Vivian Kaiser, DNP, ARNP, FNP-BC

CE
1.5
ANCC
Contact
Hours

Implementing Colon Cancer Screening Guidelines Into the Primary Care Setting

ABSTRACT

Colon cancer is the second leading cause of all cancers deaths. Despite public awareness, many healthcare providers and patients remain uninformed about colon cancer screening options alternative to colonoscopy. Research supports the lack of providers' education and patient knowledge. At a clinic for veterans in Central Florida, 2 educational presentations were delivered to primary care providers ($N = 46$) on the clinical pathway for colon cancer screening options. A pilot study with a quantitative pretest–post-test design was used to evaluate differences between screening orders 3 months before and after the presentations. A 10-item survey on the usefulness of the educational information was also administered to providers. Results of a 1-way analysis of variance indicated no significant differences between the two 3-month periods. However, with exclusion of the lowest month, a significance level resulted of .087, 91.3% confidence level. Survey responses indicated a positive impact, with most answers ranging from *agree* to *strongly agree*. The study revealed that the educational clinical pathway contributed to providers' increased recommendations of screening options and the educational information was useful. Additional research is recommended on the effectiveness of education and providers' use of screening options for colon cancer for average-risk veterans in healthcare institutions.

Colorectal cancer (CRC) affects both men and women of all racial and ethnic groups and is most prevalent at 50 years of age and older (Centers for Disease Control and Prevention [CDC], 2014). Colon cancer is the second leading cause of all cancer deaths. Screening for CRC is a cost-effective prevention and control strategy, and early detection is associated with improved survival (American Cancer Society [ACS], 2016a, 2016b). The most recent data from 2002 to 2011 showed a decreased incidence in the annual rates of CRC of 3.6% for men and 3.2% for women (CDC, 2015). The decrease in rates took place in part because of greater public awareness provided by the media, as well as an increase in public health programs, practices, and services. Despite the decreases, as of 2012 (the most recent year available), 134,784 people were diagnosed with CRC and 51,516 died as a result in the United States (U.S.) alone (CDC, 2016).

Received February 15, 2016; accepted September 1, 2016.

About the author: *Vivian Kaiser, DNP, ARNP, FNP-BC, Board Certified Family Nurse Practitioner, American Nurses Credentialing Center; Licensed Advanced Practice Register Nurse, State of Florida; and Advanced Practice Provider, Gastroenterology Department, Orlando Veteran Affairs Medical Center, Lake Nona, FL.*

This author declares no conflicts of interest or funding by any organization or institution.

Correspondence to: *Vivian Kaiser, DNP, ARNP, FNP-BC, 13800 Veterans Way, Orlando, FL 32827 (Vivian.Kaiser@va.gov).*

DOI: 10.1097/SGA.0000000000000347

Background

The most recent estimate of the ACS indicates that there will be 95,270 new cases of colon cancer in 2016 (ACS, 2016b). The majority of patients who are diagnosed have no symptoms. Prevention and early detection are possible by increased access to and utilization of CRC screening tests. However, according to the ACS (2016a), only 59% of people 50 years or older, for whom screening is recommended, reported having received CRC testing consistent with current guidelines.

The mean cost of colon cancer per Medicare patient 1 year after diagnosis has been estimated at $29,196 (Luo, Bradley, Dahman, & Gardiner, 2009), although total costs per patient have been estimated in millions of dollars. The medical cost projections associated with CRC treatment in 2010 was $14 billion, projected to $158 billion in 2020 (National

Cancer Institute, 2011). Increasing colon cancer screening recommendations is critical to reduce the substantial personal and social costs of CRC morbidity and mortality (Kiviniemi, Bennett, Zaiter, & Marshall, 2011).

Under the Patient Protection and Affordable Care Act, the expectation was that more than 30 million people would gain access to health coverage. Ensuring access to care became a major policy concern. The current shortage of primary care physicians has influenced legislation for revision of the laws governing nurse practitioners' (NPs') scope of practice. In addition, in some states, NPs are expected to assume the role of primary care providers (PCPs) (Yee, Boukus, Cross, & Samuel, 2013). With an increased number of NPs in the role of PCP, a more holistic and preventive approach would provide more emphasis on disease prevention and health promotion. Consequently, with regard to screening for colon cancer, patients would receive the screening tests based on their needs and the healthcare providers' recommendations (Spruce & Sanford, 2012).

Recently, the U.S. Department of Veterans Affairs (VA), Veterans Health Administration (VHA) directive on colon cancer screening, *VHA Directive 1015*, was issued to ensure the quality of colonoscopy monitoring requirements and updates on recommended screening tests (VA, VHA, 2014). The directive, based on the U.S. Preventive Services Task Force (2008) screening guidelines for adults aged 50–75 years, emphasized that all veterans who meet criteria for screening should be offered screening and informed of all screening options available, including the option not to screen (VA, VHA, 2014). At this writing, the guidelines are in the process of being updated by the U.S. Preventive Services Task Force (2016). These directives provided impetus for this study.

Review of the Literature

Screening Guidelines

The American Gastroenterological Association (AGA) Institute released the most current guidelines for CRC screening in 2008, considered to be the most updated guidelines since they were last published in 2003 (Levin et al., 2008). This document represents the consensus of multiple nationally recognized societies, the Multi-Society Task Force on Colorectal Center, which considered the newest emerging technologies. The Task Force represents the AGA Institute, the American Society for Gastrointestinal Endoscopy, and the American College of Gastroenterology. The guidelines include the consensus of the ACS and the American College of Radiology. The U.S. Preventive Services Task Force (2016) has used and publicized these same guidelines and as of this writing is in the process of updating the information.

The understanding of the current guidelines is considered imperative for PCPs to ensure the most current recommendations for patients. The guidelines explain approved tests options available for the early detection of colon cancer and adenomatous polyps for asymptomatic patients, 50 years of age and older, who are at average risk for CRC. To distinguish an average-risk patient from an above-average-risk or high-risk patient, the guidelines explain that patients with a personal history of colon cancer, or a first-degree relative with a history of colon cancer or adenomatous polyps, and patients with inflammatory bowel disease or genetic syndromes should not be included in these recommendations and should follow the recommendations for high-risk patients.

The screening test options included in the guidelines have been shown in the scientific literature to detect the majority of prevalent CRCs and are expected to achieve a higher level of specificity and sensitivity (Levin et al., 2008). The goal of the guidelines is to provide healthcare professionals with the most appropriate and current guidance to assist them in informing patients to make the best decisions about colon cancer screening when colonoscopy is declined. With consideration of multiple factors such as patient preferences, cost, and required follow-up, the consensus governing the guidelines was that patients should be provided with all the options available to ensure participation. The organizations that designed the guidelines also agreed that clinicians should be able to offer patients the choice of screening tests that can detect both cancer and adenomatous polyps or tests that can detect cancer, with the ultimate goal of colon cancer prevention (Levin et al., 2008).

As explained in the guidelines, screening tests that can primarily detect cancer and adenomatous polyps include colonoscopy, flexible-sigmoidoscopy, double-contrast barium enema (BE), and computed tomography (or virtual) colonography. The colonoscopy requires preparation and sedation and may not be an option for some patients. In contrast to the colonoscopy, the other tests do not require sedation but do require bowel preparation (Levin et al., 2008). Additional tests include the fecal immunochemical test (FIT), high-sensitivity fecal occult blood test (FOBT), and fecal DNA test. Fecal tests are acceptable screening options for average-risk patients; these tests require little to no bowel preparation and no sedation. Patients need to understand that, with the exception of the DNA test, for which every 3 years is recommended, these tests must be repeated yearly. If the results are abnormal, a follow-up colonoscopy is the only option. Healthcare providers should take into account individual patient needs, offer

various tests when colonoscopy is not an option, and consider the advantages and limitations of each test for individual patients (Levin et al., 2008).

Factors Related to Providers

Despite the current guidelines emphasizing that patients receive screening alternatives and individually suitable options, and be provided with risks, benefits, and limitations of each test, a need exists to improve healthcare provider and patient discussion and shared decision-making. Studies with physicians and patients concerning patients' screening options indicate that physicians recommend few options to replace colonoscopy. With 1,266 physicians from the American Medical Association, Zapka et al. (2011) explored the extent to which physicians followed the guidelines and whether they informed patients about various types of cancer and screening options. Forty-six percent reported that they usually did discuss recommendations and 28% reported "sometimes". Of the physicians who reported discussion of options, 49% reported recommending the FOBT and colonoscopy; only 6% recommended all the options. In addition, 53% of physicians reported that patient preferences were somewhat influential in their recommendation of screening choices and 51% indicated that the patients preferred the physician to make the choice.

Physicians' recommendations during routine health examinations, patients' preferences, and subsequent screening utilized 12 months later were investigated by Hawley, Lillie, Cooper, and Lafata (2014). With 64 physicians and 500 patients, the majority of the recommendations from physicians to patients were found highest for colonoscopy-only or colonoscopy plus another test, generally FOBT. Forty-one percent of patients had a "weak" preference for colonoscopy, and 22% had an "unclear" or weak preference for FOBT (18%). At 12 months, slightly more than half of the patients (56%) were screened, and no statistically significant association was found between their preferences and the tests they received. Of the screened patients, most were screened through colonoscopy rather than FOBT (78% vs. 21.7%). The study results indicated that although the majority of physicians may be open to considering patients' preferences of screening test, the physicians continued to offer the colonoscopy as a major choice. If other tests were offered, they were frequently in combination with colonoscopy.

Nadel et al. (2010) studied physicians' (N = 1,134) screening methods using fecal tests for improvement compared with previous studies in 2000, specifically their perceptions of the effectiveness of the FOBT and the newer FIT in reducing colon cancer mortality. Although the results showed improvement in recommendations of colonoscopy, the results also revealed inconsistencies among physicians' screening methods and lack of awareness about the newer, more sensitive fecal testing methods. Eighty-five percent believed that a high sensitivity guaiac-based FOBT was "somewhat effective" or "very effective" in decreasing cancer mortality, 54% believed the FIT to be the most effective, and 38% reported not knowing the effectiveness of the FIT.

Many of the providers (24%) continued to use a one-time hemoccult test after a digital rectal examination in the office. However, this test is not an appropriate source of stool for the FOBT or an appropriate method of screening. Of those physicians who recommended patients to perform the in-home FOBT, only 17% recommended a repeat test if the first one was negative, and approximately 20% admitted to stopping the workup if the patient's second FOBT was negative. For greater accuracy, the physicians should have waited for a third sample. It is widely accepted that every positive FOBT should result in a colonoscopy (Levin et al., 2008). In this study, the majority of physicians completed the workup, with 93% recommending a follow-up colonoscopy only when a positive FOBT resulted (Nadel et al., 2010).

Factors Related to the Institution/ Organization

The VHA has long been a pioneer in the use of electronic medical records to facilitate the care of patients in the largest healthcare organization in U.S. The use of information technology has had a positive impact in the communication among providers that has assisted to improve healthcare outcomes (Singh et al., 2010). Within their electronic medical records, the VHA has utilized computerized provider order entry (CPOE) programs to facilitate providers' referrals to specialty services. The VHA colonoscopy referrals are entered into the CPOE by providers who wish to send patients to the gastroenterology clinic for the purpose of screening or diagnosing other related symptoms. The referrals sent by the providers are reviewed by the gastroenterology consultant, who then arranges for the patient to be seen and services rendered. In many facilities, endoscopy services are limited because of the demand in relation to availability of gastroenterologists' services.

Singh et al. (2010) investigated whether the information detailed by referring providers in the CPOE had an effect on the timelines of diagnostic colonoscopy for patients newly diagnosed with colon cancer. The 6-year cohort included all patients with primary CRC diagnosed between June 2001 and June 2007 at several VA health facilities. At some of the facilities, the FOBT was considered the most common first-line screening test conducted, with only a few average-risk patients referred for colon screening. The VHA directives recommend a colonoscopy be completed within 60 days after a positive FOBT.

Results showed that from 2001 to 2007, 367 patients with CRC met the screening criteria and did have a referral request for either a colonoscopy or sigmoidoscopy prior to the diagnosis. The mean wait between referral and performing of the colonoscopy was 57 days, and 48% of patients had wait times longer than 60 days. Shorter wait times were associated with referrals for which the greatest information was provided, for those marked as urgent, and documentation of communication among providers. Given the limited capacity for gastroenterology services, both the quality and quantity of information provided in referrals to the gastroenterology consultant affected the patients' waiting times between referral and procedure. Study results supported the importance of alternative screening options when limited access to services is a barrier to timely referral and screening.

The use of a computer-delivered reminder intervention on improving colorectal screening rates was studied by Bian, Bennett, Fisher, Ribeiro, and Lipscomb (2012). The population was drawn from 21 networks of the CRC Oncology Watch in U.S. with administrative data from 1997 to 2010. A sample was selected of four cross-sectional groups of average-risk veterans aged 50–64 years for 2006, 2007, 2009, and 2010. Eight hospitals served as the intervention sites and 121 hospitals as controls.

The results reported by Bian et al. (2012) showed that the intervention had very little impact on CRC screening rates. A possible explanation was the increase of clinical reminders implemented in the system during the study years, which may have had an adverse effect on providers' normal workflow and thus the quality of care rendered. Another explanation may have been the allocation of greater services toward high-risk individuals or those exhibiting symptoms in contrast to individuals at average risk, especially given limited capacity of the facilities. The expected positive impact of health informatics technology was influenced by the environment in which the technology was used; the technology did not yield results that may have helped patients regarding CRC screening.

These studies indicated that, despite comprehensive screening guidelines by national and other medical organizations, providers lack crucial knowledge about alternative screening tests and routinely recommend colonoscopy. These deficits may have a direct impact on patients' awareness of screening options. Although computer technology has significantly improved delivery of patient services, patient demand may exceed resources and services become curtailed. The use of alternative screening options is of great importance when limited access precludes adequate referral and screening. In institutions such as the VA, in which demand often exceeds resources, knowledge and programs to assist providers in educating patients about alternative screening tests for CRC detection become crucial. Proper utilization of resources, effective screening strategies, and test options are still lacking.

Study Purpose

As this review demonstrated, providers' adequate knowledge of alternative screening tests and recommendations is deficient. The present study aimed to add to providers' knowledge on the availability of screening tests for patients aged 50–75 years at average risk for colon cancer with development and assessment of an educational program on the delivery of a clinical pathway for both physicians and NPs. The clinical pathway also assisted providers to educate patients so that they could make informed decisions about their screening options. The literature supports the screening of average-risk individuals to reduce the incidence of CRCs, because early detection can significantly reduce mortality of the disease (ACS, 2016; Kiviniemi et al., 2011; Levin et al., 2008). The current national guidelines encourage clinicians to become educated on all screening tests available to facilitate the screening process and provide alternatives for patients (Levin et al., 2008).

When demands for screening patients exceed the resources for offered services, it is imperative that PCPs learn about approved test alternatives to screen patients at average risk for colon cancer. Despite evidence-based recommendations from the U.S. Preventive Services Task Force (2016) and other national organizations, available colon cancer screening tests are still considerably underused by PCPs (Trinite, Loveland-Cherry, & Marion, 2009). Many adults neglect to undergo screening because of lack of symptoms and inconvenience of colonoscopy preparation (De Wijkerslooth et al., 2012). Other patients avoid undergoing testing because of fear, lack of education, socioeconomic reasons, and cultural beliefs, among other reasons. Many patients are not candidates for sedation or invasive procedures; therefore, risk assessment is indicated.

On the other hand, some facilities such as VA community clinics may have access issues due to increases in enrollment. According to the most recently updated guidelines for CRC, providers should be able to offer patients other approved tests as a reasonable alternative to colonoscopy (Levin et al., 2008). Nurse practitioners, among other PCPs, can positively influence patients' participation in colon cancer screening and increase screening rates by providing education about acceptable tests available for colon cancer screening when colonoscopy is not an option. Thus, the current study was undertaken.

Methods

Ethics

To ensure privacy of participants, the researcher adhered to all requirements mandated by the Health Insurance Portability and Accountability Act (HIPAA). Institutional review board exemption was granted by the clinic. The researcher maintained confidentiality of the data using password-secured computer programming and encryption with limited access.

Population

This study was conducted in a primary care clinic for veterans in Central Florida. The facility provides medical services to more than 90,000, men and women veterans, including specialty clinics, radiology, laboratory, and pharmacy, with other community-based outpatient clinics in Central Florida. Gastroenterology services available at this location are expected to provide services to all veterans assigned not only to the clinic, but also to other area community-based clinics. The clinic receives from 35 to 50 referrals daily, although the capacity for procedures is 20 per day, which includes both colonoscopy and endoscopy. Procedures that cannot be scheduled at the clinic are referred to other community providers. During the term of this study, the clinic transitioned to a new hospital facility.

In the clinic, all 46 PCPs, both physicians and NPs, were invited to a luncheon presentation to introduce guidelines for colon screening for average-risk patients and the incorporation of the clinical pathway into the consult/referral orders in the computer order system. A total of 10 PCPs attended the lunch presentation. A second presentation was held a month later for all PCPs to review the clinical pathway incorporation into the computer system during a mandatory training day, and 13 PCPs attended.

The complete information was provided during both the lunch presentation and meeting in a PowerPoint presentation, and a hard copy of the clinical pathway was given to all providers, even if they were not present. Information included patient criteria for colon cancer screening; tests available, including colonoscopy and endoscopic procedures; and alternatives tests to colonoscopy, according to the guidelines. The information also included tests available at the clinic. The specifics of each test were described in the hard copy of the clinical pathway as well as in e-mails.

The presentation also covered the computer changes made to the order sets, incorporating the clinical pathway material, for providers to utilize when placing orders for gastroenterology services. References and links to the colon cancer screening guidelines from national organizations were also provided. A question and discussion period followed the presentation. In addition, the researcher communicated for several months with participating PCPs for review of the clinical pathway and risk-assessment reminders.

Study Design

The study purpose was to add to providers' knowledge on the availability of screening tests for patients aged 50–75 years at average risk for colon cancer with development and assessment of an educational program on the delivery of a clinical pathway for both physicians and NPs. A pretest–post-test design was used to evaluate differences between retrospective data and prospective data of Current Procedural Terminology (CPT) codes of tests ordered by the providers before and after the educational intervention on screening guidelines and introduction of a clinical pathway. Data were gathered by the researcher surveying providers for changes in their beliefs and practices and tracking the CPT codes of tests they ordered. The clinical pathway was developed by the researcher from the screening guidelines and adjusted to the resources available at the clinic. Figure 1 illustrates the clinical pathway for providers.

Highlights of the clinical pathway were incorporated into the computer system, and the order sets changed on the computer system to reflect the clinical pathway. Hard copies of the clinical pathway were made available to all participants for use in decisions about screening test options for patients. Providers were educated about average-risk and above-average/high-risk patients and about the current guidelines. The offering of alternative screening tests was expected for all patients meeting criteria for average risk who declined or were unable to undergo a colonoscopy based on their risk assessment.

Data were gathered from the tracking of the CPT codes of the alternative screening tests available in the institution and ordered by the PCPs. Data were also gathered from a survey administered to providers following the tracking. Data analysis was conducted with the IBM SPSS software program, Version 19, with one-way analysis of variance (ANOVA) to validate the impact of the project on clinical practice.

Retrospective and Prospective Screening Tests

Following the educational presentations, and with the clinical pathway completed as well as the changes in the computer order sets, the tracking of the screening test was initiated. The only available screening tests at the clinic included BE or air-contrast BE (CPT G0106 or CPT G0120), FIT (CPT 82274), and FOBT (CPT G0328). Retrospective data were collected for 3 months prior to the presentations and prospective data 3 months following the intervention.

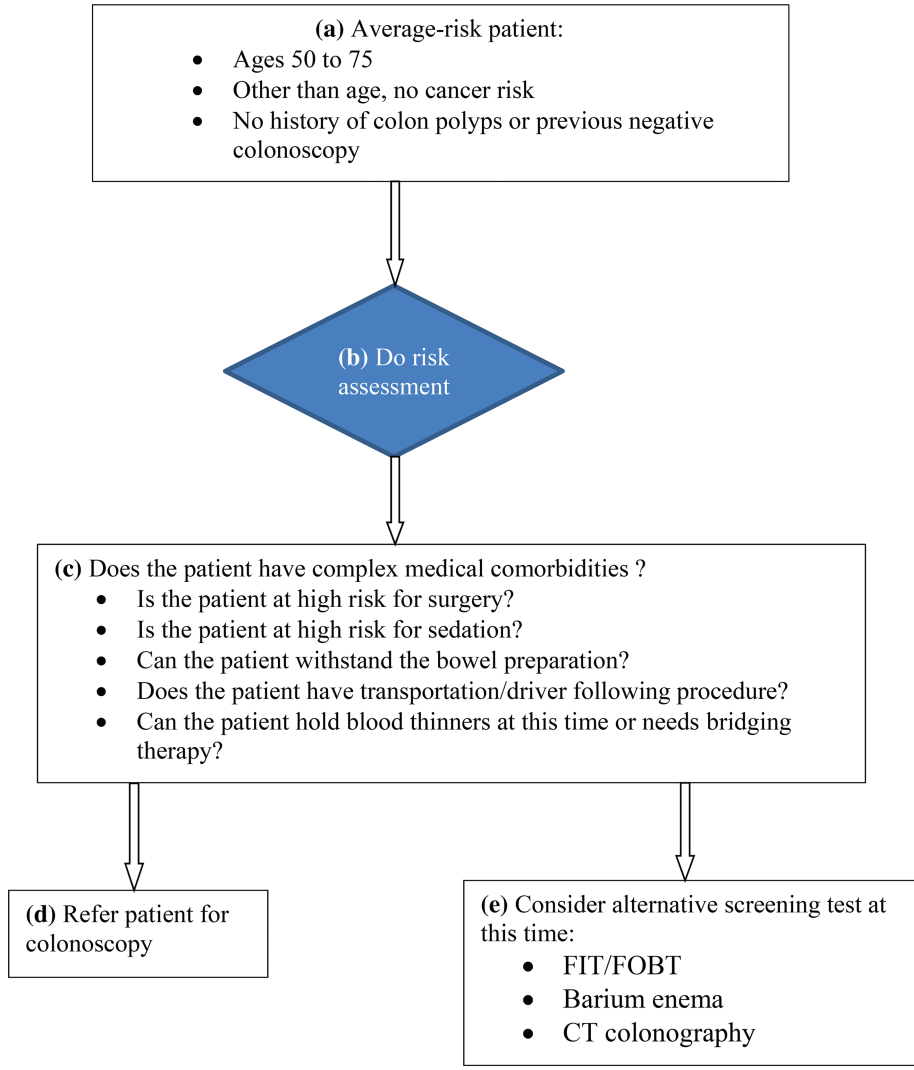

FIGURE 1. Clinical pathway. (a) Average risk criteria. (b) Risk assessment allows the provider to consider screening alternatives. (c) Risks to consider for the veteran population. (d) No risks preventing patients from having colonoscopy. (e) Patient benefits from alternative screening at this time. CT colonography = computed tomography colonography; FIT = fecal immunochemical test; FOBT = fecal occult blood test. Based on data from Centers for Disease Control and Prevention (2009); Levin et al. (2008); U.S. Preventive Services Task Force (2008).

Colon Cancer Screening Survey

A 10-item Likert-type survey on a four-point scale (*strongly disagree*, *disagree*, *agree*, and *strongly agree*) was administered to participants through e-mail postintervention via SurveyMonkey. The survey questions were designed by the researcher and reviewed and approved by both research departments at the VA clinic and the researcher's university. In the survey, participants were asked to evaluate their perceptions about their experience and utilization to date and future utilization of the clinical pathway as part of the order set in the computer system. Sample items included the following: Question 1: The colon cancer screening pathway/referral order sets allowed me to better screen my patients. Question 3: The information included in the clinical pathway helped me feel confident about the use of screening tests for patients. Question 7: I will use this information in the future when seeking guidance about providing colon screening to patients. Question 10: The clinical pathway information or referral order set did NOT change my ability to make screening recommendations for patients (see Figure 2).

Analysis

To determine results of possible significant differences in PCPs' use of the screening tests before and after delivery of the educational clinical pathway, retrospective and prospective data 3 months pre- and postintervention were collected for the CPT codes representing the tests. Only the tests that were completed were captured, and

1. The colon cancer screening pathway/referral order sets allowed me to better screen my patients.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

2. The information provided assisted me to individualize test options for patients.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

3. The information included in the clinical pathway helped me feel confident about the use of screening tests for patients.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

4. The referral order set for average risk patients is user friendly.

☐ Strongly Disagree ☐ Disagree ☐ Neither Disagree Nor Agree ☐ Agree ☐ Strongly Agree

5. The included material provided me with new and helpful information.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

6. I find the information in the clinical pathway and referral orders to be helpful in primary care practice.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

7. I will use this information in the future when seeking guidance about providing colon screening to patients.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

8. The information encouraged me to discuss screening options with my patients.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

9. My utilization of available screening tests has increased after the information provided in the computer referral orders & clinical pathway.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

10. The clinical pathway information or referral order set did NOT change my ability to make screening recommendations for patients.

☐ Strongly Disagree ☐ Disagree ☐ Agree ☐ Strongly Agree

FIGURE 2. Colon cancer postintervention survey.

the frequencies were collected by month before and after the invention. Analysis of variance was conducted to determine significant differences between the time frames.

To determine results of the postintervention colon cancer screening survey, descriptive statistics were used of participants' extent of agreement with the survey statements. These statements concerned participants'

utilization of the clinical pathway and computer referral orders provided. Data analysis is reported by frequencies, percentages, and means.

Results

Tracking Results

Retrospective data of CPT codes for screening tests ordered by the providers were collected for 3 months prior to the presentations, and prospective data of CPT codes of screening tests ordered were collected 3 months following the presentations. Only completed tests were recorded; tests ordered but not returned to the laboratory or not performed by the laboratory department at the clinic were not counted.

Tracking of the codes for the specific study clinic was complicated by the use of the same laboratory facility by adjacent clinics and the entry of each test code under the name of the pathologist reading the test and not the requesting provider. With these constraints, the researcher examined every result individually to separate those applicable to the study. The tracking results of the CPT codes used by PCPs for the 3 months prior to the presentations are displayed in Figure 3.

Results of tracking the codes 3 months prior to the presentations revealed that the majority of providers used the FIT as their choice of alternative screening test option, as opposed to BE or FOBT, which was only ordered once. With 46 PCPs in the clinic and 35–50 referrals received daily for various reasons, an estimated 80% of the referrals are for CRC screening, with a possible seasonal aspect, because some veterans who live in the northern U.S. states spend the winter months in the South. Nevertheless, the number of tests ordered over the 3 months was relatively small, a total of 82. Results of tracking the CPT codes 3 months following the presentations revealed that all providers used the FIT as their choice of alternative screening test option, as Figure 4 illustrates.

With more tests ordered following the presentation than in the 3 months prior to the presentations, 100 versus 82, the CPT count for tests ordered in May appeared atypical, given the results of June (42) and July (46), in which PCPs ordered more screening FITs. The low May figure (12) was attributed to the transition of the clinic into the new hospital during the latter part of April and May.

The data pre- and postpresentations were analyzed via one-way ANOVA for possible significant differences, as shown in Table 1. The results indicated no statistically significant difference between the codes ordered prior to and following the presentations (F ratio = 0.238, sig. = .651).

Because the data for May were atypical, they were excluded from the postintervention count. Although a one-way ANOVA comparing the pre- and resulting postpresentation codes did not show a significant result at 95%, $p < .05$, the results indicated a level of significance close to $p < .10$, F ratio 6.308, sig. = .087. This result was significant at the 92.3% level (1 − 0.087 = 0.923), as shown in Table 2.

With regard to Table 2, the t^2 value is equal to F. Then $t = 3.154$, sig. = .087. In light of the small sample size, this result may be considered promising concerning PCPs' greater ordering of CPT codes. However, more data are needed. A more graphic perspective of the data pre- and postpresentations by month is shown in Figure 5.

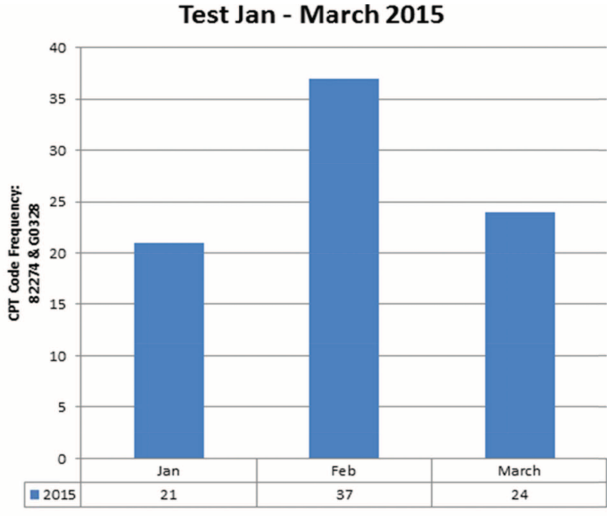

FIGURE 3. CPT codes for alternative test prior to presentation. CPT 82274 = fecal immunochemical test; CPT G0328 = fecal occult blood test. Test combined as fecal studies. CPT = Current Procedural Terminology; horizontal figures = number of tests ordered during month.

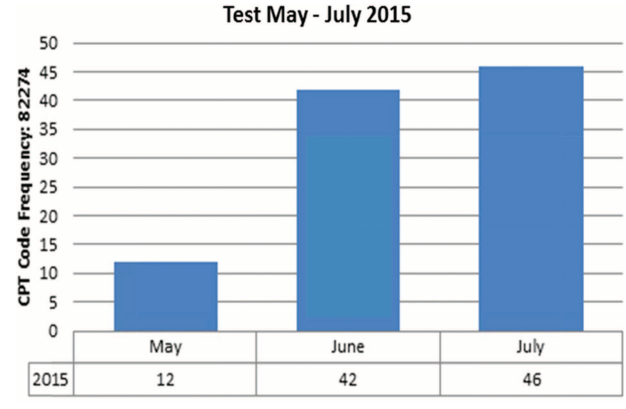

FIGURE 4. CPT codes for alternative test following presentation. CPT 82274 = fecal immunochemical test. CPT = Current Procedural Terminology; horizontal figures = number of tests ordered during month.

TABLE 1. One-Way ANOVA: Pre- and Postpresentation CPT Codes

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between groups	48.167	1	48.167	0.238	.651
Within groups	810.667	4	202.667		
Total	858.833	5			

Note. ANOVA = analysis of variance; CPT = Current Procedural Terminology.

The first three points indicate the numbers for January (n = 21), February (n = 37), and March (n = 24) (horizontal values 1.00, 2.00, 3.00, respectively). The second two points, excluding May, indicate the numbers for June (n = 42) and July (n = 46) (horizontal points 5.00 and 6.00, respectively). It can be seen that the counts increased after the presentations.

Survey Results

Results of the 10-item survey via SurveyMonkey yielded 11 responses (24%) of the total 46 PCPs. Table 3 shows the responses per item.

With calculation of frequencies and percentages on the four-point Likert scale, most responses were positive, *agree* to *strongly agree*, in terms of help to the providers. For Item 10, which requested a response on the clinical information *not having* changed participants' screening recommendations, the majority (n = 6 participants), *strongly disagreed* or *disagreed* (54.54%).

Discussion

In this pilot study, the researcher investigated the education and improved use by clinicians in the primary care setting with regard to recommendations for alternatives to colonoscopy for veterans. The literature supported the underutilization of screening test options as well as the inadequacy of education of both providers and patients about screening options (Bian et al., 2012; Hawley et al., 2014; Nadel et al., 2010; Zapka et al., 2011). The consensus appears to be that more education and more consistent screening techniques and options are called for.

This study reported on a consistent method of education and screening options. The educational presentations and changes in the order sets on the computer system to reflect the clinical pathway helped ensure that providers understood and implemented the screening options. The easily available written material provided them with reminders and refreshers. In addition, the researcher's availability to provide feedback for several months following the educational presentations helped PCPs with questions and explanations.

The results of the retrospective and prospective data analysis showed providers' improved use of screening options after the educational presentations and the researcher's communication with providers following the presentations. Although the differences were not statistically significant between the number of screening option recommendations before (January–March) and after (May–July) the presentations (Figures 3 and 4; Table 1), the latter period indicated 18 more orders than the former (82 vs. 100). This was an increase of nearly 22%. In addition, when the May figure was excluded because of the clinic's move to the hospital, the level of significance was close to $p = .10$, that is, .087, or 91.3% (1.0 − .087 = .0913) (Table 2). The researcher's ongoing support in communication and materials may have also been essential to providers' use and knowledge of screening options.

The survey results indicated that the presentations positively affected the PCPs' practice. Their responses to most items were favorable in terms of the help and effectiveness of the presentation and their increased use of screening order options (Table 3).

TABLE 2. One-Way ANOVA: Pre- and Postpresentation CPT Codes Excluding May Postpresentation

	Sum of Squares	*df*	Mean Square	*F*	Sig.
Between groups	313.633	1	313.633	6.308	.087*
Within groups	149.167	3	49.722		
Total	462.800	4			

Note. ANOVA = analysis of variance; CPT = Current Procedural Terminology.
*Significant at 91.3% (1 − .087 = .0913).

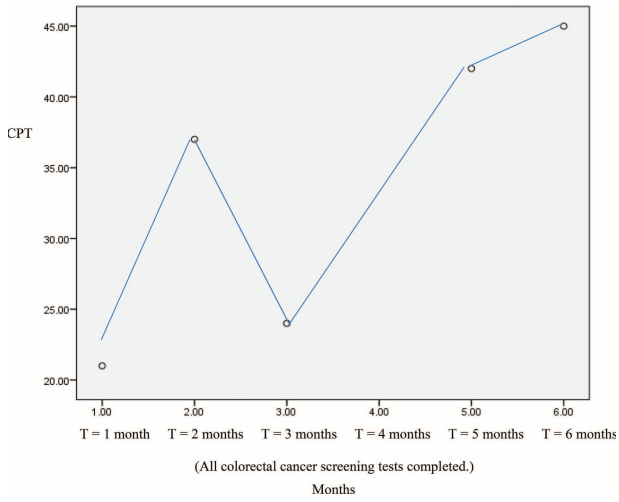

FIGURE 5. Intervention (education) month: CPT code counts for tests ordered per month. CPT = Current Procedural Terminology.

However, with regard to providers' responses to Item 10, "The clinical pathway information did NOT change my ability to make screening recommendations for patients," the results were somewhat puzzling.

Although the majority *strongly disagreed* (36.36%) or *disagreed* (18.18%), a majority of 54.54%, nevertheless 27.27% *agreed* and 18.18% *strongly agreed*, total 45.45%, that the information did not change their ability to make screening recommendations to patients. Given most providers' positive responses to the previous items, the responses of 45% to Item 10 need further explanation. This result points to need for a greater number of participants and possibly qualitative supplementary responses to explain their survey choices.

Furthermore, at the clinic under study, three screening tests were available and the data indicated that the PCPs recommended only two of these, FOBT once and primarily FIT. The limited availability may have hindered providers' recommendations of the tests and certainly limited patients' choices of screening tests.

This pilot study was undertaken to address healthcare providers' need for education in recommending to patients alternative screening options to colonoscopy for colon cancer. Although the statistical analysis did not yield compelling results, the results indicate providers' improved recommendations. Results also showed providers' increased knowledge and willingness to deliver alternative screening

TABLE 3. Providers' Survey Results ($N = 11$)

Item	Percentage (Frequency)			
	Strongly Disagree	Disagree	Agree	Strongly Agree
1. The colon cancer screening pathway/referral order sets allowed me to better screen my patients			45.45 (5)	54.55 (6)
2. The information provided assisted me to individualize test options for patients	9.09 (1)		36.36 (4)	54.55 (6)
3. The information included in the clinical pathway helped me feel confident about the use of screening tests for patients			45.45 (5)	54.55 (6)
4. Referral order set is user-friendly[a]			36.36 (4)	45.45 (5)
5. The included material provided me with new and helpful information			54.55 (6)	45.45 (5)
6. I find the information in the clinical pathway and referral orders to be helpful in primary care practice			54.55 (6)	45.45 (5)
7. I will use this information in the future when seeking guidance about providing colon screening to patients			45.45 (5)	54.55 (6)
8. The information encouraged me to discuss screening options with my patients		9.09 (1)	36.36 (4)	54.55 (6)
9. My utilization of available screening tests has increased after the information provided in the computer referral orders and clinical pathway		18.18 (2)	27.27 (3)	54.55 (6)
10. The clinical pathway information did NOT change my ability to make screening recommendations for patients	36.36 (4)	18.18 (2)	27.27 (3)	18.18 (2)

[a]For Item 4, only two respondents, 18.18%, wrote in "neither disagree nor agree."

recommendations. This study may be considered preliminary because of the low levels of participation, and further research in provider education and recommendations of screening tests is called for to serve patients more comprehensively.

The results of this pilot study showed that, despite the educational presentations, incorporation of the clinical pathway, provision of auxiliary materials, and changes implemented into the clinic's computer system, the recommendations for utilization of alternative colon cancer screening tests by PCPs to patients did not increase significantly. However, because the CPT tracking reflected only those tests completed, it cannot be explained with certainty whether the screening tests were not being ordered or whether patients did not follow through with the providers' recommendations. The lack of providers represented, as evidenced by the number of those who did participate, may indicate a need to examine whether the workload and job demands imposed on PCPs exceed their ability to engage in a study such as this one. Additional steps could be taken, such as further publicity and dissemination of rising CRC statistics, to increase PCPs' interest in participating further interventions.

Nevertheless, at the clinic, the creation of the clinical pathway resulted in several salutary outcomes. The study's implementation in the primary care setting highlighted the need for continuous strategies aimed at improving patient outcomes. Permanent changes for greater comprehensiveness were made in the computer orders used by PCPs when referring patients for gastroenterology services. The clinical pathway emphasized the importance of PCPs conducting a risk assessment (Figure 1) on patients being referred for procedures. As a consequence of the study, a dialogue was generated among the departments at the clinic and the gastroenterology department with respect to the need to develop new policy related to the proper referral process and available screening services.

Limitations

A number of limitations are acknowledged for this study. A major environmental factor may have affected participation: the opening of a new hospital and the clinic's transition to this facility. This move may have limited PCPs attention to the study and decreased their participation. In addition, the clinic has a seasonal variation of patients, which may have affected study results.

Technical issues may also have limited participation. The computer program restricted addition of a comprehensive clinical pathway in its current formatting. The use of drop-down windows or creation of links to access references to the information was restricted. Therefore, the researcher made hard copies available to participants. Because of available electronic access, some participants may not have found it convenient to consult their hard copy. In addition, limited data and specifics of each test were lacking in the orders. For example, the FIT does not require a change in diet, nor is it intended for ruling out upper gastrointestinal bleed. Annual testing is necessary, and two tests per year are acceptable.

The lack of in-depth information may have contributed to the providers offering alternative screening test options, especially for those who did not refer to the hard copy of the clinical pathway for reference. Despite this constraint, the researcher's collaboration with the informatics department made possible incorporation of specific contents of the clinical pathway into the computer order set for providers.

The lack of available screening test alternatives within the organization resulted in one test favored by providers, FIT, adding to the limited options offered to patients. In addition, the tracking of the providers' CPT codes was complicated because only one laboratory department was available for multiple adjacent clinics. Because the tracking of the codes included multiple clinics, the researcher had to examine each entry manually to ensure the counts from the correct clinic. In addition, the CPT counts reflected only those tests that were completed; thus, the total number of orders requested by the providers was limited, regardless of whether the test was completed by the patient. In addition, data were lacking to support how many alternative screening tests were originally ordered against the ones that were completed. Furthermore, providers' performance may have improved without patients' adherence.

Results for May were removed because they appeared atypical. The results for the following 3 months may also have been atypical. Thus, tracking over 3 months may not be a long enough period for accurate assessment of providers' number of orders.

The total number of participants at both educational presentations ($N = 23$, 50% of total providers) was low, as noted earlier, partly because of the imminent transition of the clinic to the new hospital. Some providers may have had limited time because of patient loads, and others may have had no desire to participate. Similarly, a small number of participants, 24%, responded to SurveyMonkey. These low response rates may have rendered the tracking and survey results unrepresentative. The low response rates may also have added to participant (or selection) bias. In addition, on the postintervention survey (Figure 2), Item 10 alone was written in reverse order, with results indicating that participants *disagreed* or *strongly disagreed* that the intervention changed their ability to make patient screening recommendations. Biases may have

contributed to this result. Participants may have responded from social acceptability bias because they knew the researcher and assumed these responses were what the researcher desired. The participants may also have desired to appear cooperative and encouraging in responding positively to the information supplied in the intervention.

Implications for Future Research

Given the study limitations, several implications for future research are suggested. Replication of this quantitative study could take place with larger samples at this research site and sister clinics, as well as other geographical locations of veterans' clinics. In addition, the postintervention survey could be revised to minimize biases. More in-depth educational interventions, such as workshops, periodic meetings, and electronic forum exchanges, could be designed and implemented to consolidate and reinforce learning.

Methods could be implemented to increase the actual screening when CRC screening tests are ordered, such as phone call reminders, incorporation of educational material such as brochures, and educational programs on colon cancer prevention. More comprehensive tracking could take place of both the numbers of tests ordered by PCPs and completed tests over longer time periods than 3 months.

Studies could help determine factors that hinder and improve patient adherence to providers' recommendations for screening. Qualitative research could be conducted to interview patients for nonadherence to recommendations and addressing of their barriers for greater adherence and following through with the elected tests. Qualitative studies could also explore PCPs' experiences and beliefs about barriers and solutions on their recommendations for alternative screening tests to colonoscopy for colon cancer screening. Such studies would bring more attention as to how patients can be further helped and how providers, especially those in the primary care setting, can impact screening rates positively.

This pilot study could become a model for future studies aimed at educating NPs as well as other healthcare providers about the importance of implementing evidence-based screening recommendations for colon cancer into primary care practice. The study could also serve as the basis for development of community programs to educate the general population on available screening tests to promote colon cancer screening awareness and participation.

Implications for Nursing Practice

As the study results show, even when changes are implemented within an organization as part of quality improvement measures, such as the educational presentations, immediate improvements do not always take place. For the present study, a greater longitudinal period, as noted earlier, would have made a positive difference in the PCPs' practice outcomes. Additional studies may reveal significant differences before and after educational implementations and could provide more data for quality improvement efforts.

This pilot study revealed that more education and awareness outreach should be offered to encourage providers' adoption of strategies to promote patients' well-being and promote their participation. When an organization lacks requisite services, or they are limited, as in the research site, given the few alternative tests that were available, the patients' options, in turn, become limited. This lack should be recognized because access to care may be compromised. Deficient options, support from providers, and limited access undoubtedly have negative impacts on healthcare delivery.

In this study, for example, many providers did not attend the educational session and many patients did not follow through with the screening tests recommended. Thus, a major implication of the study for advanced nursing practice is a renewed effort by healthcare organizations to educate their healthcare professionals. A second implication is for the organization to institute measures for follow-through of services. In turn, nurses and physicians should be able to educate their patients on the options available concerning their healthcare.

The clinical pathway may serve as a guide for NPs/PCPs to offer patients the various available approved tests and provide education about the risks and benefits for patients to make informed decisions about their options. Choice of a test suitable for individual patients would increase the patients' cooperation in undergoing screening. As a result of the educational presentations, the NPs/PCPs should be able to raise patients' awareness of their colon cancer risks and the importance of screening. Future studies could evaluate whether implementing colon cancer screening guidelines into primary care settings better utilizes available screening tests, thus decreasing unnecessary referrals and containing costs.

Recently, the VA, VHA (2014) was subject to media scrutiny about increased demands for service and current limitations. In response, the VHA committed to development of more comprehensive strategies for delivery of adequate care to veterans. Since the completion of this study, new strategies such as the Veterans Choice Program have been instituted to improve veterans' access to care.

This program is designed to refer veterans to outside agencies for services not available within 30 days or when the veterans live more than 40 miles from the VA facility and travel creates excessive burden (VA, 2016). The program not only provides much needed assistance to veterans, but also helps ensure the most expedient

access to care. Programs such as this one also provide opportunities for continued research and expansion of studies such as the present one. The continued re-evaluation and assessments of healthcare procedures should take place frequently and become the norm, as nurses and PCPs seek to provide optimal healthcare services and improved healthcare outcomes for the patients entrusted to them.

Conclusion

Colon cancer is a prevalent form of cancer that affects both men and women and is the second leading cause of cancer deaths in the U.S. (ACS, 2016; CDC, 2014). Screening for CRC is a cost-effective prevention and control strategy, and early detection is associated with improved survival. Primary care providers have an important role to play in educating patients about screening options to increase screening rates and patients' participation in their care.

The lack of cohesive intervention by providers and the underutilization of alternative screening test options can be a barrier to increasing screening rates for many populations. This study reported on the implementation of educational presentations and related materials for PCPs. A clinical pathway was provided on colon cancer screening guidelines alternative to colonoscopy for average-risk patients, aged 50–75 years (Figure 1), at a VA clinic in Central Florida. The clinical pathway was incorporated into the computer's order sets, and PCPs' recommendations for screening were tracked for 3 months before and 3 months after the presentations. Although no statistically significant differences were found before and after the presentations, PCPs' greater use of screening recommendations was evident after the presentations (Figures 3–5; Tables 1 and 2).

At veterans' clinics and hospitals, patients should have the best care and most complete options for care. Nurse practitioners are in a unique position to offer options and educate patients on their choices. This pilot study focused on NPs' and PCPs' recommendations to patients for colon cancer screening options. It is hoped that the study brings to wider attention the need for education of nurses as well as other healthcare providers in this regard. Nurse providers need convenient and efficient access to the evidence-based recommendations and implementation of alternative screening options at veterans' clinics. Such improvements should supply providers with the necessary information and knowledge so that veterans may obtain the healthcare they deserve.✪

REFERENCES

American Cancer Society (ACS). (2016a). *Colorectal cancer*. Retrieved from http://www.cancer.org/cancer/colonandrectumcancer/detailedguide/colorectal-cancer-key-statistics

American Cancer Society (ACS). (2016b). *Colorectal cancer prevention and early detection*. Retrieved from http://www.cancer.org/acs/groups/cid/documents/webcontent/003170-pdf.pdf

Bian J., Bennett, C. L., Fisher, D. A., Ribeiro, M., & Lipscomb. J. (2012). Unintended consequences of health informatics technology: Evidence from veterans' affairs colorectal cancer oncology-watch intervention. *Journal of Clinical Oncology*, *30*(32), 3847-3952.

Centers for Disease Control and Prevention (CDC). (2009). *Screening tests at-a-glance*. Retrieved from http://www.cdc.gov/cancer/colorectal/pdf/SFL_inserts_screening.pdf

Centers for Disease Control and Prevention (CDC). (2014). *Basic information about colorectal cancer*. Retrieved from http://www.cdc.gov/cancer/colorectal/basic_info/index.htm

Centers for Disease Control and Prevention (CDC). (2015). *Colorectal cancer trends*. Retrieved from http://www.cdc.gov/cancer/colorectal/statistics/trends.htm

Centers for Disease Control and Prevention (CDC). (2016). *Colorectal cancer statistics*. Retrieved from http://www.cdc.gov/cancer/colorectal/statistics/index.htm

De Wijkerslooth, T. R., De Haan, M. C., Stoop, E. M., Bossuyt, P. M., Thomeer, M., Van Leerdam, M. E., ... Dekker, E. (2012). Reasons for participation and nonparticipation in colorectal cancer screening: A randomized trial of colonoscopy and CT colonography. *American Journal of Gastroenterology*, *107*, 1777–1783. doi:10.1038/ajg.2012.140

Hawley, S., Lillie, S., Cooper, G., & Lafata, J. E. (2014). Managed care patients' preferences, physician recommendations, and colon cancer screening. *The American Journal of Managed Care*, *20*(7), 555–561.

Kiviniemi, M. T., Bennett, A., Zaiter, M., & Marshall, J. R. (2011). Individual-level factors in colorectal cancer screening: A review of the literature on the relation of individual level health behavior constructs and screening behavior. *Psycho-Oncology*, *20*, 1023–1033.

Levin, B., Lieberman, D., McFarland, B., Andrews, K., Brooks, D., Bond, J., ... Winawer, S. (2008). Screening and surveillance for the early detection of colorectal cancer and adenomatous polyps, 2008: A joint guideline from the American Cancer Society, the U.S. Multi-Society Task Force on Colorectal Cancer and the American College of Radiology. *Gastroenterology*, *135*, 1570–1595.

Luo, Z., Bradley, C. J., Dahman, B. A., & Gardiner, J. C. (2009). Colon cancer treatment costs for Medicare and dually eligible beneficiaries. *Health Care Financing Review*, *31*, 35–50.

Nadel, M. R., Berkowitz, Z., Klabunde, C. N., Smith, R., Coughlin, S. S., & White, M. C. (2010). Fecal occult blood testing beliefs and practices of U.S. primary care physicians: Serious deviations from evidence-based recommendations. *Journal of General Internal Medicine*, *25*(8), 833–839. doi:10.1007/s11606-010-1328-7

National Cancer Institute. (2011). *Cancer costs projected to reach at least $158 billion in 2020*. Retrieved from http://www.cancer.gov/news-events/pressreleases/2011/CostCancer2020

Singh, H., Peterson, L. A., Daci, K., Collins, C., Khan, M., & E7l-Serag, H. B. (2010). Reducing referrals delays in colorectal cancer diagnosis: Is it about how you ask? *BMJ Quality Safety Health Care*, *19*(5), 1–6. doi:10.1136/qshc.2009.033712

Spruce, L. R., & Sanford, J. T. (2012). An intervention to change the approach to colorectal cancer screening in primary care. *Journal of the American Academy of Nurse Practitioners*, *24*, 167–174.

Trinite, T., Loveland-Cherry, C., & Marion, L. (2009). The U.S. Preventive Service Task Force: An evidence-based prevention resource for nurse practitioners. *Journal of the American Academy of Nurse Practitioners*, *21*, 301–306.

U.S. Department of Veterans Affairs. (2016). *Veterans Choice Program*. Retrieved from http://www.va.gov/opa/choiceact/

Department of Veterans Affairs (VA), Veterans Health Administration (VHA). (2014). *VHA Directive 1015. Colorectal cancer screening*. Washington, DC: Author.

U.S. Preventive Services Task Force. (2008). *Colorectal cancer: Screening*. Retrieved from http://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/colorectal-cancer-screening

U.S. Preventive Services Task Force. (2016). *Topic update in progress—Colorectal cancer: Screening*. Retrieved from http://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/colorectal-cancer-screening

Yee, T., Boukus, E., Cross, D., & Samuel, D. (2013). Primary care workforce shortages: Nurse practitioner scope-of-practice laws and payment policies. *National Institute for Health Care Reform: Research Brief*, *13*, 1–7.

Zapka, J. M., Klabunde, C. N., Arora, N. K., Yuan, G., Smith, J. L., & Kobrin, S. C. (2011). Physicians' colorectal cancer screening discussion and recommendation patterns. *Cancer Epidemiology Biomarkers Prevention*, *20*, 509–521. doi:10.1158/1055-9965.EPI-10-0749

Instructions for Taking the CE Test Online:

- Read the article. The test for this CE activity can be taken online at www.nursingcenter.com/ce/gastro. Tests can no longer be mailed or faxed.
- You will need to create a free login to your personal CE Planner account before taking online tests. Your planner will keep track of all your Lippincott Professional Development online CE activities for you.
- There is only one correct answer for each question. A passing score for this test is 13 correct answers. If you pass, you can print your certificate of earned contact hours and the answer key. If you fail, you have the option of taking the test again at no additional cost.
- For questions, contact Lippincott Professional Development: 1-800-787-8985.

Registration Deadline: December 4, 2020

Disclosure Statement:

The authors and planners have disclosed that they have no financial relationships related to this article.

Provider Accreditation:

Lippincott Professional Development will award 1.5 contact hours for this continuing nursing education activity.

Lippincott Professional Development is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation. This activity is also provider approved by the California Board of Registered Nursing, Provider Number CEP 11749 for 1.5 contact hours. Lippincott Professional Development is also an approved provider of continuing nursing education by the District of Columbia, Georgia, and Florida CE Broker #50-1223.

Payment:

- The registration fee for this test is $10.50 for members; $15.00 for nonmembers.

DOI: 10.1097/SGA.0000000000000439