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Use of electronic health record reminders to improve primary care providers' colorectal cancer screening recommendations.

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Use of Electronic Health Record Reminders to Improve Primary Care Providers' Colorectal Cancer Screening Recommendations

by

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Abstract

Background: Colorectal cancer (CRC) is the third most common worldwide cause of cancer morbidity and mortality. CRC mortality is preventable through regular screening. Electronic health record (EHR) reminders for providers can increase providers' CRC screening recommendations and lead to earlier CRC diagnosis. According to the National Cancer Institute's Screening and Risk Factors Report for Kentucky by County 2008-2010, 62.7% of adults in a rural Kentucky county aged 50-75 had completed a home based FOBT in the past two years or have ever had a colorectal endoscopy.

Purpose: The purpose of this DNP project was to implement and evaluate an EHR CRC screening reminder for primary care providers (PCPs) at a rural Kentucky clinic.

Methods: All PCPs at a rural Kentucky clinic were provided a one-on-one training session to review current CRC screening guidelines, discuss how to manage EHR reminders, and train on how to consistently document CRC screening status. The IT team was provided a virtual training session to review how to extract EHR data to determine which patients need a screening reminder and how to code in the EHR so that there will be an automatic provider screening recommendation reminder based on documented screening status.

Intervention: EHR CRC screening reminders were inputted on all patients aged 45-75 who had been seen within the last three years and were not up to date with CRC screening based on documented screening status. Referrals were evaluated pre-intervention and compared to post-intervention data. CRC screening status documentation were evaluated post-intervention.

Results: There was a +22.8% change pre-post in provider CRC screening recommendations (33.7%; 56.5% respectively). Only 8.2% of CRC screening recommendations were documented in the new area of the chart.

Discussion: Implementing EHR CRC screening reminders provided a process that can increase CRC screening recommendations. In this study, 43.2% of patients were already up to date on CRC screening. 45.6% of patients refused CRC screening despite PCP recommendations being a key facilitator to screening updates.

Keywords: Electronic health record reminders, colorectal cancer screening, primary care

Contents

Introduction

The National Cancer Institute (NCI, 2022) reported that in 2019 only 67.1% of U.S. adults were compliant with the U.S Preventative Services Task Force Recommendations for CRC screening. According to the European Journal of Gastroenterology and Hepatology (2017), only 25% of primary care providers recommended evidence-based screening tests during usual check-up visits (e.2). Successful CRC screening in the primary care setting is a challenging process that requires both provider and patient collaboration and effort. In the rural county where this quality improvement project was implemented, nearly 40% of adults over age 50 have never been screened for CRC (see Table 1). National Institute of Health [NIH] Screening and Risk Factors Report for Kentucky by County 2008-2010). A quality improvement (QI) project at a primary care clinic in this rural Kentucky (KY) county targeted PCPs and implemented CRC screening EHR reminders with goals of improving CRC screening recommendations, documentation, and tracking.

Table 1

CRC Statistics

Location	Incidence	Mortality	Screening Rate
United States	32.5 per 100,000 (2020)	12.6 per 100,000 (2020)	67.1% (2019)
KY	41.2 per 100,000 (2020)	15.6 per 100,000 (2020)	71.3% (2020)
KY County	41.5 per 100,000 (2015-2019)	12.4 (2016- 2020)	62.7% (2008-2010)

Note. (NIH, 2020. Centers for Disease Control and Prevention (CDC), 2020)

Background/Significance

CRC is the third most common cancer worldwide and ranks third in terms of cancer-related mortality (American Cancer Society [ACS], 2023). It is estimated that 52,550 people will die from CRC in 2023 (ACS, 2023). According to the ACS (2020), “the relative survival rate for

CRC is 64% at 5 years following diagnosis and 58% at 10 years. The most important predictor of CRC survival is the stage at diagnosis. The 5-year survival rate is 90% for the 39% of patients diagnosed with localized-stage disease but declines to 71% and 14% for those diagnosed with regional and distant stages, respectively" (p.10).

According to the CDC, (n.d.), mortality from CRC is preventable through regular screening procedures and early detection. This is significant because early CRC often has no symptoms (ACS, 2020). CRC screening allows for precancerous polyps, abnormal growths in the colon or rectum, to be removed before they mature into cancer (CDC, n.d.). Screening can detect early CRC when treatment is the most effective (CDC, n.d.). Healthcare provider's promotion of CRC screening to patients is one of the strongest predictors of patients completing screening (Honein-AbouHaidar et al., 2016; Lafata et al., 2014; Laiyemo et al., 2014; Peterson et al., 2016); however, inconsistencies in provider CRC screening recommendations and processes can contribute to delayed diagnoses and poor patient outcomes.

Despite a variety of screening options being available, CRC screening rates are suboptimal, not enough people are getting screened, and not enough healthcare providers are recommending screening despite healthcare providers playing such an influential role in CRC screening (Honein-AbouHaidar et al., 2016). The ACS (2020) recommends initiating routine screening for anyone 45-75 years old who is at average risk for developing CRC. Table 2 delineates current CRC screening guidelines for average risk individuals ages 45-75 (CDC, 2022). A wide variety of screening options are available to eligible patients and involve either a visual exam or a stool-based exam. A visual exam includes colonoscopy, CT colonography, or flexible sigmoidoscopy. A stool-based exam includes a fecal immunochemical test, fecal occult blood test, or stool DNA test. At the age of 76, it is then advised that patients consult with their

healthcare provider for customized screening recommendations between the ages of 76 and 85. Once a patient turns 86, screening is no longer endorsed (ACS, 2020). The ACS (2020) recommends earlier, more frequent, and customized screening according to a patient's history for adults at higher risk for CRC.

Table 2

Colorectal Cancer Screening Tests

Test	Frequency
Guaiac-based fecal occult blood test (gFOBT)	Once a year
Fecal immunochemical test (FIT)	Once a year
FIT-DNA (or stool DNA test)	Every 3 years
Flexible Sigmoidoscopy (Flex Sig)	Every 5 years, or every 10 years with a FIT every year
Colonoscopy	Every 10 years
CT Colonography (Virtual Colonoscopy)	Every 5 years

Note. (CDC, 2022)

According to surveillance research conducted by the ACS (2020), it is estimated that 56% of adults in the United States 45-75 years old report being up to date with CRC screening in 2018 (p.22). The CDC 2018 behavioral risk factor surveillance system estimates that 67.4% to 68.8% of adults 50 to 75 years old are up to date with recommended CRC screening in 2018. The NIH (2022) reported that in 2019 only 67.1% of U.S. adults were up to date with CRC screening. Table 1 compares CRC incidence, CRC mortality, and CRC screening rates in the U.S., KY, and the rural KY county that is the focus of this QI project.

This project was designed to increase recommendations for CRC screening in a rural KY primary care clinic. The potential impact of this intervention long term could not only increase CRC screening rates and decrease CRC screening care gaps but potentially aid in earlier diagnosis and treatment of CRC.

Literature Review

Provider and patient nonadherence to national screening guidelines is a common dilemma across multiple preventative health recommendations (Honein-AbouHaidar et al., 2016; Zhu et al., 2021). Several interventions have been studied to improve CRC screening rates including the use of various provider reminder systems. The purpose of this project is to implement and evaluate an EHR CRC screening reminder for providers at a primary care clinic in a rural Kentucky county. By piloting CRC screening provider reminders via the EHR, this feature may then be applied to a multitude of preventative health screenings and recommendations. Prompting providers to discuss and recommend patient screening can have a major impact across the board on improving patient health and early diagnosis of many conditions (Hector et al., 2019; Hsiang et al., 2019; Jones et al., 2018; Lehtovuori et al., 2020; Reyes-Portillo et al., 2018). This intervention has been chosen based on a compilation of published literature, existing evidence, and relevant articles pertinent to improving colorectal cancer screening rates.

A review of CRC incidence, mortality, and screening rates was conducted through an interactive dataset released by the NIH. Table 1 describes the most current available statistics based on location: the U.S., KY, and the rural KY county where the QI project was conducted. Despite significant evidence that CRC screening reduces CRC incidence and mortality, U.S. rates are suboptimal at only 67.1% of the eligible population (CDC, 2020). CRC incidence and mortality are higher in KY than in the U.S. and the CRC screening rate is 4% (71.3%) higher in

KY when compared to the U.S. (67.1%). In the rural Kentucky county of focus, the incidence and mortality of CRC are lower than the state as a whole, but alarmingly the screening rate is also lower than state and national rates at 62.7%. This county's reported lower rates of CRC-associated morbidity and mortality and CRC screening compared to KY suggest a potentially underreported incidence and mortality due to a lack of CRC detection and diagnosis.

CRC can be prevented, and provider consistent recommendations based on current screening guidelines contribute to not only reducing patient risks, but also overall healthcare costs (CDC, 2021). According to the CDC (2021), the U.S. spends about 14.1 billion dollars on CRC costs and care annually. The CDC reports that CRC alone accounts for 11% of all cancer care costs in the U.S. Estimates by the CDC (2021) also report that Medicare could save 14 billion dollars by 2050 if CRC screening increases from the current rate of 66% to 70%. In 2015, Meester et al. estimated that if CRC screening increased to 80% by 2018, CRC incidence would decrease by 22% and mortality by 33% by 2030.

In 2018, The ACS updated their CRC screening guidelines for patients at average risk to begin screening at the age of 45. The U.S. Preventative Services Task Force (USPSTF) followed suit with these recommendations in 2021 (ACS, 2021). Table 2 delineates current CRC screening guidelines for average risk individuals ages 45-75 (ACS, 2019; USPSTF, 2022). Primary care providers play a vital role in CRC prevention and screening. Appropriate recommendations by primary care providers with their patients can lead to earlier screening, earlier diagnosis, and earlier management, and can improve patient outcomes related to CRC (Honein-AbouHaidar et al., 2016; Lafata et al., 2014; Laiyemo et al., 2014; Peterson et al., 2016).

A systematic review and meta-analysis by Honein-AbouHaidar et al. (2016) discussed the pivotal role that PCP play in educating patients about the importance of CRC screening but

found that PCPs are not recommending CRC screening as frequently as they should (p.912). Various forms of provider interventions have been studied throughout the literature to improve CRC screening processes and rates. A review of the literature supports that electronic provider reminders are proven to be successful for a multitude of patient needs including cancer screenings, behavioral risks, and vaccinations (Hector et al., 2019; Hsiang et al., 2019; Jones et al., 2018; Lehtovuori et al., 2020; Reyes-Portillo et al., 2018). As Reyes-Portillo et al. (2018) reported, providing EHR clinical decision support can effectively improve the quality of care in numerous areas of medicine. Hector et al. (2019) conducted an observational retrospective cohort study evaluating the impact of electronic provider reminders on Hepatitis B vaccine initiation and found that provider reminders in the EHR had "an immediate high impact" and "statistically significant differences in the changes of the annual vaccine initiation rates (RRR: 70.7, 95% CI: 62.8–79.6)" (p.195). Jones et al. (2018) conducted a prospective study of hepatitis screening, referrals, and treatment outcomes utilizing provider reminders in the EMR and found a 12.27% increase (95% confidence interval) in screening rates during the first year of the intervention (p. 209).

Lehtovuori et al. (2020) conducted a before-and-after quasi-experimental study to evaluate the impact of provider electronic reminders in improving provider documentation of diagnoses. This study found a statistically significant increase ($p<0.001$, RM-ANOVA) of 125% in provider documentation after installing electronic reminders (p.2).

A consistent finding in the literature found that electronic reminders in the EHR were the most effective during the initial phases of implementation (Lehtovuori et al., 2020). In addition, although EHR alerts for providers can increase the ordering of screening tests, other interventions may be needed to improve patient compliance (Hsiang et al, 2019). In a

retrospective quality improvement study by Hsiang et al. (2019), electronic reminders were associated with a significant increase in healthcare providers ordering CRC screening, “13.7 percentage points; 95% CI, 8.0-18.9 percentage points; P< .001, but no change in patient completion;1.0 percentage points; 95% CI, −3.2 to 4.6 percentage points; P= .36” (p.1).

The literature provides mixed findings on strategies to improve PCP documentation (Lorenzetti, 2018). In addition, provider consistency with screening recommendations has been a constant challenge across both primary care and gastrointestinal healthcare settings (Honein-AbouHaidar et al., 2016; Zhu et al., 2021). Targeting patients who are not up to date with screening and prompting providers to initiate screening recommendations is imperative for early detection and management of CRC (Honein-AbouHaidar et al., 2016). A review of the literature provides evidence that provider reminders can aid with the improvement of CRC screening processes, referrals, and rates (Hsiang et al., 2019; Lehtovuori et al., 2020). A thorough evaluation of each study was completed to ensure ample strength, relevancy, and accuracy. The level and quality of evidence were evaluated using Cincinnati Children’s LEGEND Evidence Appraisal of a Single Study Intervention and LEGEND: Table of evidence levels (see appendix A). All studies were conducted in an outpatient setting. These studies differ in patient population, study arms, and intervention styles. Despite the variances, an aim to improve provider recommendation consistency via electronic reminders remains a constant theme.

A multitude of patient barriers exist as well, however, ensuring that a resistant patient that is properly informed may increase compliance with recommendations (Honein-AbouHaidar et al., 2016). A study done by Shen et al. (2020) found that a positive physician response and thorough education, especially when patients were resistant to screening, played a significant role in patient adherence to recommendations (p. 14). Ylitalo et al. (2019) found a particular barrier

between home fecal immunochemical tests (FIT) and patients failing to return them (p.183). "The most common barrier to FIT return reported by patients were forgetfulness (61%), lack of motivation (51%), and fear of embarrassment (31%)" (Ylitalo et al., 2019, p. 184). A common issue with colonoscopy completion is patient intolerance and/or inadequate bowel preparation (Millien & Mansour, 2020, pp. 1-2). Unknown costs to the patient also pose an obstacle to patient compliance (Honein-AbouHaidar et al., 2016). Recently, the age to start CRC screening was reduced from 50 to 45 years old, however, health insurance coverage for CRC screening is unpredictable for people at average risk who are less than 50 years old (ACS, 2020, p. 19).

Rationale

Data from a 2019 performance audit conducted for this rural primary care practice was reviewed for problem evidence. At this time, this practice earned a 77.3% performance score for CRC screening measures for their patients insured by Medicare (Imperium Health Management, 2020). This category was amongst the lowest of their quality measure scores. The most recent CRC performance audit as of August 2022 for Medicare patients indicated a <50% performance score for CRC exams (Imperium Health Management, 2022).

CRC screening recommendation improvement was identified as a needed change for this practice. The clinic physician and owner indicated a willingness to provide support and collaborate for this QI project. Confirmation was received that screenings of any kind, including CRC, are not always completed during office visits. Screening inadequacies were reported to be related to a variety of factors such as healthcare providers prioritizing other patient needs, not having any screening reminders except in a well-visit charting template, not remembering to screen patients, or not having enough time for all the steps required to do so. Historically, providers at this clinic have been independently responsible for remembering to assess a

patient's chart of CRC screening needs during annual well visits. This intervention allowed the EHR to efficiently alert providers of a patient's CRC screening needs instead of depending on provider memory and manual seeking of this data in a patient's chart. Therefore, this plan also decreased the time spent by providers searching for each patient's screening status.

Prior to this intervention, all providers charted CRC screening differently and in various areas of the EHR. Therefore, there was no previous way to measure screening data, to track screening data, or to generate data reports. The practice was not using the EHR to its fullest ability as they were not using the pre-existing provider reminder feature and not collecting data or reports to guide QI that can be generated when the EHR capabilities are more fully integrated into daily practice. This project required providers to document differently and consistently in this process change to ensure that screening codes were inputted as searchable data that can be used to formulate screening reports and screening reminders.

This project had support from the providers and had great potential for feasibility and sustainability. Following completion of this initial QI project Plan-Do-Study-Act (PDSA) cycle, this project will be led for future PDSA cycles by the nurse who was involved in the initial implementation and evaluation of this project so that she could facilitate continued QI in this area in the future. This practice was provided with all learning materials produced during this project. The IT team was also provided with instructions for implementing provider reminders in the EHR, Allscripts. Consistent provider documentation and recommendations plus proper inputting of provider alerts were paramount to the sustainability of this project.

Purpose & Specific Aims

The purpose of this QI project was to implement and evaluate an EHR CRC screening reminder for providers at a rural Kentucky clinic. The specific aims of this project were to

1. Review the recently updated CRC screening guidelines with all PCPs
2. Train PCPs about new EHR screening reminders and new EHR CRC screening documentation
3. Implement CRC screening recommendation EHR documentation to generate automated EHR screening data
4. Evaluate patient CRC screening recommendation/referral pre- and post-intervention
5. Evaluate provider CRC screening status documentation post-intervention

The long-term goals of this project are to increase CRC screening recommendation rates, standardize CRC screening documentation, generate EHR data on CRC screening recommendations, and improve CRC screening completion rates.

Quality Improvement Model

The Institute for Health Improvement utilizes the Model of Improvement (Appendix B) as a guide to help direct and accelerate processes of improvement. This is a two-part model that starts with three fundamental questions. The second part of this model uses W. Edwards Deming's Plan-Do-Study-Act (PDSA) cycle to set aims, establish measurements, and select changes (Institute for Healthcare Improvement, n.d.). The PDSA cycle allows for continuous learning and improvement. This framework was chosen because the processes allow for thorough planning and evaluation. In addition, this model is ideal for minor adjustments that may be deemed necessary for installment throughout the implementation and learning process. As previously discussed, we implemented and evaluated an EHR CRC screening reminder for providers. The specific application of the PDSA cycle for this QI project can be viewed in Appendix C.

Methods

Design

This project employed electronic provider CRC screening reminders in the EHR for all eligible patients ages 45-75 at a primary care clinic in a rural KY county. This project enabled pop-op EHR reminders that occurred at every patient encounter until screening is documented as completed or ineligible due to individualized reasons such as a history of CRC. The design for this project incorporated a longitudinal descriptive pre-post evaluation that utilized retrospective EHR chart reviews to assess provider CRC screening recommendations over a 24-week period. Data collection took place from September 2022 to May 2023. CRC screening status documentation data was collected over a 12-week period February 2023 to May 2023. Recommendations were evaluated 12 weeks pre-intervention (September 2022 to December 2022), four weeks post-intervention (March 2023), and over 12 weeks post-intervention (February 2023 to May 2023). Documentation of CRC screening status was assessed at the four weeks post-intervention mark and until 12 weeks post-intervention. Due to current provider inconsistencies in documentation, documentation of screening status prior to the intervention will not be evaluated or compared.

Setting (Environment)

This project will take place at a primary care practice in a rural KY county. Currently, this clinic has five full-time PCPs including two physicians and three nurse practitioners. This clinic has an estimated 5,500 active patients (based on a 1-year assessment) and has approximately 25,000 patient encounters annually. This practice currently serves patients across the care continuum from pediatric to geriatric care.

Sample

The target population for the intervention included five practice PCPs; however, intervention evaluation was completed via retrospective patient EHR chart reviews. The project included 340 patients who were 45-75 years old, were active and seen within the study period, had EHR documentation, and had incomplete CRC screening documentation in their chart. The EHR was evaluated for screening recommendations. This study excluded patients who had a history of CRC, a history of a colectomy, who were less than 45 years old or greater than 75 years old, inactive, or seen outside of the study period.

Context

There are many variables that can affect CRC screening completion including barriers from both the provider and the patient. This project focused on the role of the provider due to current inconsistencies with CRC screening practices, documentation, and reported provider needs. In addition, improving and assessing provider screening recommendations and documentation processes can aid in identifying the significance of provider and patient factors in CRC screening gaps.

The key stakeholders in this project were the quality improvement nurse practitioner, two additional nurse practitioners, two physicians/practice owners, and patients. All providers played an essential role in participating in this process improvement program. Facilitators within the context of change within this practice included the motivation of the practice's providers and owners to change and improve CRC screening recommendations and rates. The practice is motivated to not only implement change, but to also sustain positive changes that could lead to increased CRC screening recommendations and subsequently increased CRC screening completion in their primary care patient population. Additionally, there are reimbursement incentives for primary care providers that are linked to the completion of screenings such as

CRC screening, and thus, this project provided a potential foundation that may assist with improving patient outcomes and practice third-party payer reimbursement (Bae et al., 2018; Centers for Medicare & Medicaid Services, 2022). Additional insurance reimbursement to the practice is a potential outcome of increasing quality improvement scores and CRC screening rates. The cost of treating CRC far outweighs the cost of screening, and some insurance companies reimburse to promote provider recommendations (Centers for Medicare & Medicaid Services, 2022). Early screening and management can decrease health care costs for the patient and insurance alike.

For practice owners, this QI project served as a pilot project to potentially apply this process improvement intervention to additional screening and care gap needs. A more consistent screening recommendation and documentation process allows for more accurate data recording, mining, and analysis. Additionally, when the EHR is used to collect and report this data, it can provide an automated coding process to then use this collected data to create reminders of CRC screening and/or additional patient needs.

Many barriers exist with the implementation of change. Obstacles exist between both the healthcare provider and the patient (Honein-AbouHaidar et al., 2016). According to Zhu et al. (2021) and Guerra et al. (2007), the most frequent provider-reported barriers to CRC screening include providers focusing on urgent health needs over preventative screening, providers failing to offer a choice of screening options, providers lacking time to discuss screening recommendations, and providers not consistently advising screening to patients. Provider screening inconsistency may be associated with recent screening guideline updates. Read et al. (2021) discussed, “with multiple CRC screening guidelines available, there may be a lag for new guidelines to reach PCPs and additional time before new guidelines become implemented in

clinical practice" (p.1793). There are also barriers with physicians and nurse practitioners alike taking the time to ensure thorough education is provided to patients, especially when a patient is resistant to screening patient (Honein-AbouHaidar et al., 2016). Additional education time requires longer appointment times and/or a decrease in the number of patients seen daily. Scheduling changes may be met with resistance; however, this project did not incorporate longer appointment times. Provider lack of familiarity or resistance to new charting processes may have also affected this project's outcomes. Literature provided mixed findings on strategies to improve provider documentation practices (Lorenzetti et al., 2018) In addition, provider reminder fatigue was also a potential barrier (Jones et al., 2018). Initially, the CRC screening reminders included both patients who need CRC screening and those who are up to date on CRC screening. This will hold true until proper CRC screening recommendation and screening completion documentation has been fully inputted for patients over time. This increased the potential for provider alarm fatigue. In addition, this process required some additional documentation and time by the provider to update the CRC screening information in the appropriate EHR chart area. The long-term success of this intervention relies on the providers' documentation to create a feedback loop within the EHR that will automatically initiate CRC screening reminders.

The geographical location of the IT team was also a barrier. This team is in India; therefore, only virtual communication can be utilized and the windows of ideal timeframes for the IT team and the practice to communicate are limited. English is also the IT team's second language and posed a potential barrier to accurate understanding of process changes and training.

Ethical Considerations/Permissions

This project was submitted to the University of Louisville Institutional Review Board for approval as a process improvement intervention prior to implementation. Approval was received by the owners of the clinic and the quality improvement nurse practitioner to implement this process improvement project (see Appendix D). This included approval from the clinic owners to access patient data via Allscripts and insurance reporting systems. Data collected from insurance reporting systems and Allscripts electronic charting systems were password protected. In addition, this practice had its own private cloud server which exclusively only allows data access to authorized personnel with a password. All the computers on site had anti-virus software installed. HIPPA guidelines were respected to ensure all patient information was kept private and only needed information was accessed. No patient identifiers were used, discussed, or published at any point in this project. Any saved data remained on a single password protected computer only accessible to the DNP candidate. This data was saved to UofL Box. A separate written spreadsheet containing medical record numbers and study numbers was locked in a practice file cabinet while not in use and destroyed post project completion (see Appendix E).

Procedure/Intervention Implementation

The intervention incorporated a 12-week CRC screening process improvement program from February 2023 to May 2023 using EHR reminders for PCPS and standardized documentation among PCPs. The project followed a pre-intervention/post-intervention evaluation design. CRC screening data were collected retrospectively from the clinic's EHR platform, Allscripts. The purpose of this data collection and evaluation was to gain knowledge about CRC screening documentation post-intervention and recommendations both pre- and post-intervention. CRC screening referral data was collected from the practice EHR. Referral documentation was previously found in the referral section of a patient's EHR (see Appendix F).

This process did not change. The pre-intervention data for patient recommendations/referrals was collected and evaluated three months prior to the start of the intervention via a manual retrospective EHR chart audit. Due to previous inconsistencies in provider CRC screening status documentation, pre-intervention documentation of CRC screening status was not evaluated or compared with the updated documentation recommendations of this intervention. Four weeks post-intervention, a process check-in and additional one-on-one training was informally conducted with all providers via verbal discussions to understand the provider's perspective on the intervention thus far. In addition, a retrospective chart review of recommendations/referrals and documentation was also completed. A final check-in and retrospective chart review of recommendations/referrals and documentation was completed three months post-intervention.

Virtual training was provided for the IT team. They were provided virtual training via telephone and emailed printable instructions. The IT team was trained on how to extract EHR data to determine which patients need screening reminders. Then the IT team was trained on how to code the EHR so that there were automatic provider screening recommendation reminders based on documented screening status. Provider reminders were inputted for all active eligible patients which included any patient ages 45-75 seen within the past 3 years that required screening documentation. Initially, these reminders included non-eligible and compliant patients until proper documentation by providers had been fully instituted for all patients. These instructions on how to input these reminders into Allscripts can be found in Appendix G. These instructions were emailed to the IT team two weeks prior to virtual training to allow for ample time to review the processes beforehand. The virtual training was conducted with the aid of a practice physician/owner who assisted with any communication and language barriers. A copy of

these instructions was provided to the practice owners and the quality improvement nurse practitioner for future reference as needed.

Next, a single 15-minute clinic one-on-one training was conducted with each PCP in January 2023. First, CRC screening guidelines and updates were briefly reviewed. A handout by the CDC was provided to display updated CRC screening guidelines and CRC tests for all clinicians (see Appendix H). Then there was a discussion on the intervention itself, CRC screening reminders, and documentation. Where and why these reminders pop up was also reviewed. These reminders popped up on the first screen of any type of patient visit. Then how to properly document CRC screening status, screening referrals, and how to de-activate the reminder post-screening completion was also reviewed. A printed document of exactly how to navigate the new way of charting in Allscripts was provided during this training session in addition to an email to all advanced providers (see Appendix I). Upon screening completion, the provider was instructed to document the code 3017F which represents *Colorectal Cancer Screening Reviewed and Documented*. If a patient had a diagnosis or history of total colectomy or CRC, then the provider was instructed to document the code G9711. If a patient refused CRC screening, then the code Z53.20 was to be documented. These codes were to be inputted into the assessment and plan section of a patient's EHR accordingly to screening status. The assessment and plan section was the new area of the chart in which the providers had to begin charting CRC screening status. Providers continued to document these codes in the patient's visit note under the Health Maintenance section as they previously did before, however, visit notes are for quick reference, and are not considered searchable data. Consistent documentation with proper codes in the assessment and plan section of the EHR allowed data to become searchable so that it could be used for reminder coding and report management.

These steps ensured that the process was done the same way every time so that others can perform this intervention the same way in the future for this practice or elsewhere. Our goal was for the intervention to become permanently implemented as a process change that can also be applied to a multitude of care gap needs. A review of the EHR and analysis of patient charts for screening referrals, completion, and documentation was a way to see if the intervention process is being followed. Individual providers were associated with patient visits; therefore, adherence could be manually audited to provide insight into provider compliance as needed. This additional raw data gave insight into which providers needed further education on screening processes and/or practices to aid with the sustainability of this intervention.

This project required minimal additional monetary costs to implement. It was estimated that this practice spent about $210 in printed materials, provider time, and billing team time. The needed staff, Allscripts technology, and computers were already in place. This project required minimal additional working time from the IT team to aid with implementation and sustainability. On average, reminders took about 15-30 minutes to input into Allscripts. Therefore, this project was budget-neutral and cost-effective.

Measures

A retrospective chart review using a chart audit tool (Appendix J) was completed on a random sample of 170 patients 45-75 years old who visited the primary care clinic within 12 weeks prior to project implementation. Pre-intervention provider adherence to CRC screening guidelines was evaluated based on referrals during that time. Referral documentation and screening status documentation were evaluated during a program check-in four weeks post the start of the intervention. This included a retrospective chart review of a random sample of 20 patients 45-75 years old seen within the first month of the intervention launch. Post-intervention

provider consistency in CRC screening guidelines including referral documentation and screening status documentation was also measured using a retrospective chart review on a random sample of 170 patients over 12 weeks after project implementation. As previously discussed, due to a new way of documenting CRC screening status being implemented with this intervention and current inconsistencies in provider CRC screening status documentation, pre-intervention documentation of CRC screening status was not evaluated or compared.

The Excel Spreadsheet (Appendix J) was utilized as a tool to input and organize data collected via chart reviews during the 12 weeks prior to intervention, 4 weeks post-intervention and 12 weeks post-intervention. This data included the following demographic variables: age, gender, race/ethnicity, insurance provider, whether screening was recommended or not, and screening status. Accurately charting screening status codes in the right area of the patient's chart was also assessed.

Data Analysis

Data analysis was completed to assess aims 4-5 of this project. The independent variable of this project was the electronic chart reminder, and the dependent variable was the CRC screening recommendation. CRC screening referrals for eligible patients 45-75 years old at this clinic were the primary outcome evaluated. A retrospective chart audit of CRC screening referrals was conducted both pre and post-intervention to assess the percentage of change. This data was evaluated as the percentage of change in documented referrals post-intervention compared to the percentage of documented referrals pre-intervention. Raw data in Allscripts through a manual retrospective audit was utilized to formulate these numbers. SPSS Statistical Package for the Social Sciences (SPSS) version 28 was used for data analysis. Demographics descriptive statistics were used to analyze demographic data and describe the project sample.

Descriptive statistics were used to assess CRC screening status documentation during a retrospective chart audit post-intervention only due to inconsistencies in CRC screening status documentation prior to intervention. Proper status coding documentation by all providers was both a facilitator and a barrier to the success of accurately assessing the data. The accuracy of these chart audits depended greatly on consistent charting by the providers. This intervention required all providers to document the same way and in the same area of the Allscripts EHR for all CRC screening statuses.

Results

The retrospective chart review included a total of 340 randomly selected patient charts (170 pre and 170 post-participants) that met the inclusion criteria. Participant characteristics are found in Table 3. In the combined group from the random sample, 43.2% (*n*=147) of patients were up to date on CRC screening and 50.1% (*n*=172) of patients were not up to date on CRC screening. As shown in Table 4, there was a 67.7% increase in screening recommendation: pre (33.7%) post (56.5%) resulting in a +22.8% change pre-post in CRC screening recommendations (33.7%; 56.5%, respectively). There was a 60.2% decrease in undocumented CRC screening status: pre (8.8%) post (3.5%) resulting in a -5.3% change in undocumented CRC screening status (8.8%; 3.5%, respectively). As shown in Table 5, PCPs documented screening status in the new area of the chart 8.2% of the time indicating that this new way of documenting is not feasible nor sustainable at this time. Providers continued to chart in the health maintenance section of the chart 89.4% of the time. Overall, 45.8% (*n*=79) of patients refused recommended CRC screening. Table 6 displays an unanticipated finding with a 4.5% increase in patient CRC screening refusal despite an increase in provider recommendation: pre (44.0%) post (46.0%). In the total sample size (*N*=340) gender and age ranges were well distributed. 88.5% of participants

were identified as Caucasian and 39.7% of participants had solely private insurance. A low number of uninsured patients is related to this practice not accepting uninsured patients at this time.

Table 3

Patient Characteristics

Patient Group	Pre-Intervention (n=170)		Post-Intervention (n=170)		Combined Group (n=340)	
Characteristic	***N***	**%**	***N***	**%**	***N***	**%**
CRC Screening Status						
Up to Date	75	44.1%	72	42.4%	147	43.2%
Not Up to Date	80	47.1%	92	54.1%	172	50.1%
Undocumented	15	8.8%	6	3.5%	21	6.2%
Gender						
Male	83	48.8%	84	49.4%	167	49.1%
Female	87	51.2%	86	50.6%	173	50.9%
Age Range						
45-49	27	15.9%	20	11.8%	47	13.8%
50-54	32	18.8%	34	20.0%	66	19.4%
55-59	30	17.6%	35	20.6%	65	19.1%
60-64	28	16.5%	34	20.0%	62	18.2%
65-69	28	16.5%	17	10.0%	45	13.2%
70-75	25	14.7%	30	17.7%	55	16.2%
Race/Ethnicity						
Black/African American	7	4.1%	7	4.1%	14	4.1%
White/Caucasian	157	92.3%	144	84.7%	301	88.5%
Other*	2	1.2%	11	6.4%	13	3.8%
Hispanic	2	1.2%	0	0%	2	0.6%
Unknown	2	1.2%	8	4.7%	10	2.9%

Insurance Provider						
Medicare	23	13.5%	17	10%	40	11.8%
Medicare + Private	41	24.1%	37	21.8%	78	22.9%
Medicaid/Passport	45	26.5%	38	22.4%	83	24.4%
Private	59	34.7%	76	44.7%	135	39.7%
Medicare + Medicaid	2	1.2%	0	0.0%	2	0.6%
None	0	0.0%	2	1.2%	2	0.6%

Table 4

CRC Screening Recommendations for Patients Not Up to Date

Provider Recommendation	**Pre-Intervention (*n*=80)**		**Post-Intervention (*n*=92)**		**Combined Group (*n*=172)**	
	N	**%**	***N***	**%**	***N***	**%**
Yes	27	33.7%	52	56.5%	79	46.0%
No	53	66.3%	40	43.5%	93	54.0%

Table 5

Provider CRC Screening Documentation Area

EHR Chart Area	**Post-Intervention (n=170)**	
	n	**%**
Original Area	152	89.4%
New Area	14	8.2%

Table 6

Patient Decision Post Provider Recommendation

Patient Decision	**Pre- Intervention (*n*=27)**		**Post-Intervention (*n*=52)**		**Combined Group (*n*=79)**	
	N	**%**	***N***	**%**	***N***	**%**
Accepted	15	56.0%	28	54.0%	43	54.4%
Refused	12	44.0%	24	46.0%	36	45.6%

Barriers

Barriers that occurred during the project intervention included provider variability in screening practices and challenges with changing documentation habits. Another barrier is related to multiple areas of the EHR where a provider can document CRC screening status.

Facilitators

The quality improvement NP and practice owner were facilitators of this intervention. The quality improvement NP and the practice owner advocated for proper screening and documentation amongst other providers.

Intervention Modifications

During the 4-week post review, an additional unanticipated one-on-one education session was held with all providers.

Discussion

Summary

In summary, CRC screening recommendations can be a challenging task for PCPs to complete during patient visits. EHR CRC screening reminders can help increase provider CRC

screening recommendations. Change in provider documentation behavior and patient CRC screening adherence remains a challenge.

Interpretation

The purpose of this quality improvement project was to implement a CRC screening process to increase CRC screening recommendations and documentation. At this practice, a 2021 audit reported CRC screening scores as an area for improvement. In addition, at this clinic, there was no standardized CRC screening or documentation process for providers. By implementing EHR reminders, providers were prompted about patient CRC screening needs. In this study, 43.2% of patients were already up to date on CRC screening, however, this is lower than screening rates for the US, KY, and the rural county this practice is located in (NCI, 2022; NIH 2008-2010). Consistent with current evidence which found a +13.7% change in PCP recommendations after implementing EHR reminders (Hechter et al., 2019; Hsiang et al., 2019; Jones et al., 2019; Lehtovuori et al., 2020; Reyes-Portillo et al., 2018), this process resulted in +22.8% change and increased CRC screening recommendations by 67.7%, however, a key area of improvement remains with documentation. There was minimal improvement, only 8.2%, found in documenting screening status in a new and additional area of the chart. Documenting in this correct area of the chart, Assessment and Plan is necessary for the sustainability of this reminder system since the data inputted in this section is trackable. The providers in this study documented in the Health Maintenance section of the EHR 89.4% of the time, however, this portion of the chart is used as a quick summary and is not trackable data. Without accurate documentation, the reminder system will continue to flag patient charts that are already up to date which may lead to provider reminder fatigue. Future research is indicated for additional approaches to changing provider documentation practices.

A high rate of refusal was an unanticipated finding. 45.6% of patients refused CRC screening despite PCP recommendations being a key facilitator to screening uptake (Honein-AbouHaidar et al., 2016; Peterson et al., 2016; Lafata et al., 2014; Laiyemo et al., 2014). We know that this population is not a high-income population related to the high percentage of patients covered by Medicaid/Passport. It has been found that patients with lower income are more likely to not adhere to colorectal cancer screening (Wools,et al., 2015).

Limitations

Findings of this project are not generalizable. This project was limited by the small sample size (*n*=340) and a small practice with only 5 PCPs. In addition, 1 NP was removed, and a different NP was added halfway through this study. This study was also limited by the short data collection timeframe of 6 months (3 months pre; 3 months post). Inconsistent documentation among providers also limited this study.

Conclusion

In conclusion, healthcare providers' CRC screening recommendations remain a key facilitator of screening completion (Honein-AbouHaidar et al., 2016; Peterson et al., 2016; Lafata et al., 2014; Laiyemo et al., 2014).). Implementing EHR CRC screening reminders provides a process that can increase CRC screening recommendations (Hechter et al., 2019; Hsiang et al., 2019; Jones et al., 2019; Lehtovuori et al., 2020; Reyes-Portillo et al., 2018). However, increased CRC screening recommendations do not always result in higher CRC screening completion rates (Peterson, et al., 2016). Provider recommendation alone is not sufficient to improve screening rates and the quality of this communication bears more significance (Peterson, et al., 2016). A PCPs time for patient preventative recommendations is

often limited (Guerra et al., 2007) and PCPs may benefit from training focused on best CRC screening recommendation practices (Lafata et al., 2014; Klabunde et al., 2007).

Changing provider documentation behavior has proven to be challenging (Lorenzetti et al., 2018). Non-standardized documentation inhibits this clinic's ability to accurately track EHR CRC screening data. In addition, third-party payer reimbursement to PCPs is often linked to patient CRC screening completion (Centers for Medicare and Medicaid Services, 2022). Standardized CRC screening recommendations and documentation are essential components of interventions to increase patient adherence to CRC screening (Honein-AbouHaidar et al., 2016; Peterson et al., 2016; Lafata et al., 2014; Laiyemo et al., 2014). In addition, increased CRC screening rates will require research and implementation of strategies that address social determinants of health across socioecological strata (Carethers et al., 2020; Honein-AbouHaidar et al., 2016; Wang et al., 2019; Wools et al., 2016).

The next suggested steps are to report quality improvement findings to the primary care clinic. PCPs should discuss their perspective related to project findings and suggestions for tailoring interventions further based on their primary care clinic setting. Future research should continue to explore effective communication approaches with patients to increase willingness to complete screening. Lafata et al. (2014) found that using the 5As Model of Behavior (i.e., Assess, Agree, Assist, and Arrange) during screening communication with patients is associated with increased patient adherence to CRC screening completion (Glasgow et al., 2006). This study found that screening adherence increased as the number of 5A steps increased. Wools et al., 2015 reported that "perceived risk and knowledge on CRC influences the perceptions of screening necessity and is crucial to adopt preventive behaviour." In a systematic review by Lee et. Al (2018), it was concluded that there was no specific CRC screening test modality that low-income

populations tended to adhere to more than the others. Instead, Lee et al., (2018) found that reviewing choices and welcoming a shared decision-making environment between patients and providers yielded more valuable results. It is recommended that this practice consider offering all CRC screening options as evidence supports this approach increases screening uptake (Bone et al., 2020; Ghai et al., 2020; Inadomi et al., 2012; Lee et al., 2018; Martin et al., 2019; Peterson et al., 2016). It is also advised that PCPs discuss the feasibility, acceptability, and sustainability of new EHR CRC screening documentation to guide intervention modification for the future then initiate a second PDSA cycle based on intervention adaptation guided by current evidence and the specific environment.

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Appendix A

Legend: Let Evidence Guide Every New Decision

Cincinnati Children's

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Table of Evidence Levels

TABLE OF EVIDENCE LEVELS: ***Levels of Individual Studies by Domain, Study Design, & Quality***

	TYPE OF STUDY / STUDY DESIGN																			
DOMAIN OF CLINICAL QUESTION	**Systematic Review Meta-Analysis**	**Meta-Synthesis**	**RCT⁺**	**CCT⁺**	**Psychometric Study**	**Qualitative Study**	**Cohort – Prospective**	**Cohort – Retrospective**	**Case – Control**	**Longitudinal** *(Before/After, Time Series)*	**Cross – Sectional**	**Descriptive Study Epidemiology Case Series**	**Quality Improvement** *(PDSA)*	**Mixed Methods Study**	**Decision Analysis Economic Analysis Computer Simulation**	**Guidelines**	**Case Reports N-of-1 Study**	**Bench Study**	**Published Expert Opinion**	**Local Consensus Published Abstracts**
Intervention *Treatment, Therapy, Prevention, Harm, Quality Improvement*	1a* 1b*		2a 2b	3a 3b		4a 4b	3a 3b	4a 4b	4a 4b	4a 4b	4a 4b	4a 4b	4a 4b	2a/2b 3a/3b 4a/4b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Diagnosis / Assessment	1a 1b			2a 2b	2a 2b		3a 3b	4a 4b			4a 4b	4a 4b		2a/2b 3a/3b 4a/4b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Prognosis	1a 1b						2a 2b	3a 3b	4a 4b		4a 4b	4a 4b		2/3/4 a/b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Etiology / Risk Factors	1a 1b		2a 2b	3a 3b			3a 3b	4a 4b	4a 4b		4a 4b	4a 4b		2/3/4 a/b	5a 5b	5a 5b	5a 5b	5a 5b	5a 5b	5
Incidence	1a 1b						2a 2b	3a 3b				4a 4b				5a 5b	5a 5b	5a 5b	5a 5b	5
Prevalence	1a 1b								2a 2b		3a 3b	4a 4b				5a 5b	5a 5b	5a 5b	5a 5b	5
Meaning / KAB⁺		1a 1b				2a 2b								2/3/4 a/b		5a 5b	5a 5b	5a 5b	5a 5b	5

* ***a*** *= good quality study* ***b*** *= lesser quality study*

⁺ ***CCT*** *= Controlled Clinical Trial* ***KAB*** *= Knowledge, Attitudes, and Beliefs* ***RCT*** *= Randomized Controlled Trial*

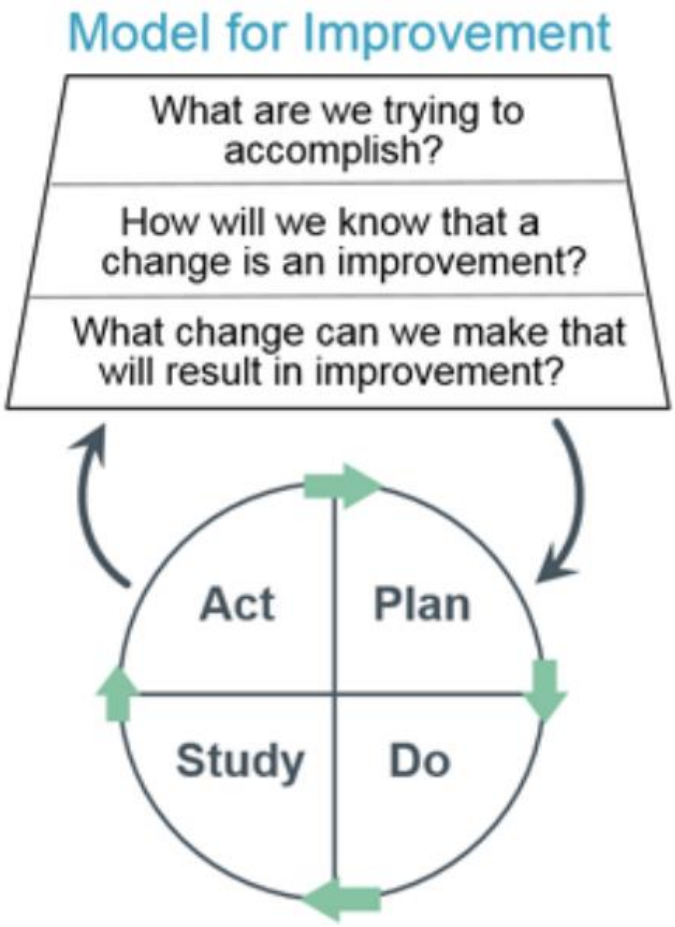
Shaded boxes indicate study design may not be appropriate or commonly used for the domain of the clinical question.

Development for this table is based on:
1. Phillips, et al: Oxford Centre for Evidence-based Medicine Levels of Evidence, 2001. Last accessed Nov 14, 2007 from http://www.cebm.net/index.aspx?o=1025.
2. Fineout-Overholt and Johnston: Teaching EBP: asking searchable, answerable clinical questions. *Worldviews Evid Based Nurs,* 2(3): 157-60, 2005.

 March 26, 2012

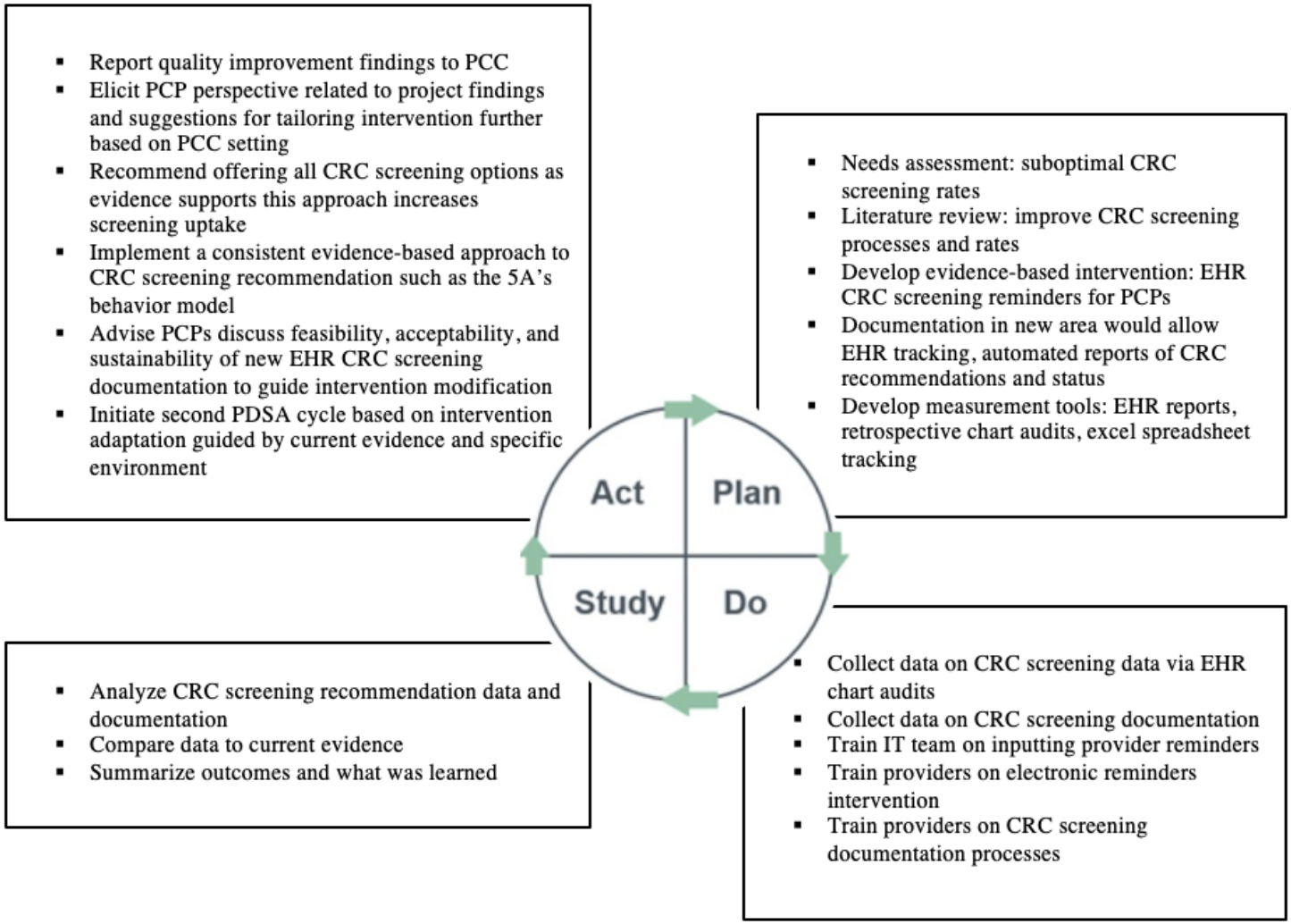
Appendix B

Quality Improvement Model



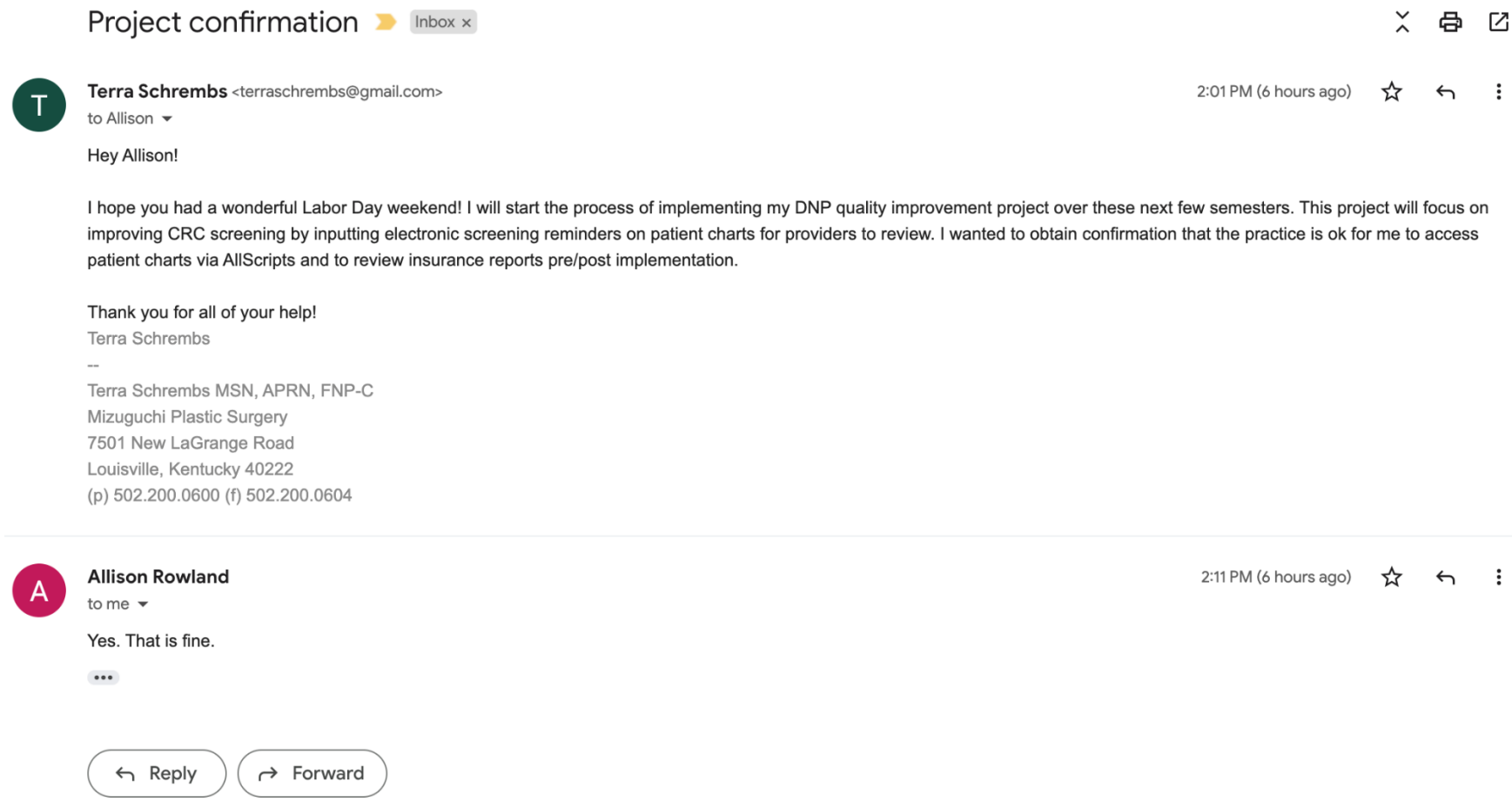
Appendix C

Plan-Do-Study-Act (PDSA) Cycle



Appendix D

Site Permission to Implement Project



Project confirmation Inbox ×

Terra Schrembs <terraschrembs@gmail.com> 2:01 PM (6 hours ago)

to Allison

Hey Allison!

I hope you had a wonderful Labor Day weekend! I will start the process of implementing my DNP quality improvement project over these next few semesters. This project will focus on improving CRC screening by inputting electronic screening reminders on patient charts for providers to review. I wanted to obtain confirmation that the practice is ok for me to access patient charts via AllScripts and to review insurance reports pre/post implementation.

Thank you for all of your help!
Terra Schrembs
--
Terra Schrembs MSN, APRN, FNP-C
Mizuguchi Plastic Surgery
7501 New LaGrange Road
Louisville, Kentucky 40222
(p) 502.200.0600 (f) 502.200.0604

Allison Rowland 2:11 PM (6 hours ago)

to me

Yes. That is fine.

Reply Forward

Appendix E

Tool: Protected Study Number Identifier

	A	B
1	**Study #**	**MR #**
2	1	
3	2	
4	3	
5	4	
6	5	
7	6	
8	7	
9	8	
10	9	
11	10	
12	11	
13	12	
14	13	
15	14	
16	15	
17	16	
18	17	
19	18	
20	19	
21	20	
22	21	
23	22	
24	23	
25	24	
26	25	
27	26	
28	27	
29	28	
30	29	
31	30	
32	31	
33	32	
34	33	
35	34	

Appendix F

Instruction Sheet: How to Find Referral Form in Allscripts

1. Launch Allscripts

2. Input Username and Password

3. The appointment page will automatically open; select patient name from appointment list

4. An “Encounter Selection” box will pop-up. Click on appointment encounter associated with today’s date under “Appointment”

5. The patient’s EHR will then open. On the top right section of the screen, find “Encounters”

6. Scroll down and select “referral/order form” or “Referral note”

7. Then click date associated with referral order form or referral note

Appendix G

Instructions Sheet: How to Code Chart Reminders in Allscripts

1. Open Allscripts
2. Input ID and Password
3. Click “Sign In”
4. Click “Clinical Module”
5. Select “Connect”
6. Select “Continue to Module”
7. Input ID and Password
8. Click “Login”
9. Click icon with four squares next to printer icon located at top right corner of screen
10. Scroll down and click on “Reporting Module”
11. Next, click “Segments” on the left-hand side of the screen under “Patient Reports”
12. Select “<All Caregivers>” under the options list located to the right of “Caregiver”
13. Single click “All Active Patients” located at the bottom of the list
14. Select “Execute…”
15. On the next pop-op box, click “Execute” (Do NOT check “Use Training Patients Only” or “Display Result”)
16. The next “Information” pop-up box will provide the number of active patients (“Segment created containing _____ Patients”). Click “Ok”
17. Next, click the green + sign above “Caregiver”
18. In “Segment Properties,” type in the desired title next to “Title” (i.e., Active Patients 45 Plus)
19. Next, click button next to “Status:” to change status to “Enabled”

20. Enter the same entry used for the "Title" into the "Description" (i.e., Active Patients 45 Plus)

21. Click plus sign below "Report" to create criteria

22. Click "Criterion…"

23. Select "Demographics"

24. Select "Age (Years)"

25. Click "Ok"

26. A new screen will pop up titled "Criterion Properties." Next to "Age in Years" click the first grey box to indicate ">="

27. Next, type "45" in the following blank white text box

28. Click "Ok." This will take you back to the "Segment Properties" Screen

29. Click the green + plus sign again located under "Report"

30. Click "Criterion..."

31. Select "Demographics"

32. Select "Status"

33. Click "Ok"

34. A new screen will pop up titled "Criterion Properties." Next to "Status" click the first grey box to indicate "="

35. Next, select "Active" by clicking in the blank white text box

36. Click "Ok." This will take you back to the "Segment Properties" screen

37. Click "Ok" again

38. Single click on the segment you just created (i.e., Active Patients 45 Plus) and click "Execute…"

39. On the next pop-op box, click "Execute" (Do NOT check "Use Training Patients Only" or "Display Result")

40. Click “Ok” on the next pop-op “Information” box. (This box will display the number of patients created in this segment).

41. Click “Reports” located on the left-hand side of the screen under “Patient Reports”

42. Click the green + plus sign above “Caregiver:”

43. Type in report name next to “Title” (i.e., CRC Screening 45 Plus)

44. Next to “Status:” click “Enabled”

45. In the description box, use the same phrase used for “Title:” (i.e., CRC Screening 45 Plus)

46. Next to “Segment,” select the segment created above (i.e., Active Patients 45 Plus)

47. Under “Report” click the green + sign

48. Select “Criterion...”

49. Select “History”

50. Click on “Health Maintenance History (CPT)”

51. Click “Ok”

52. The next screen will be titled “Criterion Properties.” Click the green + sign to “Add CPT”

53. On the next screen titled “CPT Search,” type in “3017F”

54. Click “Search”

55. Check the boxes next to “COLORECTAL CANCER SCREENING RESULTS DOCUMENTED AND REVIEWED (PV) (3017F)” and “Colorectal cancer screening results documented and reviewed (PV) (3017F) (3017F)

56. Click “Ok”

57. On the next screen click “Mark Negative”

58. Click “Ok”

59. Select “Unknown Set”

60. Under “Report” click the green + sign

61. Select “Criterion...”
62. Select “History”
63. Click on “Health Maintenance History (CPT)”
64. Click “Ok”
65. The next screen will be titled “Criterion Properties.” Click the green + sign to “Add CPT”
66. On the next screen titled “CPT Search,” type in “G9711”
67. Click “Search”
68. Check the boxes next to “PATIENTS WITH A DIAGNOSIS OR PAST HISTORY OF TOTAL COLECTOMY OR COLORECTAL CANCER (G9711)” and “PATIENTS WITH A DIAGNOSIS OR PAST HISTORY OF TOTAL COLECTOMY OR COLORECTAL CANCER (G9711)”
69. Click “Ok”
70. On the next screen click “Mark Negative”
71. Select “Unknown Set”
72. Click the green + plus sign again and select “Criterion…”
73. Select “Encounter” on the left-hand side of the screen
74. Then select “Date Range” under “Criterion”
75. Click “Ok”
76. Next to “Start Date” input start date that goes back by 3 years
77. Next to “End Date” input end date as today’s date
78. Click “Ok”
79. Select box next to “Save Criteria in Result (slower)”
80. Click “Ok”
81. On the next screen, select your report (i.e., “CRC Screening 45 Plus”) under “Patient Reports”

82. Select “Actions…”
83. Check the box next to “Create Reminders”
84. In the subject field type in “Colorectal Cancer Screening”
85. In the main text box type in “Colorectal Cancer Screening INCOMPLETE”
86. Select “Ok”
87. Click your report (i.e., “CRC Screening 45 Plus”) under “Patient Reports”
88. Click “Execute”
89. A box with pop-up titled “Execute Report”
90. DO CHECK the boxes next to “Display Result” and “Execute Actions”
91. Click “Execute”
92. A box titled “Information” will pop-up indicating how many patients the report contains.
93. Click “Ok”
94. Click “Ok” again and the reminders will now be active.

Appendix H

Colorectal Cancer Screening Tests

Screening Tests At-A-Glance

Colorectal Cancer Screening Saves Lives

Screen for life

The U.S. Preventive Services Task Force, a group of medical experts, recommends that men and women who are 45 to 75 years old be screened for colorectal cancer.

The decision to be screened between ages 76 and 85 should be made on an individual basis. If you are older than 75, talk to your health care provider about getting screened.

Each test has advantages and disadvantages. Talk to your health care provider about the pros and cons of each test, and how often to be tested.

Test	Preparation	What Happens?
Stool Tests Three stool tests can be done at home: • Guaiac-based fecal occult blood test (gFOBT) • Fecal immunochemical test (FIT) • FIT-DNA (or stool DNA) test	Your health care provider may recommend that you follow a special diet before taking the gFOBT.	For the gFOBT and FIT tests, you receive a test kit from your health care provider. At home, you use a stick or brush to obtain a small amount of stool. You return the test to the health care provider or a lab, where stool samples are checked for blood. **How often: Once a year.** For the FIT-DNA test, you collect an entire bowel movement and send it to a lab to be checked for changes in the DNA that might suggest the presence of cancer or a precancerous polyp. **How often: Every 3 years.**
Flexible Sigmoidoscopy (Flex Sig) This is sometimes done in combination with FIT.	Your health care provider will tell you what foods you can and cannot eat before the test. The evening before the test, you use a strong laxative and/or enema to clean out the colon.	During the test, the health care provider puts a short, thin, flexible, lighted tube into the rectum. This tube allows the health care provider to check for polyps or cancer inside the rectum and lower third of the colon. **How often: Every 5 years, or every 10 years with a FIT every year.**
Colonoscopy Colonoscopy may be used for screening and may also be used as a follow-up test if one of the other screening tests finds anything unusual.	Before this test, your health care provider will tell you what foods you can and cannot eat. The evening before the test, you use a strong laxative to clean out the colon. Some health care providers recommend that you also use an enema. During this test you will be given medicine that will make you drowsy. Make sure you arrange for a ride to and home from the clinic, as you may not be allowed to drive for as long as 24 hours.	You will receive medication during this test to make you more comfortable. This test is similar to flex sig, except the health care provider uses a longer, thin, flexible, lighted tube to check for polyps or cancer inside the rectum and the entire colon. During the test, the health care provider can find and remove most polyps and some cancers. **How often: Every 10 years (for people who do not have an increased risk of colorectal cancer).**
CT Colonography (Virtual Colonoscopy)	You prepare for this test as you would for a colonoscopy. Before the test, you follow a special diet and use a strong laxative to clean out the colon.	Virtual colonoscopy uses X-rays and computers to produce images of the entire colon. The images are displayed on a computer screen for the health care provider to analyze. **How often: Every 5 years.**

Your health care provider will discuss your test results with you. Depending on your results, you may need a follow up appointment or another screening test.

CDC Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

https://www.cdc.gov/cancer/colorectal/
Call 1-800-CDC-INFO (1-800-232-4636)
For TTY, call 1-888-232-6348

CDC Publication #21-1029, Revised February 2022

95.

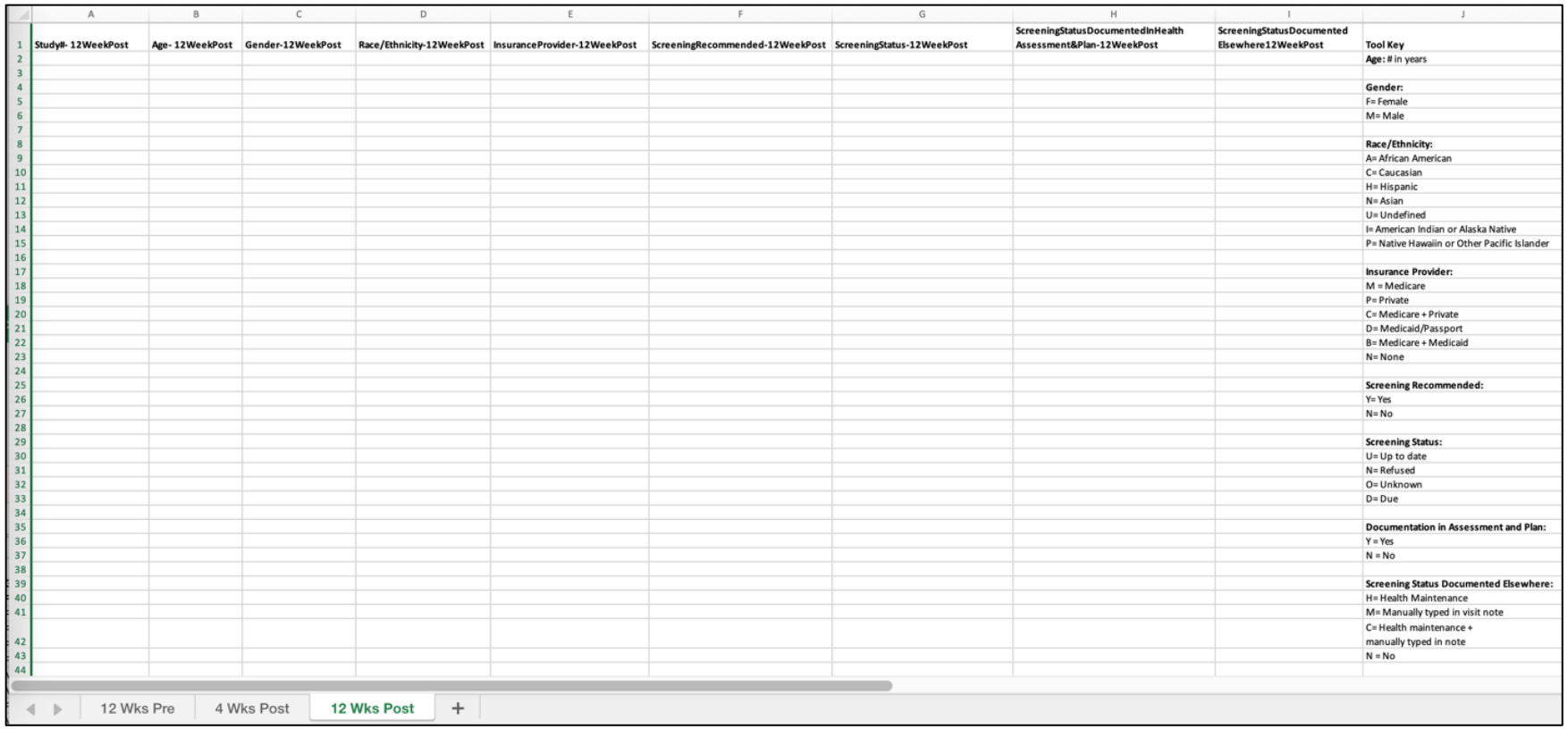
Appendix I

Instruction Sheet: How to Document Colorectal Cancer Screening Status in Allscripts

1. Open Allscripts
2. Input ID and Password
3. Click “Sign In”
4. Click “Clinical Module”
5. Select “Connect”
6. Select “Continue to Module”
7. Input ID and Password
8. Click “Login”
9. The appointment page will automatically open; select patient name from appointment list
10. An “Encounter Selection” box will pop-up. Click on appointment encounter associated with today’s date under “Appointment”
11. The patient’s EHR will then open. Select “Assessment and Plan” on the left-hand side of the page
12. Select “Short Lists”
13. Under “PQRI Measures,” select “Cancer Screening”
14. Under the drop-down options, select appropriate option
    a. Screening for Colorectal Cancer (Z12.11): Colorectal Cancer Screening Results Documented and Reviewed (3017F)
    b. Referral for Colonoscopy
    c. Referral for Cologuard
    d. Colonoscopy Refused Z53.20
    e. Patients with a Diagnosis or Past History of Total Colectomy or Colorectal Cancer (G9711)
15. Your selection will be inputted into “current plans” and then automatically saved

Appendix J

Tool: Tracking Spreadsheet



	A	B	C	D	E	F	G	H	I	J
1	StudyII- 12WeekPost	Age- 12WeekPost	Gender-12WeekPost	Race/Ethnicity-12WeekPost	InsuranceProvider-12WeekPost	ScreeningRecommended-12WeekPost	ScreeningStatus-12WeekPost	ScreeningStatusDocumentedInHealth Assessment&Plan-12WeekPost	ScreeningStatusDocumented Elsewhere12WeekPost	Tool Key
2										**Age:** # in years
3										
4										**Gender:**
5										F= Female
6										M= Male
7										
8										**Race/Ethnicity:**
9										A= African American
10										C= Caucasian
11										H= Hispanic
12										N= Asian
13										U= Undefined
14										I= American Indian or Alaska Native
15										P= Native Hawailn or Other Pacific Islander
16										
17										**Insurance Provider:**
18										M = Medicare
19										P= Private
20										C= Medicare + Private
21										D= Medicaid/Passport
22										B= Medicare + Medicaid
23										N= None
24										
25										**Screening Recommended:**
26										Y= Yes
27										N= No
28										
29										**Screening Status:**
30										U= Up to date
31										N= Refused
32										O= Unknown
33										D= Due
34										
35										**Documentation in Assessment and Plan:**
36										Y = Yes
37										N = No
38										
39										**Screening Status Documented Elsewhere:**
40										H= Health Maintenance
41										M= Manually typed in visit note
42										C= Health maintenance + manually typed in note
43										N = No
44										

12 Wks Pre | 4 Wks Post | 12 Wks Post | +