Monthly Variations in Colorectal Cancer Screening Tests among Federally Qualified Health Centers Patients in Missouri, USA: Quality Improvement Project

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Submitted to: JMIR Cancer
on: July 26, 2024

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Abstract

Background: Compelling evidence shows screening detects colorectal cancer (CRC) at earlier stages and prevents the development of CRC through removal of pre-cancerous polyps. For average risk patients, there are three commonly used screening tests used in the United States—two types of stool tests collected at home (FIT/FOBT and FIT-DNA) and colonoscopy completed at procedural centers.

Objective: This study's purpose is to examine variation by month for the three types of CRC testing to evaluate consistent patient care by clinical staff.

Methods: Data from 31 federally qualified health center (FQHC) clinics in Missouri from 2011-2023 were analyzed. A sample of 37,994 unique eligible patients were identified. Simple statistics characterize the sample, while bivariate analyses assess differences in screening types by month.

Results: In the post COVID-19 era, from 2021 to 2023, colonoscopy testing remained stable with about one third of patients (38%) completing this test. Whereas FIT-DNA increased (16% to 26%) and FIT/FOBT decreased (46% to 35%). Completion of CRC screening yielded statistically significant differences for patients completing the different types of CRC screening by month. For patients who received a colonoscopy (n=7,850), October – January were the highest months for screening, while February-April was the lowest. For FIT/FOBT (n=6,818), March-August was higher whereas December-February were the lowest screening months. For FIT-DNA (n=2,663), March was the most popular month followed by April, May and November, with January the lowest month of testing.

Conclusions: Home-based tests are more popular than the gold standard, colonoscopy. However, variation of screening over the course of a year suggests under-utilized CRC screening efforts and therefore less than ideal patient care. Months with lower rates of screening for each type of CRC test represent opportunities for improving CRC screening.

(JMIR Preprints 26/07/2024:64809)
DOI: https://doi.org/10.2196/preprints.64809

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Original Manuscript

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Running title: Seasonality in CRC screening types

Key words: colorectal cancer screening, Federally Qualified Health Centers (FQHCs), Colonoscopy, fecal immunochemical test (FIT), FIT-DNA

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Background

Colorectal carcinoma (CRC) is the third most common cancer in the United States [1]. Compelling evidence shows screening detects CRC at earlier stages and prevents the development of CRC through removal of pre-cancerous polyps. For average risk patients, there are three common screening tests—two types of stool tests collected at home (fecal immunochemistry test/

immunochemical fecal occult blood test (FIT/FOBT); fecal immunochemistry test-DNA, such as Cologuard® (FIT-DNA)) and colonoscopy completed at procedural centers. The revised Healthy People 2030 goal for colorectal cancer screening among people aged 45-75 years changed from 74.4% to 68.3% [2]. Federally qualified health centers provide low-cost care for approximately 30 million people and 90% of FQHC's patient population has incomes less than 200% of the federally poverty level [3,4]. Colorectal cancer screening of patients utilizing FQHCs in Missouri is 36.5% compared to 74.1% for patients not using FQHCs [5]. Screening opportunities takes place routinely at visits among the health system's patient population and determining variation by month in screening can assist healthcare systems to adjust outreach efforts and establish consistently high CRC screening opportunities throughout the year.

Objective

The objective of this quality improvement (QI) project was to determine if there is variation in the 3 types of CRC testing by month. Identifying variations by month can support targeted attention. The global aim of the QI project was to support FQHCs work to provide CRC screening opportunities with consistent screening rates each month.

Methods

Starting in 2020, our program, as part of a 5-year CDC-funded (Centers for Disease Control and Prevention) quality improvement program, supported eight health care systems' initiation or enhancement of four evidence-based interventions to increase CRC screening rates of age eligible patients using a practice facilitator model. As part of this quality improvement program, up to four years of annual data on CRC screening by type and date of completed CRC test for the eligible patient population in the selected healthcare system were available. Patient characteristics including age, race/ethnicity, primary language, and sex were gathered. Screening compliance was defined as: colonoscopy recommended every 10 years; FIT/FOBT every year; and FIT-DNA every 3 years. Screened for CRC was defined as having a medical record of being up-to-date on one of the three types of tests. Eligible patients were defined as aged 50-75 years, no prior diagnosis of colorectal cancer, adenomatous polyps, or inflammatory bowel disease; no personal diagnosis or family history of known genetic disorders that predispose them to a high lifetime risk of colorectal cancer such as Lynch syndrome or familial adenomatous polyposis [6]. Simple statistics characterize the sample, while bivariate analyses assess differences in screening types by month. A chi-square test for equal proportions of the CRC screening tests by month among the 3 types of CRC tests was used. This project was approved by University of Missouri's Institutional Review Board (IRB #2034264).

Results

Thirty-one clinics servicing predominately rural residents, yielded 37,994 unique eligible patients. Among these eligible patients, 18% were up-to-date on their CRC screening, another 14% had received CRC screening at some time in the past but were not up-to-date and the remaining 68% of the patients had no record of ever being screened for CRC. About 92% spoke English as their primary language with 80% being non-Hispanic White, 7% Hispanic/Latinx, and 4% non-Hispanic Black. A chi-square test for equal proportions found statistically significant seasonality (by month) of CRC screening among the 3 types of CRC tests. Colonoscopy (n = 7,850, X2 = 48.71, $P < .001$); FIT-FOBT (n = 6,818, X2 = 53.5, $P < .001$); FIT-DNA (n = 2,663, X2 = 46.71, $P < .001$). For patients who were up-to-date on CRC screening by colonoscopy, January was the highest month for screening (92 additional screenings / 14% higher on average), while February was the lowest (109 fewer screenings / 17% lower on average). For FIT/FOBT (n = 6,818), August was the highest month

(77 additional screenings / 14% higher on average) compared to February (97 fewer screenings / 17% lower on average). For FIT-DNA (n = 2,663), March was the highest month (65 additional screenings / 29% higher on average), and January was the lowest month of testing (48 fewer screenings / 22% lower on average), Figure 1.

In reviewing the distribution of type of test, in the post COVID-19 pandemic era, from 2021 to 2023, colonoscopy testing remained stable at 38% whereas FIT-DNA increased (from 16% to 26%) and FIT/FOBT decreased (from 46% to 35%). However, this overall pattern was not uniformly experienced by all healthcare systems. From 2021-2023, among the healthcare systems that showed a changed in the type of testing completed, two healthcare systems FIT-DNA replaced some of the FIT/FOBT kits completed whereas colonoscopies completed at about the same rate of 15%. FIT-DNA testing replaced colonoscopies at two healthcare systems by 42% and 16% respectively and in another healthcare system, FIT-DNA replaced both colonoscopies and FIT kits, combined by 41%.

Discussion

Colonoscopy is considered the ‘gold standard’ of CRC screening since pre-cancerous polyps can be removed at the time of the test, thereby preventing cancer. However, home-based testing is becoming more common and FIT-DNA has increased in the post COVID-19 years [7]. The increasing uptake in using FIT-DNA may reflect patient preference for home-based testing that does not incur being wait-listed for months to get a colonoscopy. Another factor may be the logistics with the manufacturer of FIT-DNA providing full service in handling all aspects of patient completion of this screening test. It starts with the referral to following up with patients to nudge them to return the kits to sending results directly into the patient’s electronic medical record. For the FIT tests, the burden is on the clinic to follow-up with patients on completing their collection and sending the kit in for analysis.

Among the 3 types of CRC screening for average risk patients seen at our FQHCs in the United States, none of the tests were completed at a consistent level by month and each test had different peak months of completion. As reflected in our FQHCs clinics, during the COVID-19 pandemic closures of specialty care including elective procedures such as colonoscopies increased home-based CRC screening [7]. This change in CRC screening options to acceptability of home-based CRC screening tests allowed for testing to be at the discretion of the patient and not based on availability of openings at the procedural center. However, we were unable to determine an explanation for the variability by month of the different screening tests. For example, only completed FIT-DNA tests peaked in colorectal cancer awareness month of March.

Undoubtedly, individual level barriers influence CRC screening rates such as transportation, medical mistrust, financial issues, and low health literacy [8]. However, organizational factors, including monitoring and feedback, has been identified as implementation facilitators [8]. This suggests providing clinical staff information on rates of completed CRC screening by test type, monthly, can be a facilitator for increased CRC screening.

Screening matters since variance in testing over the course of a year can impact the healthcare system’s capacity for timely preventive patient care. Availability of gastroenterologist to complete colonoscopy may be limited in some regions of the country but home-based tests can be accomplished each and every month. Months with lower rates of screening can be identified with a goal of less monthly fluctuations in CRC test completion with the potential of significantly increasing annual CRC screening rates.

Acknowledgement

This work was supported by the Centers of Disease Prevention and Control award

[NU58DP006765]**.** The contents are those of the authors and do not represent official views of, nor an endorsement, by the Centers for Disease Control and Prevention (CDC), Health and Human Services (HHS), or the U.S Government.

Declaration of conflicting interests

The Author(s) declare(s) that there is no conflict of interest

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Supplementary Files

Figures

Percent Deviation from the Monthly Average by CRC Screening Test.