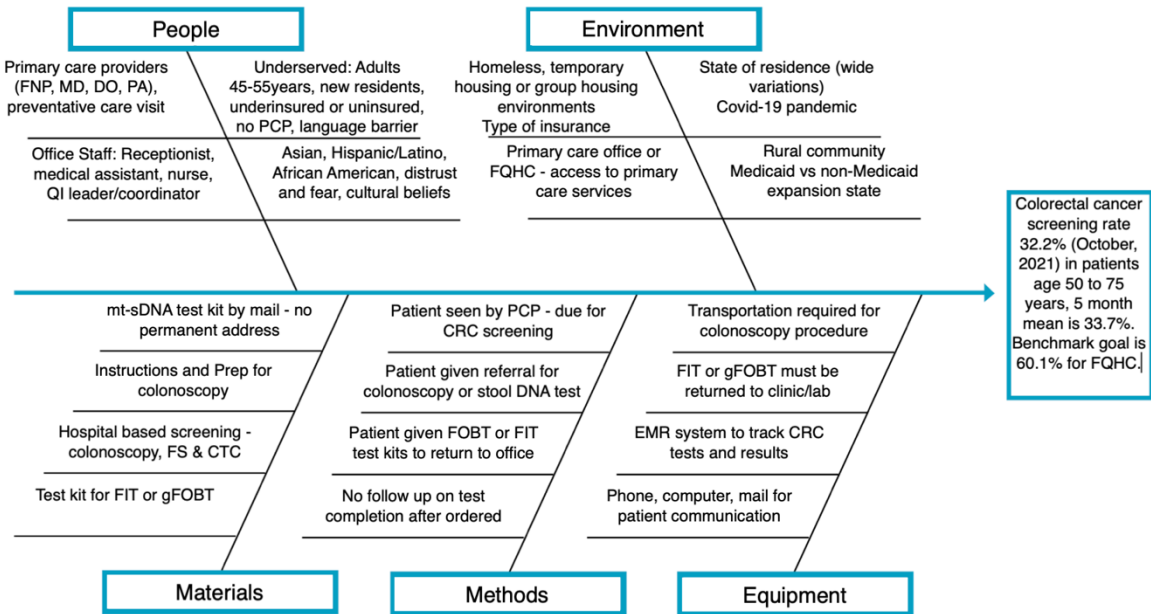
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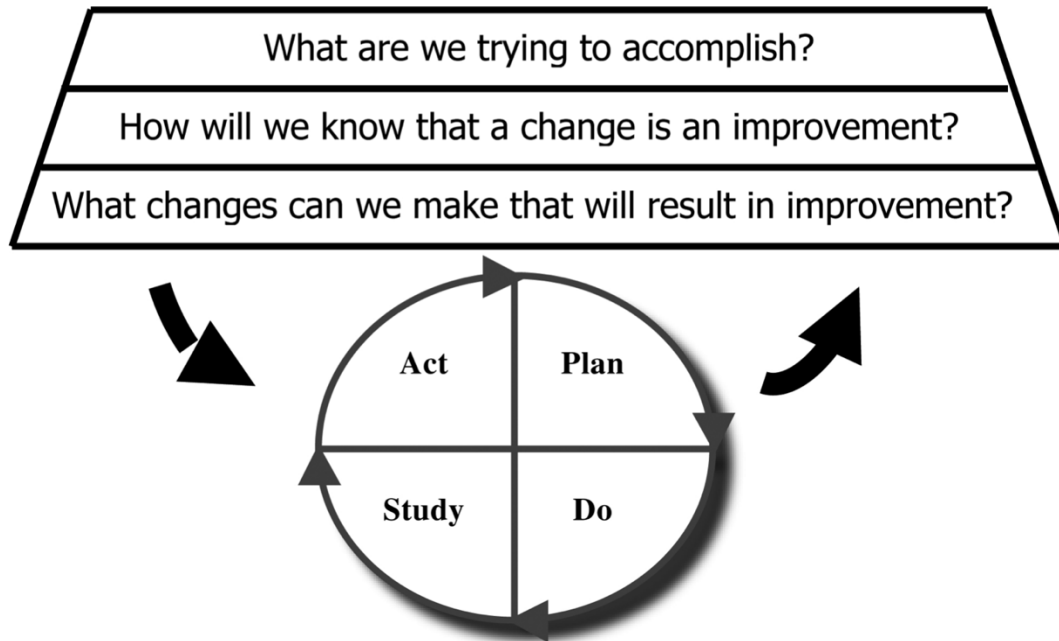
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Appendix A

Cause and Effect Diagram



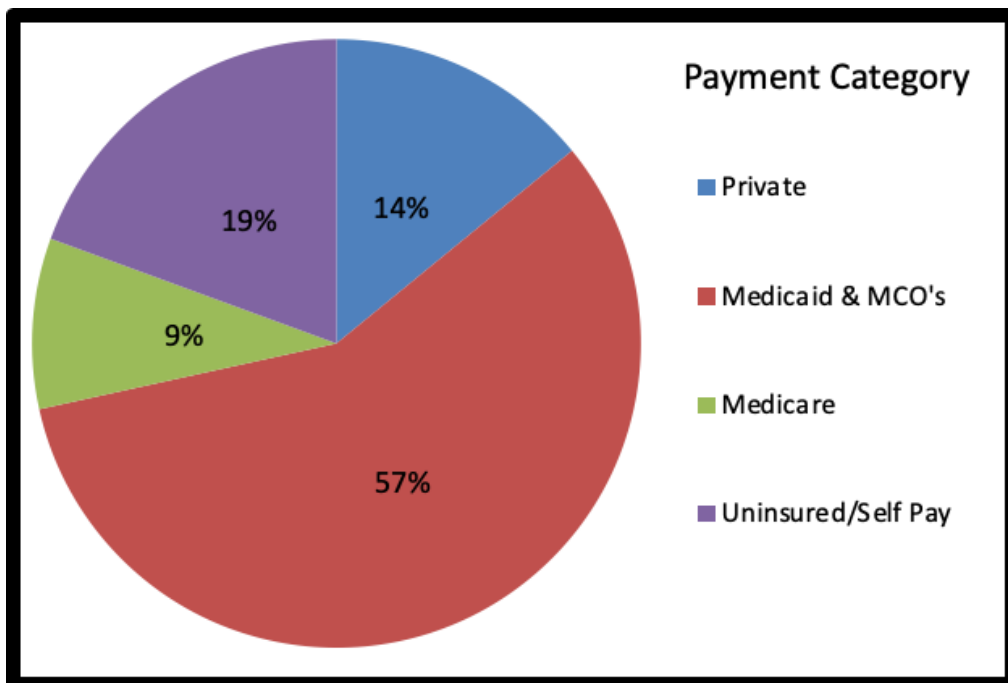
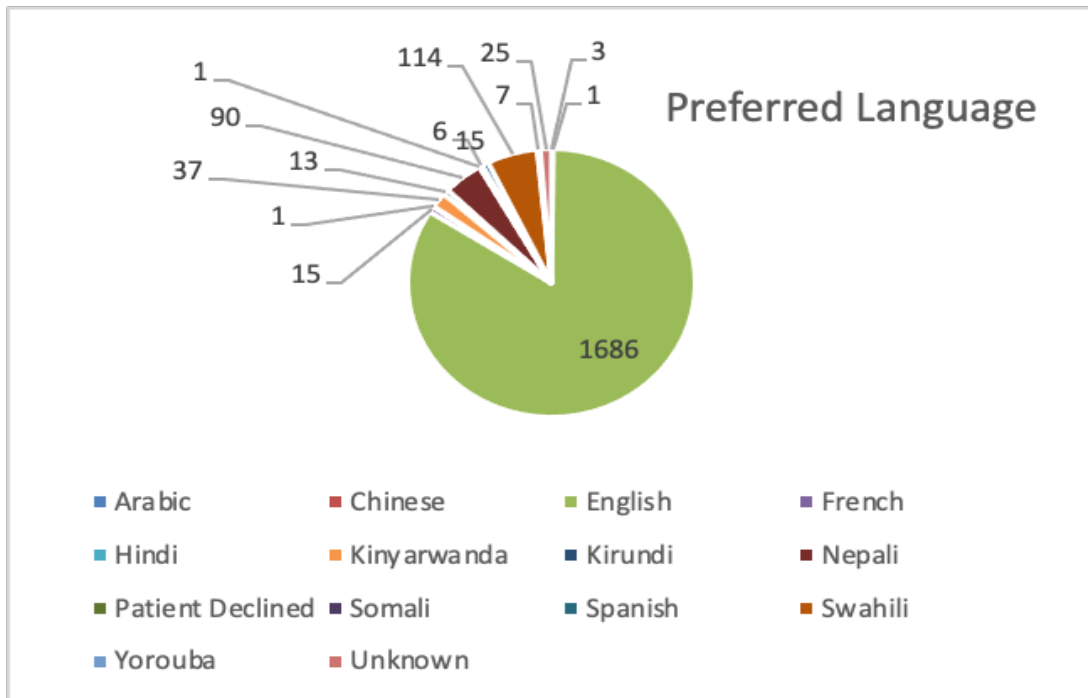
## Appendix B

**FIGURE 1-5.** *The Model for Improvement*

Source: Langley G.J., et al.: *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*, 2nd ed. San Francisco: Jossey-Bass, 2009. Printed with permission.

Appendix C

Patient Demographics: September 2021





**Appendix D**

**CHAN UDS Colon Cancer Screening Report**

Colorectal Cancer Screening reported as: Percentage of patients 50 – 75 years who had appropriate screening tests.

Screening tests:

- Colonoscopy every 10 years
- Flexible sigmoidoscopy every 5 years
- Fecal occult blood test annually
- FIT-DNA (mt-sDNA) every 3 years
- Computed tomography colonography every 5 years

Date	CRC Screening Rate FQHC	FQHC Average Region
January 2020	30.9%	48.3%
February 2020	31.6%	48.7%
June 2021	34.9%	48.1%
July 2021	34.5%	48.5%
August 2021	33.4%	48.5%
September 2021	33.4%	48.5%
October 2021	32.2%	48.4%

Reference	QI - Performance Measure	Brief Description of the Measure	Reporting Source	CHAN - 2018 UDS NH FQHC Benchmark	Target for HCH 2021	Performance Status					YTD 2021
						Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	
UDS	The percentage of adults 50-75 years of age who had appropriate screening for colorectal cancer	Colorectal Cancer Screening	CHAN	60.1%	60.1%	34.9%	34.5%	33.4%	33.4%	32.2%	33.7%

## Appendix E

### Guide to Colorectal Cancer Screening

Is your patient aged 45 to 75 years?

Patients are considered AVERAGE RISK if they DO NOT have:

A personal history of colorectal cancer (CRC), adenomas, inflammatory bowel disease or past radiation to the abdomen or pelvis for cancer **OR**  
A family history of CRC, advanced polyp, or genetic predisposition to CRC (Lynch syndrome or FAP)

**HIGHER RISK patients (yes to any of above) must have colonoscopy screening**

Average risk patients screening options:

FIT yearly  
FIT-DNA test (Cologuard®) every 3 years  
Colonoscopy every 10 years

**Abnormal stool test - follow-up with colonoscopy**

CRC screening rates:

- 1) Remind patients who have not completed their CRC screening test.
- 2) Remember to enter CRC screening test results into the EMR flowsheet.

## 5 Steps to Increase Colon Cancer Screening Rates

1) Providers – “Make a Recommendation! Be clear that screening is important. Ask patients about their needs and preferences. The best test is the one that gets done.” (NCCRT, 2019)

2) Identify patients aged 45 to 75 years (no later than 50 years) who have not been screened for colorectal cancer in the EMR or during each patient visit. A team-based approach is the best way to achieve success.

3) Know the screening options for colorectal cancer (see provider guide). Consider the patient’s risk factors, cost & preferences. Higher risk patients refer for colonoscopy. Insurance will cover most CRC screenings.

4) Be persistent with reminders. Designate a team member to use the FIT Workflow Diagram to follow-up with patients who have not returned their test kit within 2 weeks.

5) A goal has been set to increase CRC screening rates by 20% over 3 months. The average rate is now 33.7%, the benchmark goal is 60.1%. Send a phone note to the nurse/MA or enter the CRC screening results & repeat date in the EMR flowsheet after review. Patients with abnormal stool test results must follow-up with colonoscopy.