



Healthcare Provider Knowledge, Attitudes, Practices, and Beliefs about Colorectal Cancer Screening Final Report



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Executive Summary

Healthcare Provider Knowledge, Attitudes, Practices, and Beliefs about Colorectal Cancer Screening

Project Purpose

This project was one part of a larger initiative of the Comprehensive Cancer Control Program of South Dakota (SD) and the South Dakota Council on Colorectal Cancer (CRC). The purpose of this project was to explore healthcare provider knowledge, attitudes, practices, and beliefs related to CRC screening.

Methods

The target population for this project was healthcare providers who perform, order, or refer patients for CRC screening in the state of SD. A modified version of an existing survey, the “National Survey of Primary Care Physicians’ Cancer Screening Recommendations and Practices: Colorectal and Lung Cancer Screening Questionnaire” was used. Data were analyzed using descriptive statistics.

Results

The CRC screening recommendations and practices survey was completed by 140 providers for a 21% response rate. The majority of the providers reported CRC screening recommendations and practices consistent with the current guidelines with the exception being a number of providers still using digital rectal examination with guaiac testing. The majority recommended colonoscopy every 10 years for the average-risk patient. Age-related guidelines were not as well known. The greatest barriers to screening were perceived as insurance coverage, especially for colonoscopy.

Summary and Recommendations:

Based on the findings of this study, we offer the following ideas toward enhancing healthcare provider knowledge, attitudes, practices, and beliefs related to CRC screening:

1. Offer continuing education for all healthcare providers specifically related to CRC screening guidelines with emphasis on age and risk guidelines and the lack of evidence for continued use of guaiac of DRE testing.
 - a. Publish educational pieces on current CRC screening guidelines in journals and other places that reach South Dakota healthcare providers.
 - b. Offer public education related to CRC screening methods and the importance of early detection.
2. Lead policy efforts to influence insurers to cover screening colonoscopy per current guidelines.
3. Further study of colonoscopy preparation to determine actual problems such as timing of preparations, amount of preparation, quality of preparation methods, and both tolerance and adherence to preparatory procedures.

Healthcare Provider Knowledge, Attitudes, Practices, and Beliefs about Colorectal Cancer Screening

Introduction

Background and Significance

Rural populations experience disparities in colorectal cancer (CRC) screening, treatment, and outcomes compared to urban populations (Benuzillo et al., 2009; Cole, Jackson, & Doescher, 2012; James, Greiner, Ellerbeck, Feng, & Ahluwalia, 2006). Many CRC deaths for this population could be prevented through early detection. According to the U.S. Preventive Services Guidelines, CRC screening is recommended for adults aged 50 to 75 years (Smith, Cokkinides, & Brawley, 2008). Despite a range of screening options, at least one-third of eligible adults do not meet current guidelines (Centers for Disease Control and Prevention [CDC], 2010). Access to healthcare services and providers are known barriers to healthcare for rural populations, and these factors may influence CRC screening rates (Benuzillo et al., 2009; Campo et al., 2008; James et al., 2006). A baseline assessment of healthcare provider knowledge, attitudes and practices related to CRC screening in rural areas is needed in rural states like South Dakota (SD).

Purpose of the Project

This purpose of this study was to provide statewide partners in SD with baseline data needed to plan for enhancement of CRC screening services, healthcare provider education, and policy development to assure that all eligible residents are screened. This study replicates a 2006-2007 nationwide assessment of primary care physician attitudes and practices toward CRC screening (National Cancer Institute, 2006; Zapka et al., 2012). Findings from the prior study are limited to a very different population of primary care providers than those who work in predominantly rural settings. There is a need to include nurse practitioners and physician assistants in the assessment to explore healthcare provider knowledge, attitudes, practices and beliefs as they exist in this predominantly rural state.

METHODS

Design and Sample

This study used a participatory research approach and a descriptive survey research method. Community partners included the SD Department of Health (SD DOH), the Colorectal Cancer Workgroup within the SD Comprehensive Cancer Control Program (SD CCCP), the SD Council on Colorectal Cancer, Saint Mary's Foundation, and South Dakota State University (SDSU). Partners collaborated to design the study, develop the modified protocol and survey, and plan for dissemination of findings. Institutional Review Board approval was obtained from SDSU.

The target population for this study included healthcare providers in SD who provide or refer patients for CRC screening. The sample was accessed by contacting all healthcare facilities in the state of SD that potentially offered any type of CRC screening. The healthcare facility list was compiled from SD DOH resources, including the provider list from the “Get Screened SD” program (focused on colorectal cancer screening), the registered or certified health or allied health services database, and the state vaccine registry (SD DOH, 2013a, b, c). The study excluded all Indian Health Service (IHS) and Tribal Health facilities because of a concurrent project led by the American Indian Cancer Research Foundation (2013) involving 54 IHS/Tribal Health facilities located throughout the Northern Plains region of the US.

After removal of duplicates from the three SD DOH resources, there were 747 healthcare facilities remaining on the compiled list. An additional 58 facilities were identified as ineligible prior to any telephone contact, leaving 689 facilities on the list. Ineligibility was due to the following factors: (a) location outside of SD, (b) facility closed, (c) facility did not provide health services (e.g., dictation service or medical laboratories), or (d) facility was an IHS or Tribal Health service site. After initial contact, an additional 310 facilities were screened as ineligible due to no CRC screening procedures or tests provided at the facility. Of the remaining 379 facilities, 140 were not reached after multiple contacts. An additional 8 facilities were closed and 52 facilities were eligible but declined the invitation to participate in the study. A total of 179 facility administrators agreed to complete a CRC screening capacity survey for another component of the larger study, and to distribute provider surveys for this study.

Instrument

The project partners created a modified version of an existing instrument entitled the “National Survey of Primary Care Physicians’ Cancer Screening Recommendations and Practices: Colorectal and Lung Cancer Screening Questionnaire” (National Cancer Institute, 2006). Retained survey questions assessed knowledge, attitudes, practices, and beliefs regarding a variety of CRC screening tests including guaiac-based fecal occult blood testing (gFOBT), flexible sigmoidoscopy, and colonoscopy. The survey was modified to include assessment of fecal immunochemical testing (FIT/iFOBT). Three CRC screening options were eliminated from the modified survey (virtual colonoscopy, fecal DNA testing, and double-contrast barium enema) to better reflect screening guidelines and available testing in SD. Lung cancer questions were also eliminated from the modified survey. Healthcare providers were asked to complete the pencil and paper survey and return it in a postage-paid envelope.

Protocol

This study was completed as part of a larger project that explored CRC screening capacity. Initial contact with potentially eligible healthcare facilities was done via telephone calls to administrators who were informed about the project and were invited to participate in the capacity survey, and facilitate distribution and return of healthcare provider surveys within the facility. Research assistants, who conducted the telephone contact, were trained in telephone data collection methods including handling difficult calls, soft conversions, and data entry procedures. To assure that consistent information was requested, all calls and e-mails were scripted. Healthcare facilities were contacted three times via phone and e-mail. Administrators who agreed to facility participation were mailed a packet with healthcare provider surveys for all providers who refer and/or provide CRC screening at the facility. Surveys were returned by each provider in a stamped self-addressed envelope.

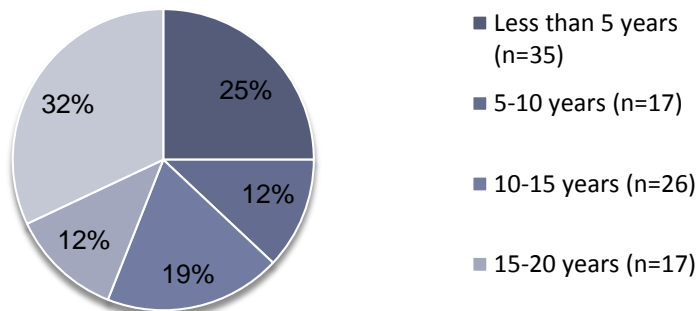
Each provider survey was randomly assigned a project code number prior to sending out the surveys. Data entry and analysis was completed using *IBM Statistical Package for the Social Sciences (SPSS) Version 21.0 (2013)*. Upon receipt of study surveys, data was entered into SPSS with the project code number and zip code (used to classify respondents as working in small rural, large rural, or urban areas). Provider identifiers were not linked to the data. All data were double-entered and stored on a secure, password-protected server.

Results

Participants

A total of 179 facility administrators agreed to participate and distribute surveys to 657 healthcare providers who provided CRC screening services. There were 140 provider surveys returned for a response rate of 21.3%. Geographic distribution of respondents was 31% urban, 46% large rural, and 23% small rural. Healthcare provider respondents included 70 physicians (50%), 43 physician's assistants (30.7%), 26 nurse practitioners (18.6%), and 1 medical assistant. Years of practice since training were highly variable, with a range of less than 5 years to more than 20 years of practice (Figure 1).

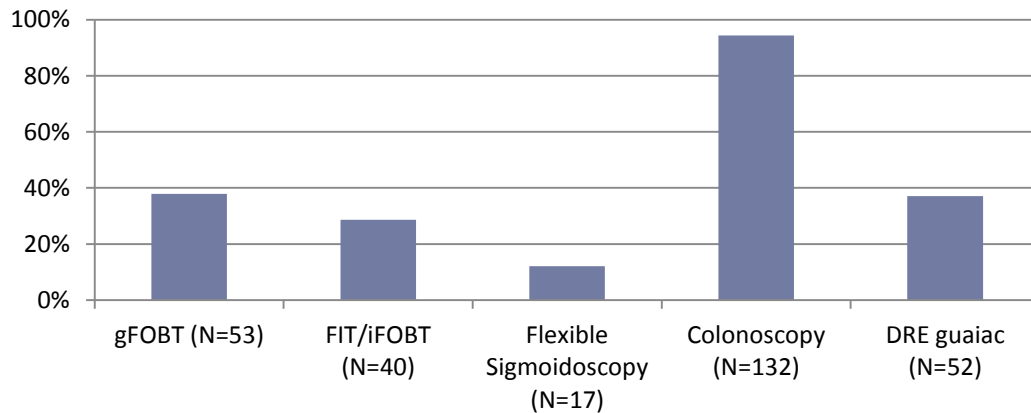
Figure 1. Respondents Years Practiced Since Finishing Training (n=140)



Provider Practices

Providers were asked to indicate which CRC screening tests they routinely recommend. The options included the digital rectal exam with guaiac testing (DRE), even though this screening is not within the current clinical practice guidelines. Multiple responses could be selected. Colonoscopy was the most frequently recommended screening option (Figure 2). The DRE was still used by 37% of providers.

Figure 2. Provider Practice of Routine CRC Screening by Type of Test



Providers were also asked to describe the CRC screening tests they recommend for healthy adults, including the starting age, frequency of testing, and age at which they no longer recommend screening. Results for each test are given in Table 1. The DRE is not included in the table since the test no longer conforms to practice guidelines. The CRC screening test most frequently recommended was colonoscopy starting at age 50 with a frequency of every 10 years for healthy individuals with no significant health risks. The majority recommended no longer screening after 80 years of age. Other screening tests were less frequently recommended. There were two comments related to early screening of higher risk patients.

Health care providers were asked how often they presented more than one test option when discussing CRC screening with an average risk patient. The majority (71.4%) usually or sometimes presented more than one test option; however, 40 respondents (28.6%) rarely or never presented more than one option. The screening test most often recommended was colonoscopy alone (50.7%) followed by gFOBT plus colonoscopy and FIT/iFOBT plus colonoscopy (Table 2). Thirteen providers (9.3%) recommended guaiac testing of a digital rectal exam (DRE) specimen, which is no longer recommended in the guidelines.

Table 1. Provider Recommendations by Type of CRC Screening Test for Healthy Patients

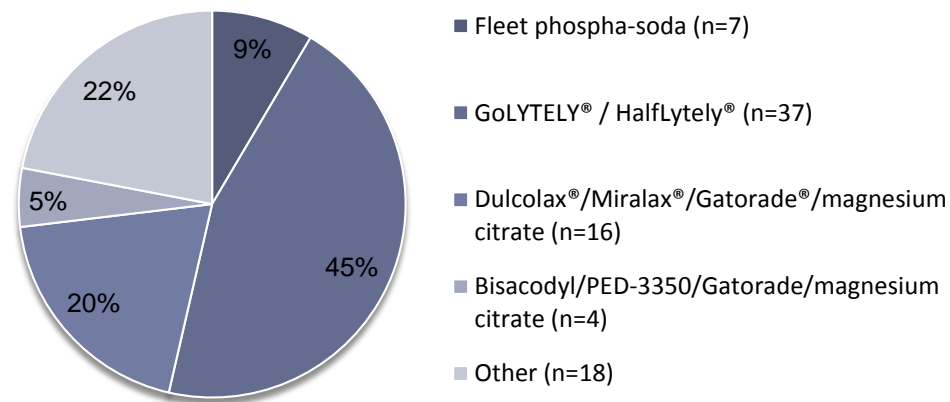
	Take home fecal occult blood test (gFOBT)	Fecal Immunochemical Test (FIT/iFOBT)	Flexible Sigmoidoscopy	Colonoscopy
Do you routinely recommend? n, %	Yes - 53 (37.9%) No - 67 (47.9%) Missing - 20 (14.3%)	Yes - 40 (28.6%) No - 71 (50.7%) Missing - 29 (20.7%)	Yes - 17 (12.1%) No - 100 (71.4%) Missing - 23 (16.4%)	Yes - 132 (94.3%) No - 8 (5.7%)
Recommended starting age n, %	30 years - 1 (0.7%) 40 years - 11 (7.9%) 45 years - 1 (0.7%) 50 years - 50 (35.7%) Missing - 77 (55.0%)	40 years - 8 (5.7%) 45 years - 1 (0.7%) 50 years - 37 (26.4%) Missing - 94 (67.1%)	40 years - 2 (1.4%) 50 years - 22 (15.7%) Missing - 116 (82.9%)	40 years - 4 (2.9%) 50 years - 125 (89.3%) 55 years - 1 (0.7%) 60 years - 1 (0.7%) Missing - 9 (6.4%)
Recommended frequency of testing in years - (yr.) n, %	1 yr - 45 (32.1%) 2 yr - 2 (1.4%) 3 yr - 4 (2.9%) 5 yr - 4 (2.9%) 6 yr - 2 (1.4%) Missing - 83 (59.3%)	1 yr - 32 (22.9%) 2 yr - 1 (0.7%) 3 yr - 3 (2.1%) 5 yr - 4 (2.9%) 6 yr - 2 (1.4%) Missing - 98 (70.0%)	2 yr - 3 (2.1%) 3 yr - 1 (0.7%) 4 yr - 1 (0.7%) 5 yr - 11 (7.9%) 8 yr - 1 (0.7%) 10 yr - 6 (4.3%) Missing - 117 (83.6%)	2 yr - 4 (2.9%) 3 yr - 3 (2.1%) 5 yr - 21 (15.0%) 7 yr - 3 (2.1%) 10 yr - 89 (63.6%) Missing - 20 (14.3%)
Is there an age at which you no longer screen healthy patients? n, %	Yes - 24 (17.1%) No - 33 (23.6%) Missing - 83 (59.3%)	Yes - 21 (15.0%) No - 21 (15.0%) Missing - 98 (70.0%)	Yes - 9 (6.4%) No - 14 (10.0%) Missing - 117 (83.6%)	Yes - 74 (52.9%) No - 43 (30.7%) Missing - 23 (16.4%)
If yes, age to no longer screen n, %	69 years - 1 (0.7%) 73 years - 1 (0.7%) 75 years - 7 (5.0%) 80 years - 8 (5.7%) 85 years - 4 (2.9%) Missing - 119 (85%)	69 years - 1 (0.7%) 70 years - 2 (1.4%) 75 years - 7 (5.0%) 80 years - 7 (5.0%) 85 years - 3 (2.1%) Missing - 120 (85.7%)	69 years - 1 (0.7%) 75 years - 6 (4.3%) 80 years - 2 (1.4%) 85 years - 1 (0.7%) Missing - 130 (92.9%)	69 years - 1 (0.7%) 70 years - 2 (1.4%) 73 years - 1 (0.7%) 75 years - 17 (12.1%) 80 years - 38 (27.1%) 85 years - 12 (8.6%) 90 years - 2 (1.4%) Missing - 67 (47.9%)

Table 2. Screening Test/Test Combination Recommended Most Often for Average Risk Patients.

Screening test	Frequency	Percent
Colonoscopy	71	50.7%
gFOBT + colonoscopy	24	17.1%
FIT/iFOBT + colonoscopy	17	12.1%
Guaiac of DRE specimen	13	9.3%
gFOBT	7	5.0%
FIT/iFOBT	5	3.6%
Sigmoidoscopy or sigmoidoscopy + gFOBT/FIT/iFOBT	3	2.1%

Respondents were asked which types of colonoscopy preparation they recommend. The most common response was not to order or recommend a preparation (38.6%). A number of these respondents noted that they leave it up to the gastroenterologist or surgeon performing the procedure to order the preparation. Of those indicating they order colonoscopy preparations, the most commonly ordered was a polyethylene glycol electrolyte solution (GoLYTELY® or Halflytely®) which includes the PEG- 3350 and bisacodyl tablets (Figure 3). Other responses (n = 10) included a variety of bowel cleansing agents and multiple combinations using Miralax®, Dulcolax®, magnesium citrate, and others . Several respondents reported using up to three to four preparations in combination. While the survey collected information on the bowel cleansing agents, it did not address dosage or timing of such agents in relationship to the procedure.

Figure 3. Recommended Colonoscopy Preparation by Providers (n=82)



Respondents rated whether the volume of specific CRC screening procedures ordered, performed, or supervised had increased or decreased (Table 3). Results indicated a decrease in the use of guaiac of DRE specimens, take-home gFOBT, and flexible sigmoidoscopy. Colonoscopy was reported to have increased the most, followed by FIT/iFOBT.

Table 3. Volume of CRC Screening Procedures

Screening procedure	Increased (over 20%) n (%)	Increased (0-20%) n (%)	About the same n (%)	Decreased (0-20%) n (%)	Decreased (over 20%) n (%)	Missing n (%)
Guaiac of DRE specimen	2 (1.4)	3 (2.1)	73 (52.1)	12 (8.6)	17 (12.1)	33 (23.6)
Take-home gFOBT	2 (1.4)	12 (8.6)	64 (45.7)	15 (10.7)	12 (8.6)	35 (25.0)
FIT/iFOBT	10 (7.1)	15 (10.7)	53 (37.9)	9 (6.4)	4 (2.9)	49 (35.0)
Flexible sigmoidoscopy	2 (1.4)	1 (0.7)	54 (38.6)	8 (5.7)	24 (17.1)	51 (36.4)
Colonoscopy	31 (22.1)	28 (20.0)	67 (47.9)	2 (1.4)	0 (0.0)	12 (8.6)

**Knowledge
and
Attitudinal
Factors**

Providers were asked about factors that influenced their recommendations for CRC screening. These factors included clinical evidence in published literature, published guidelines and recommendations from the US Preventive Services Task Force and the American Cancer Society, third party reimbursement, and availability of screening tests. Patient preference was also somewhat influential. Colleague practice was less influential (Table 4).

Table 4. Factors Influencing Recommendations for CRC Screening

Influencing Factor	Very influential n (%)	Somewhat influential n (%)	Not influential n (%)
Clinical evidence in published literature	99 (77%)	39 (27.9%)	0 (0.0%)
U.S. Preventative Services Task Force recommendations	93 (66.4%)	38 (27.1%)	7 (5.0%)
American Cancer Society guidelines	95 (67.9%)	41 (29.3%)	3 (2.1%)
Reimbursement by third party players, including Medicare / Medicaid	37 (2.64%)	54 (38.6%)	46 (32.9%)
Availability of screening test	45 (32.1%)	71 (50.7%)	19 (13.6%)
How my colleagues in my practice or community provide CRC screening	34 (24.3%)	61 (43.6%)	41 (29.3%)
My patient’s preference for CRC screening	57 (40.7%)	70 (50.0%)	8 (5.7%)
Cost of screening tests for patients with no third party coverage	59 (42.1%)	64 (45.7%)	12 (8.6%)

Respondents were asked to indicate which initial screening they would most likely recommend at various ages for patients, assuming the patient was asymptomatic and average risk, treated in an ideal setting, without systematic or financial barriers to receiving care, and without previous screening or expressed preferences for CRC screening. They were also asked for recommendations related to patients with underlying health risks.

Results demonstrated that colonoscopy was the most preferred screening test for healthy patients (see Table 5). Colonoscopy screening was most highly recommended for healthy 50- and 65- year old individuals (over 60%), followed by guaiac of DRE specimen (13% to 14%). Also recommended was the gFOBT and colonoscopy (8.6%) for both 50- and 65-year olds. For healthy 80-year olds, the most commonly recommended screening was colonoscopy (31%) followed by no screening (25%) and guaiac of DRE (18%). There were no providers who recommended gFOBT or FIT/iFOBT and sigmoidoscopy for any healthy patients, and these options were excluded from Table 5.

Table 5. Recommended CRC Screening Test for Healthy Patients by Age

Patient description	Test or test combination	Frequency	%
Healthy 50-year old	Guaiac of DRE specimen	20	14.3%
	Take home gFOBT	10	7.1%
	FIT/iFOBT	5	3.6%
	Flexible sigmoidoscopy	1	0.7%
	Colonoscopy	87	62.1%
	gFOBT and colonoscopy	12	8.6%
	FIT / iFOBT and colonoscopy	0	--
	No screening	5	3.6%
Healthy 65-year old	Guaiac of DRE specimen	18	12.9%
	Take home gFOBT	6	4.3%
	FIT/iFOBT	7	5.0%
	Flexible sigmoidoscopy	1	0.7%
	Colonoscopy	91	65.0%
	gFOBT and colonoscopy	12	8.6%
	FIT/iFOBT and colonoscopy	5	3.6%
	No screening	0	--
Healthy 80-year old	Guaiac of DRE specimen	25	17.9%
	Take home gFOBT	10	7.1%
	FIT/iFOBT	9	6.4%
	Flexible sigmoidoscopy	2	1.4%
	Colonoscopy	43	30.7%
	gFOBT and colonoscopy	2	1.4%
	FIT/iFOBT and colonoscopy	12	8.6%
	No screening	35	25.0%
	Other	1	0.7%

For individuals ages 50- and 65-years old with ischemic cardiomyopathy, dyspnea, and New York Heart Association (NYHA) Class II, colonoscopy remained the most recommended screening exam followed by non-invasive screenings including guaiac of DRE specimen, take home gFOBT, and FIT/iFOBT (Table 6). For individuals 80-years of age with ischemic cardiomyopathy 44% recommended no screening and 38% recommended a non-invasive screening method. There were no providers that recommended gFOBT or FIT/iFOBT and sigmoidoscopy for patients with chronic conditions, and these options were excluded from Table 6.

Table 6. Recommended CRC Screening Test for Patients with Chronic Conditions by Age

Patient description	Test or test combination	Frequency	%
50-year old with ischemic cardiomyopathy, who experiences dyspnea with ordinary activity (NY Heart Association Class II) treated with appropriate medication	Guaiac of DRE specimen	19	13.6%
	Take home gFOBT	19	13.6%
	FIT/iFOBT	14	10.0%
	Flexible sigmoidoscopy	6	4.3%
	Colonoscopy	60	42.9%
	gFOBT and colonoscopy	5	3.6%
	FIT/iFOBT and colonoscopy	5	3.6%
	No screening	1	0.7%
Other	5	3.6%	
65-year old with ischemic cardiomyopathy, who experiences dyspnea with ordinary activity (NY Heart Association Class II) treated with appropriate medication	Guaiac of DRE specimen	21	15.0%
	Take home gFOBT	18	12.9%
	FIT/iFOBT	15	10.7%
	Flexible sigmoidoscopy	4	2.9%
	Colonoscopy	57	40.7%
	gFOBT and colonoscopy	6	4.3%
	FIT / iFOBT and colonoscopy	5	3.6%
	No screening	4	2.9%
Other	5	3.6%	
80-year old with ischemic cardiomyopathy, who experiences dyspnea with ordinary activity (NY Heart Association Class II) treated with appropriate medication	Guaiac of DRE specimen	22	15.7%
	Take home gFOBT	17	12.1%
	FIT/iFOBT	14	10.0%
	Flexible sigmoidoscopy	1	0.7%
	Colonoscopy	12	8.6%
	gFOBT and colonoscopy	3	2.1%
	FIT / iFOBT and colonoscopy	2	1.4%
	No screening	61	43.6%
Other	2	1.4%	

Provider Beliefs

Beliefs related to effectiveness of screening procedures in reducing CRC mortality in average-risk patients aged 50 years or older were assessed. Table 7 outlines the provider responses by type of screening. Colonoscopy was rated highest by providers in terms of effectiveness. Colonoscopy was believed to be the most effective screening procedure. There were over 55% of providers who believed that the DRE was still a very or somewhat effective screening option. Over 7% of providers identified FIT/iFOBT as not effective and an additional 12% did not know the effectiveness of this screening option. Other test options that are not cited in the table included virtual colonoscopy (n=1), barium enema (n=1), and “camera swallow” (n=1); all were rated as very effective.

Table 7. Provider Beliefs Regarding Effectiveness of CRC Screening Procedures

How Effective is...	Very Effective n (%)	Somewhat Effective n (%)	Not Effective n (%)	Don't Know n (%)	Missing n (%)
Guaiac of digital rectal exam specimen	7 (5.0%)	72 (51.4%)	58 (41.4%)	--	3 (2.1%)
Take home guaiac-based 3-card Fecal Occult Blood Test (gFOBT) (e.g. Hemocult II, Hemocult Sensa, Coloscreen)	11 (7.9%)	112 (80.0%)	13 (9.3%)	1 (0.7%)	3 (2.1%)
Fecal Immunochemical FOBT (FIT/iFOBT) (e.g. Instant-View®, Insure!™, immoCARE®, MonoHaem®)	14 (10.0%)	90 (64.3%)	10 (7.1%)	17 (12.1%)	9 (6.4%)
Flexible sigmoidoscopy	27 (19.3%)	81 (57.9%)	20 (14.3%)	5 (3.6%)	7 (5.0%)
Colonoscopy	125 (89.3%)	8 (5.7%)	1 (0.7%)	--	6 (4.3%)

A number of questions specific to tests that used fecal samples were asked. Nearly all (84%) of the providers indicated use of these screening tests. Of those using the tests, 17% indicated using a single card in the office during a guaiac DRE exam exclusively, 41% provided or mailed the patient a kit to complete at home, and 25% report using both an in-office and mailed screening test. To assess any potential concerns about using gFOBT or FIT/iFOBT for the purpose of screening, providers were asked to respond to the common criticisms of these tests. The majority of respondents (70%) noted at least one concern about using (gFOBT) for CRC screening. The main concern identified was other tests are better for screening. Less concern was identified for false positives, false negatives, and poor patient compliance (Table 8). When asked about FIT/iFOBT testing, most respondents had concerns (56%) about the quality of one screening test over another as well as patient compliance (Table 8). Other concerns addressed included: cost, patient acceptance, not familiar with exam, and wrong end point.

Table 8. Number of Respondents Expressing Concern about Screening Test

Concern	gFOBT n (%)	FIT/iFOBT n (%)
False positives	45 (32.1%)	11 (7.9%)
False negatives	33 (23.6%)	10 (7.1%)
Too inconvenient for patients	17 (12.1%)	9 (6.4%)
Other tests are better for screening	49 (35.0%)	33 (23.6%)
Poor patient compliance	36 (25.7%)	28 (20.0%)
Not available in our facility	2 (1.4%)	18 (12.9%)
Too little time to discuss	4 (2.9%)	5 (3.6%)

In the case of a positive result, a large number of providers (82%) recommend a follow-up colonoscopy. A smaller number (14%) repeated the guaiac DRE specimen, gFOBT or FIT/iFOBT. Only two providers (1%) recommended a flexible sigmoidoscopy. One respondent stated a referral to a gastroenterologist. Respondents were asked whether they stopped the work-up if the second test was negative. Only four providers (2.9%) indicated they stopped the work-up. Most of the respondents did not complete the question (117 or 83.6%) which was most likely a response from those who did not use a second test. The usual process for follow-up of a positive guaiac of DRE specimen, gFOBT or FIT/iFOBT was the primary care provider (n=48 or 34.3%), the nursing staff (n=47 or 33.6%), or other clinic staff (n=4 or 2.9%) who contacted the patient by phone. Some providers (n=18 or 12.9%) scheduled a follow-up visit, only 5 (3.6%) mailed a patient letter. No process was reported by 7 (5.0%) and 11 (7.9%) did not complete the question.

Providers were asked to report on patient and system level barriers to CRC screening by asymptomatic, average-risk patients. Responses are summarized in Table 9. Most providers felt patients did not avoid the discussion of CRC screening. Only 13% indicated frequent avoidance of the discussion. Additionally, providers reported the majority of patients are aware of CRC screening (53%), and understand the information presented about CRC screening (60%). However, only 29% (n=40) reported that patients perceive CRC as a serious health threat. Providers reported that many patients (51%) are frequently concerned about costs, with 9% indicating additional concern about transportation to appointments.

Table 9. Providers' Report of Average-Risk Patients' Perceptions of CRC Screening

When you talk to your symptomatic, average-risk patients about CRC screening, how often do they...	Never n (%)	Rarely n (%)	Occasionally n (%)	Frequently n (%)	Very frequently n (%)
Not want to discuss CRC screening	10 (7.1%)	36 (25.7%)	73 (52.1%)	16 (11.4%)	2 (1.4%)
Have difficulty understanding the information I present about CRC screening	6 (4.3%)	78 (55.7%)	45 (32.1%)	6 (4.3%)	2 (1.4%)
Seem unaware of CRC screening	7 (5.0%)	67 (47.9%)	52 (37.1%)	9 (6.4%)	2 (1.4%)
Do not perceive CRC as a serious health threat	7 (5.0%)	33 (23.6%)	58 (41.4%)	32 (22.9%)	8 (5.7%)
Raise concerns about cost or lack of adequate insurance coverage for CRC screening	2 (1.4%)	18 (12.9%)	47 (33.6%)	52 (37.1%)	19 (13.6%)
Raise concerns about transportation to CRC screening appointments	18 (12.9%)	56 (40.0%)	51 (36.4%)	8 (5.7%)	5 (3.6%)

Other barriers to CRC screening were categorized as system-level barriers and were not highly cited (Table 10). The majority (62%) did not feel clinic time demands limited their ability to discuss CRC screening options with patients nor did they feel their time would have been better spent on other topics due to poor patient compliance with screening recommendations (79%). Finally, providers felt there was not a shortage of healthcare providers in the area to conduct screening other than gFOBT or FIT/iFOBT (79%).

Table 10. Other Factors Affecting CRC Screening Practices

Other Factors	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
Clinic time demands limit my ability to adequately discuss CRC screening options with patients.	25 (17.9%)	61 (42.6%)	22 (15.7%)	26 (18.6%)	4 (2.9%)
My clinic time is better spent on other topics due to poor patient compliance with screening recommendations.	34 (24.3%)	77 (55.0%)	21 (15.0%)	6 (4.3%)	1 (0.7%)
There is a shortage of trained providers in my geographic area of practice to conduct screening other than gFOBT or FIT/iFOBT.	41 (29.3%)	70 (50.0%)	14 (10.0%)	11 (7.9%)	3 (2.1%)

Discussion

A total of 140 healthcare providers completed the survey and roughly one-half were physicians, while others were mainly physician assistants and nurse practitioners. The survey response rate was 21%. While this is disappointing, no remuneration was offered to providers for their time and effort. This was an experienced group of providers with only 25% having fewer than 5 years of experience.

This study confirms results of other studies demonstrating the increased recommendation and use of colonoscopy for CRC screening. (Nodora et al., 2011; White, Sahu, Poles, & Francois, 2012). The majority of providers identified colonoscopy as the most effective CRC screening procedure. Most other tests were identified as somewhat effective. While colonoscopy is recommended in the guidelines, patient preference and cost are also recognized barriers to the use of colonoscopy. Providers noted other screening tests were recommended but to a lesser extent. Other combinations most frequently recommended for average-risk patients were gFOBT and colonoscopy (17%) and FIT/iFOBT and colonoscopy

(12%). It was noted that although colonoscopy was reported as most highly recommended, over one-third of responding providers still recommended guaiac of DRE testing. This method of screening is limited due to the high probability of false positives, false negatives and dietary influences (Collins, Lieberman, Durbin, & Weiss, 2005). Only 32% of respondents noted the limitation of false positives and 24% noted concerns about false negatives. While this seems to be a contradiction, CRC screening guidelines state that any screening or combination of screening tests (if colonoscopy is refused) is better than no screening; however, other methods of fecal testing were recommended, but the options do not include the guaiac testing of a DRE (US Preventive Services Task Force (USPSTF), 2008).

Providers were asked about their practice regarding recommended starting ages for CRC screening and frequency of testing. The assessment of colorectal cancer screening by the USPSTF (2008) concluded that CRC screening from ages 50 to 75 years demonstrated a substantial benefit for average-risk patients. They also concluded that the net benefits of screening those aged 76 to 85 are small, and for those over 85 years of age the benefits of screening do not outweigh the risks. The majority of providers in this study recommended screening for each of the screening tests to begin at age 50; however, a few recommended starting at younger ages. For colonoscopy, a majority recommended a screening age cut-off of 80 years of age. For other screening tests, the age to stop screening was most often left blank. This omission may indicate a need for additional knowledge of the current guidelines related to age and risk/benefit ratio of CRC screening.

Frequency of testing for the guaiac of DRE specimen, gFOBT, and FIT/iFOBT was most often reported as annually. The USPSTF (2008) guidelines suggest the following regimens are equally effective in life-years gained (assuming 100% compliance): (a) annual high-sensitivity fecal occult blood testing, (b) sigmoidoscopy every 5 years combined with high-sensitivity fecal occult blood testing every three years, or (c) screening colonoscopy every 10 years. Based on the provider responses, it appears that the majority of the respondents for each question may have some understanding of the guidelines. It is not possible to fully determine this based on the questionnaire. However, the responses also indicate that further education would be beneficial related to starting and stopping ages for screening of average-risk individuals and screening intervals.

Respondents were asked to indicate which screening test would be used for average-risk and greater-risk patients at various ages. The preferred screening test for average-risk patients of ages 50, 65, and 80 years of age was colonoscopy. For patients with NYHA Class II ischemic cardiomyopathy, colonoscopy was the preferred screening test for those age 50 and 65 years of age. For those with ischemic cardiomyopathy age 80 years, the majority recommended no screening.

These responses appear to be consistent with guidelines. A number of respondents chose various tests or combinations which may be appropriate depending on the screening interval. There were 13-18% of providers who consistently recommended guaiac of DRE specimens, even though this test is not included in the screening guidelines (USPSTF, 2008). Guaiac of DRE specimens lacks control as dietary recommendations prior to the specimen collection may not have been given or followed and the sensitivity for CRC detection is very low (4.9%) (Collins et al., 2005).

When asked about volumes of CRC screening tests, a substantial increase was reported in colonoscopy and FIT/iFOBT, while guaiac of DRE specimens and flexible sigmoidoscopy decreased. This change in frequency appears to reflect the changes in guidelines for CRC screening (USPSTF, 2008).

Responses to questions on colonoscopy preparation indicated that providers use or order a variety of preparation solutions and sometimes a combination of preparatory resources are used. The most recommended preparation remains the polyethylene glycol electrolyte solution, either used alone, or in combination with other options. This most likely reflects the ongoing issues related to adequate preparation of the colon and patient acceptability and tolerance of preparation. A limitation of the survey was that the dosage of bowel cleansing preparations, timing of preparations, and patient's ability to complete the preparation were not explored (Arora et al., 2013; Manes et al., 2013).

Follow-up to positive guaiac, gFOBT, or FIT/iFOBT test was reported as primarily colonoscopy, which follows USPSTF (2008) recommendations. The follow-up is usually conducted by a provider or nurse in the clinic, mostly through a telephone call. A few providers reported having no standard process in place.

Providers were asked about barriers to CRC screening. The literature cites patient-level and system barriers such as unwillingness to discuss testing, perceived risk of CRC and cost (Dolan, 2005; Dolan, Boohaker, Allison, & Imperiale, 2013). Providers in this study reported that a majority of patients are willing to discuss CRC screening and have some knowledge about the tests. Providers did identify that some patients do not perceive CRC as a serious health threat. The greatest patient concern identified was the cost of screening. Current information from the CDC (2013) suggests that CRC screening tests other than colonoscopy are routinely covered by health insurance, while screening colonoscopy is not consistently covered. Other clinic demands were identified as occasional or frequent system barriers by 35% of respondents.

Conclusion

The majority of respondents appear to have knowledge of the current CRC screening guidelines. There are a number still using guaiac of DRE testing even though there are problems with false positives and negatives and the test is not within the current USPSTF (2008) guidelines. The greatest barriers to CRC screening appear to be the cost, especially for colonoscopy, followed by time in the clinic for discussion of screening options.

This is a self-report assessment which has inherent limitations and may not reflect actual daily practices; however, it indicates that a good number of the respondents are aware of current recommendations. There is room for improvement and continued education to assure consistency of, and access to, appropriate CRC screening across the state.

Recommendations

Based on the findings of this study, we offer the following ideas toward enhancing healthcare provider knowledge, practice and beliefs related to CRC screening:

1. Offer continuing education for all healthcare providers specifically related to CRC screening guidelines with emphasis on age and risk guidelines and the lack of evidence for continued use of guaiac of DRE testing.
 - a. Publish educational pieces on current CRC screening guidelines in journals and other places that reach SD healthcare providers.
 - b. Offer public education related to CRC screening methods and the importance of early detection.
2. Lead policy work to influence insurers to cover CRC screening colonoscopy per current guidelines.
3. Further study of colonoscopy preparation to determine actual problems such as timing of preparations, amount of preparation, quality of preparation methods, and both tolerance and adherence to preparatory procedures.

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Appendix A

Colorectal Cancer (CRC) Screening Recommendations and Practices

1. Which of the following best describes your training?

- Physician
 Nurse Practitioner
 Physician's Assistant
 Other: _____

2. How many years have you practiced since finishing your training?

- Less than 5 years
 15-20 years
 5-10 years
 More than 20 years
 10-15 years

3. How effective do you believe the following screening procedures are in reducing colorectal cancer (CRC) mortality in average-risk patients aged 50 years and older?

How Effective is...	Very Effective	Somewhat Effective	Not Effective	Don't Know
Guaiac of digital rectal exam (DRE) specimen				
Take home guaiac-based 3-card Fecal Occult Blood Test (gFOBT) (e.g., Hemoccult II, Hemoccult Sensa, Coloscreen)				
Fecal Immunochemical FOBT (FIT/iFOBT) (e.g., Instant-View®, InSure!™, immoCARE®, MonoHaem®)				
Flexible sigmoidoscopy				
Colonoscopy				
Other (specify): _____				

4. Please complete the table below based on your recommendations to asymptomatic, average-risk patients (in good health for their age) for CRC screening. Please respond based on how you actually practice even if this differs from how you would like to practice under ideal circumstances.

Do you routinely Recommend...	Your Recommended Starting Age	Your Recommended Frequency of Testing	Is there an age at which you no longer recommend screening for <u>healthy</u> patients?
Guaiac of DRE specimen <input type="checkbox"/> Yes <input type="checkbox"/> No	_____ Years	Every _____ Years	<input type="checkbox"/> Yes Age _____ <input type="checkbox"/> No
Take home fecal occult blood test (gFOBT) <input type="checkbox"/> Yes <input type="checkbox"/> No	_____ Years	Every _____ Years	<input type="checkbox"/> Yes Age _____ <input type="checkbox"/> No
Fecal Immunochemical Test (FIT or iFOBT) <input type="checkbox"/> Yes <input type="checkbox"/> No	_____ Years	Every _____ Years	<input type="checkbox"/> Yes Age _____ <input type="checkbox"/> No
Flexible Sigmoidoscopy <input type="checkbox"/> Yes <input type="checkbox"/> No	_____ Years	Every _____ Years	<input type="checkbox"/> Yes Age _____ <input type="checkbox"/> No
Colonoscopy <input type="checkbox"/> Yes <input type="checkbox"/> No	_____ Years	Every _____ Years	<input type="checkbox"/> Yes Age _____ <input type="checkbox"/> No
Other: _____	_____ Years	Every _____ Years	<input type="checkbox"/> Yes Age _____ <input type="checkbox"/> No

5. How often do you present more than one test option when discussing CRC screening with your average-risk patients?

- Never
 Sometimes
 Rarely
 Usually

6. Indicate the screening test or test combination you recommended most often for average-risk patients? (Please choose only one.)

- Guaiac of DRE specimen
 gFOBT + Sigmoidoscopy
 gFOBT
 gFOBT + Colonoscopy
 FIT/iFOBT
 FIT/iFOBT + Sigmoidoscopy
 Sigmoidoscopy
 FIT/iFOBT + Colonoscopy
 Colonoscopy

7. Which initial screening would you be most likely to recommend for the following patients? Assuming these patients are:

- Asymptomatic and average-risk;
- Treated in an ideal setting, without systemic or financial barriers to receiving care; and
- Without previous screenings or expressed preferences for colorectal cancer screening

	What test or test combination would you <u>usually</u> order?	
a. Healthy 50-year old?	<input type="checkbox"/> Guaiac of DRE specimen <input type="checkbox"/> Take home gFOBT <input type="checkbox"/> iFOBT/FIT <input type="checkbox"/> Flexible sigmoidoscopy	<input type="checkbox"/> Colonoscopy <input type="checkbox"/> No screening <input type="checkbox"/> Other: _____
b. Healthy 65-year old?	<input type="checkbox"/> Guaiac of DRE specimen <input type="checkbox"/> Take home gFOBT <input type="checkbox"/> iFOBT/FIT <input type="checkbox"/> Flexible sigmoidoscopy	<input type="checkbox"/> Colonoscopy <input type="checkbox"/> No screening <input type="checkbox"/> Other: _____
c. Healthy 80-year old?	<input type="checkbox"/> Guaiac of DRE specimen <input type="checkbox"/> Take home gFOBT <input type="checkbox"/> iFOBT/FIT <input type="checkbox"/> Flexible sigmoidoscopy	<input type="checkbox"/> Colonoscopy <input type="checkbox"/> No screening <input type="checkbox"/> Other: _____
d. 50-year old with ischemic cardiomyopathy, who experiences dyspnea with ordinary activity (NY Heart Association Class II) treated with appropriate medication	<input type="checkbox"/> Guaiac of DRE specimen <input type="checkbox"/> Take home gFOBT <input type="checkbox"/> iFOBT/FIT <input type="checkbox"/> Flexible sigmoidoscopy	<input type="checkbox"/> Colonoscopy <input type="checkbox"/> No screening <input type="checkbox"/> Other: _____
e. 65-year old with ischemic cardiomyopathy, who experiences dyspnea with ordinary activity (NY Heart Association Class II) treated with appropriate medication	<input type="checkbox"/> Guaiac of DRE specimen <input type="checkbox"/> Take home gFOBT <input type="checkbox"/> iFOBT/FIT <input type="checkbox"/> Flexible sigmoidoscopy	<input type="checkbox"/> Colonoscopy <input type="checkbox"/> No screening <input type="checkbox"/> Other: _____
f. 80-year old with ischemic cardiomyopathy, who experiences dyspnea with ordinary activity (NY Heart Association Class II) treated with appropriate medication	<input type="checkbox"/> Guaiac of DRE specimen <input type="checkbox"/> Take home gFOBT <input type="checkbox"/> iFOBT/FIT <input type="checkbox"/> Flexible sigmoidoscopy	<input type="checkbox"/> Colonoscopy <input type="checkbox"/> No screening <input type="checkbox"/> Other: _____

8. Which type of colonoscopy preparation do you recommend?

- Do not order/recommend colonoscopy prep
- GoLYTELY/Half Lytely (PEG-3350 with electrolytes)
- Visicol
- Dulcolax/Miralax/Gatorade/Magnesium Citrate
- Fleet Phospho-Soda
- Bisacodyl/PED-3350/Gatorade/Magnesium Citrate
- MoviPrep
- Other: _____

9. Over the past 3 years, has the volume of CRC screening procedures that you order, perform, or supervise:

	Increased Substantially (over 20%)	Increased Somewhat (0-20%)	Stayed About the Same	Decreased Somewhat (0-20%)	Decreased Substantially (over 20%)
Guaiac of DRE specimen					
Take-home gFOBT					
FIT/iFOBT					
Flexible sigmoidoscopy					
Colonoscopy					

10. For the majority of your patients, by what means do you conduct gFOBT or FIT/iFOBT for screening purposes?

- Complete a single card in the office during a digital rectal exam
- Give or mail patients kits to complete at home
- Both of the above
- I do not use gFOBT or FIT/iFOBT in my practice

11. Which of the following do you usually recommend to a healthy, average-risk patient as an initial follow-up step to a positive guaiac of a DRE specimen, FOBT, or iFOBT/FIT? (Please choose only one.)

- Repeat Guaiac DRE specimen, gFOBT, or iFOBT/FIT
- Flexible sigmoidoscopy
- Colonoscopy
- Double contrast barium enema
- Other (specify): _____

Do you stop the work-up if the second one is negative?

- Yes
- No

12. Is there a usual process for follow-up of positive guaiac of DRE specimen, gFOBT, or iFOBT/FIT?

- Yes, primary care provider contacts by phone
- Yes, nursing staff contact patient by phone
- Yes, primary care provider follow-up visit
- Yes, other clinic staff contact patient by phone
- Yes, letter sent to patient
- No process in place

13. Do you have any concerns using the guaiac-based fecal occult blood test (gFOBT) for CRC screening?

- Yes
- No

- Too many false positives
- Too many false negatives
- Too inconvenient for patients
- Other tests are better for screening
- Poor patient compliance
- Not available in our facility
- Too little time to discuss
- Other: _____

14. Do you have any concerns using the fecal immunochemical test (FIT or iFOBT) for CRC screening?

- Yes
- No

- Too many false positives
- Too many false negatives
- Too inconvenient for patients
- Other tests are better for screening
- Poor patient compliance
- Not available in our facility
- Too little time to discuss
- Other: _____

15. To what extent are the following factors influential in your recommendations for CRC screening?

How influential is...	Very Influential	Somewhat Influential	Not influential
Clinical evidence in the published literature			
U.S. Preventive Services Task Force recommendations			
American Cancer Society Guidelines			
Reimbursement by third party payers, including Medicare/ Medicaid			
Availability of screening tests (other than gFOBT or FIT/iFOBT)			
How colleagues in my practice or community provide CRC screening			
My patients' preferences for colorectal cancer screening			
Cost of screening tests for patients with no third party coverage			
Other (specify): _____			

16. When you talk to your asymptomatic, average-risk patients about CRC screening, how often do they:

	Never	Rarely	Occasionally	Frequently	Very Frequently
Not want to discuss CRC screening					
Have difficulty understanding the information I present about CRC screening					
Seem unaware of CRC screening					
Do not perceive CRC as a serious health threat					
Raise concerns about cost or lack of adequate insurance coverage for CRC screening					
Raise concerns about transportation to CRC screening appointments					
Other (specify): _____					

17. How strongly do you agree with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Clinic time demands limit my ability to adequately discuss CRC screening options with patients					
My clinic time is better spent on other topics due to poor patient compliance with screening recommendations.					
There is a shortage of trained providers in my geographic area of practice to conduct screening other than gFOBT or FIT/iFOBT.					

18. Is there anything else you would like to tell us about colorectal cancer screening in your practice?

Thank you for taking time to complete this survey! Please mail the completed survey in the self-addressed/postage paid envelope.

Return address: Amanda Mitchell, SDSU College of Nursing; Box 2275; Brookings, SD 57007