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A Multilevel Approach to Understand the Context and Potential Solutions for Low Colorectal Cancer (CRC) Screening Rates in Rural Appalachia Clinics

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Abstract

Purpose: To explore system/staff- and patient-level opportunities to improve colorectal cancer (CRC) screening within an 11-clinic Federally Qualified Health Center (FQHC) in rural Appalachia with CRC screening rates around 22%-30%.

Methods: Using a convergent parallel mixed-methods design, staff (n = 26) and patients (n = 60, age 50-75, 67% female, 83% <college, 47% Medicare, 23% Medicaid) were interviewed about CRC-related screening practices. Staff and patient interviews were guided by the Consolidated Framework for Implementation Research and Health Belief Model, respectively, and analyzed using a hybrid inductive-deductive approach.

Results: Among staff, inner setting factors that could promote CRC screening included high workplace satisfaction, experiences tracking other cancer screenings, and a highly active Performance Improvement Committee. Inner setting hindering factors included electronic medical record inefficiencies and requiring patients to physically return fecal tests to the clinic. Outer setting CRC screening promoting factors included increased Medicaid access, support from outside organizations, and reporting requirements to external regulators, while hindering factors included poor social determinants of health, inadequate colonoscopy access, and lack of patient compliance. Among patients, perceived screening benefits were rated relatively higher than barriers. Top barriers included cost, no symptoms, fear, and transportation. Patients reported high likelihood of getting a stool-based test and colonoscopy if recommended, yet self-efficacy to prevent CRC was considerably lower.

Conclusions: Contextualized perceptions of barriers and practical opportunities to improve CRC screening rates were identified among staff and patients. To optimize multilevel CRC screening interventions in rural Appalachia clinics, future quality improvement, research, and policy efforts are needed to address identified challenges.

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Keywords

cancer early detection; colorectal cancer; community health centers; health status disparities; implementation science

In the United States, colorectal cancer (CRC) is the third most common cancer and second leading cause of cancer deaths.[1] Importantly, there are clear screening guidelines and strong evidence that CRC screening decreases CRC incidence and mortality by 30%-60%.[2] Over recent years, CRC screening rates have improved nationally due to heightened emphasis and screening initiatives aimed at improving CRC screening rates to >80% of age-eligible individuals.[3] Nonetheless, CRC screening rates remain below this goal with national estimates indicating that CRC screening rates are approximately 63%.[1] However, in many US rural and medically underserved regions, CRC screening rates are dramatically lower than national averages and targets. For example, the CRC screening rate among age-eligible individuals was about 22%-30% for the targeted patient population of this research, a Federally Qualified Health Clinic (FQHC) network serving the rural southwest Virginia region of Appalachia.

Unfortunately, lower CRC screening rates and higher CRC cancer mortality are associated and are clustered at the community or population level.[4,5] Numerous social determinants of health and population-level risk factors contribute to these CRC disparities, such as high poverty rates, low health literacy, geographical barriers, cultural norms and attitudes, and chronic barriers to accessing preventive services.[6-10] Likewise, many clinics in rural and medically underserved areas may have limited capacity to prioritize cancer prevention and control initiatives. This is due, in part, to limited resources and high patient demand for chronic disease self-management and complaint-driven primary care.[11-13] Both patient-level barriers and practice challenges faced by staff and systems must be addressed to improve documented CRC screening disparities.

Effective CRC screening strategies are highlighted in several systematic reviews.[13-16] For example, the Community Preventive Services Task Force (CPSTF) found that multicomponent interventions combining 2 or more strategies (ie, increasing community demand, community access, and/or provider delivery of screening services) are most effective in improving CRC screening rates.[15] Similarly, a recent systematic review focused on rural and low-income populations identified clinic-based components that are highly effective (ie, provider ordered inclinic distribution, kits by direct mail, use of self-addressed stamped envelopes, and client reminders).[16]

Collectively, these reviews highlight the need to address system-, staff-, and patient-level barriers when aiming to improve CRC screening.[13-16] Focusing on barriers and opportunities among clinics as well as patients' perceived barriers in accessing CRC screening services in rural, medically underserved areas fills a critical gap in the CRC screening literature by focusing on the need for multilevel interventions adapted to specific environments.[16] Despite literature relevant to system-level CRC screening,[12,17-19] no known research has focused on the unique perspectives and experiences of front-line clinic staff, especially in rural Appalachia where CRC screening rates are often low (ie, <40% of age-

eligible adults). While some patient-level CRC screening barriers can be gleaned from the literature,[20] rural Appalachian residents are known to have unique micro- and macrolevel barriers (eg, cancer information seeking behaviors, fatalistic attitudes toward cancer, access to health care, and cancer treatment).[21-29] Furthermore, Appalachia is consistently designated as a high cancer burden area, with high allcause cancer incidence rates and mortality rates, which is indicative of low cancer screening rates.[30,31] As such, understanding patient-level barriers and opportunities is a necessary component of any effort aimed at increasing community demand and/or increasing community access to CRC screening in this notably rural, underserved region.

The purpose of this multilevel study was to explore system/staff- and patient-level barriers and opportunities to improve CRC screening within Stone Mountain Health Services (SMHS), a multiclinic FQHC in the rural southwest Virginia region of Appalachia. Specifically, at the system/staff level, the Consolidated Framework for Implementation Research (CFIR) was applied to explore perceptions of SMHS staff regarding organizational practices pertaining to CRC screening.[32] At the patient level, the Health Belief Model (HBM) was applied to explore factors influencing CRC screening behaviors.[33] This manuscript details emergent barriers and facilitators to CRC screening and potential strategies to improve rates and reduce disparities within the context of rural Appalachia.

Methods

Design

This mixed-methods, multilevel study explored the CRC screening experiences of both SMHS staff and patients. A convergent parallel mixed-methods design was used, whereby quantitative and qualitative data were collected simultaneously, analyzed independently, and then triangulated during the data interpretation phase.[34,35] Interview scripts included open-ended qualitative questions and quantitative rating questions. This research was approved by the Institutional Review Boards at SMHS and the University of Virginia (UVA). Informed consent was obtained and all interviews were audio recorded. Staff and patients received a $50 and $25 gift card, respectively, for their participation.

Context

SMHS is an 11-clinic FQHC located across 7 of the most rural counties in southwest Virginia, including categories 7, 8, and 9 as defined by the Rural-Urban Continuum Codes (9 = most rural).[36] SMHS employs nearly 200 people, including 20 medical providers, and delivers quality health care to approximately 20,000 patients a year. SMHS provides care for many who would otherwise not have access, including uninsured, Medicaid, and low-income patients. The 2017 and 2018 Uniform Data Systems (UDS) CRC screening rates of age-eligible patients (50-75 years) reported by SMHS averaged about 22% and 30%, respectively, across the 11 clinics. Each FQHC is required to report UDS figures annually to the Health Resources and Services Administration, and these data are taken from their electronic medical record (EMR) system.[37] When this research originated, there were no initiatives aimed at understanding and applying evidence-based strategies to increase CRC screening at SMHS.

In response to the identified CRC need and priority, this research was conducted in conjunction with a newly formed multidisciplinary, community-academic Cancer Control Leadership Team from SMHS and the UVA Cancer Center. The Leadership Team was formed to collaboratively direct all phases of the research and a participatory research approach was used to develop this team's capacity.[38,39] This team comprised 4 SMHS (ie, 1 physician/medical director, 1 PhD-level psychologist and Behavioral Health and Wellness Services Director, 1 Clinical Network Support Technician, and 1 staff nurse) and 6 UVA Cancer Center (ie, 4 PhD-level researchers, 1 research associate, and 1 health educator) personnel. The team met monthly via video conference and in-person for half-day meetings twice per year. An overarching goal was to build research capacity among this Leadership Team through an adapted rapid-cycle research process aimed at understanding the unique context of low CRC screening rates and ultimately advance toward solution development and testing.[40]

System/Staff-Level Guiding Framework and Data Collection Instrument

The CFIR includes 39 factors across 5 domains (ie, intervention characteristics, outer setting, inner setting, process, individual characteristic) that influence system-level intervention implementation and has been applied widely in general health systems research and specifically to cancer screening initiatives.[12,17,18,32,41] Given the formative phase of this research, the semistructured staff interview script was developed to capture the CRC screening clinical workflow process and to explore 2 CFIR domains, inner setting and outer setting factors, that influence CRC screening. Additionally, staff were asked to rate 6 statements pertaining to their perceptions of patient CRC screening barriers.[42]

System/Staff-Level Sample and Data Collection

Of 11 SMHS clinics, a purposive sample of 6 clinics was chosen to represent diversity in current CRC screening rate, rurality status of clinic location, patient demographics, clinic volume, and number of staff. Within the 6 clinics, a purposive sample of staff was invited to participate, including all providers (ie, physicians and nurse practitioners), as well as select nursing staff, managers, and administrators. Two PhD-level researchers performed 1-on-1 interviews with staff between April and May 2019. Interviews were conducted in a private room within the clinic facility or by phone and lasted approximately 42 (range 23-62) minutes.

Patient-Level Guiding Theory and Data Collection Instrument

The HBM is a behavior change model that has been widely applied to understand health-related behaviors, including the uptake of health services and cancer screenings.[33,43,44] This model posits that an individual′s perceived severity, susceptibility, benefits, and barriers in combination with cues to action and self-efficacy can explain engagement in health-related behaviors. These perceptions can be further influenced by individual characteristics such as demographic, psychosocial, knowledge, and other structural variables.

The patient instrument was drafted based on the HBM, other existing cancer screening literature, and established CRC screening measures.[5,45-47] The instrument was pilot tested with 4 individuals representing the targeted region and revised accordingly. The final

instrument comprised 10 sections, including 8 CRC-specific sections (ie, knowledge, provider CRC screening recommendations, perceived susceptibility/risk, perceived barriers, perceived benefits, perceived severity, cues to action, and self-efficacy) and 2 general sections (ie, personal history of cancer and cancer screenings, demographics).

Patient-Level Sample and Data Collection

A convenience sample of patients from the 6 clinics was invited to participate. The sampling strategy included interviewing about 10 patients from each clinic, age 50-75 years of age, and who were not up-to-date with their CRC screening as indicated by EMR, or until data saturation was achieved. To achieve this, the SMHS Clinical Network Support Technician performed an EMR review to identify age-eligible patients who were not up-to-date with their CRC screening (ie, no record of a colonoscopy within 10 years or a stool-based test within 1 year) and who had an upcoming appointment. Then, SMHS mailed letters to eligible patients inviting them to participate. When patients attended their appointment, the study was verbally introduced and interested patients signed a release form to share their contact information with the research team. Once the release form was signed, the patient information was given to the research team who called patients to obtain consent and conduct the interview. At least 4 attempts were made to contact patients. Three trained UVA research staff conducted the interviews by telephone between June and October 2019. Interviews averaged 36 (range 19-55) minutes.

Data Analysis

All staff and patient audio files were transcribed verbatim. NVivo 12 (QSR International, Doncaster, Australia) software was used to manage the coding process.

System/staff-level data were analyzed using a hybrid inductive-deductive qualitative approach.[48,49] Coding took part over several phases. First, using past literature and postinterview memos, an initial codebook was developed that reflected the 2 CFIR domains (ie, inner and outer setting) and initial codes within each domain (eg, support for CRC screening process). Using the codebook, each transcript was coded by 2 trained researchers. Coders met to resolve discrepancies and, if an agreement could not be reached, a third coder helped resolve discrepancies. During this process, coders also identified emerging subcodes (eg, mailing back completed FOBT tests), met to discuss these new subcodes, and expanded and refined the codebook to formalize subcode definitions. Coders then followed the same procedure to subcode within the original coded transcript sections. Finally, 2 researchers verified that each discrete code and subcode aligned with the definition and also mapped subcodes to CFIR constructs (eg, implementation climate, patient needs, and resources). Also, to differentiate consistencies related to future strategies that staff suggested to improve CRC screening, the number of staff responses that aligned with codes were tallied.

For patient-level data, a similar hybrid inductive-deductive qualitative approach was used.[48,49] Using a coding structure guided by the HBM (eg, barriers, selfefficacy), initial transcripts were coded by a single coder. The HBM codes were then reviewed by 2 additional coders and emerging subcodes were identified.

Quantitative data were entered into SPSS (IBM Corp., Armonk, NY) and explored with descriptive statistics. Internal reliability of scales was determined with Cronbach alphas. In the final analysis step, data triangulation was conducted to elucidate consistencies and contradiction between staff and patient data as well as between quantitative and qualitative data strands.[34]

Results

System/Staff-Level Findings

Table 1 describes the 26 staff who participated from the 6 SMHS clinics. Interviews ranged from 2 to 9 per clinic, depending on the practice size.

Table 2 describes SMHS′s clinical workflow processes related to CRC screening. Overall, staff generally believed that they have a good process for CRC screening and that this process has been helped by Medicaid expansion, yet it is hindered by lack of patient compliance. A few notable findings include limited and inconsistent processes for follow-up once a CRC screening test has been ordered, no option for mailing fecal occult blood tests (FOBT) directly to the lab or clinic, and lack of patient navigation to promote colonoscopy adherence.

Table 3 illustrates emerging factors that hinder and support CRC screening as aligned with CFIR constructs, along with representative staff quotes. At the inner setting, SMHS culture positively supports CRC screening, while implementation climate and readiness for implementation may both support or hinder CRC screening. More specifically, 3 factors that promoted CRC screening were satisfaction with SMHS workplace and mission, efforts to improve other screening rates (eg, mammograms, pap tests) within SMHS, and committees and training that support general organizational changes within SMHS. Two emergent inner setting obstacles included inefficiencies in the EMR and current protocol requiring patients to return FOBT tests to the clinic instead of mailing. The type of patient appointment can also support or hinder the ability to consistently address CRC screening, with lack of time to address screening during nonwellness-type appointments.

At the outer setting, external policies and incentives support CRC screening, while cosmopolitan (ie, the degree to which an organization is networked with other external organizations) may both support or hinder CRC screening, and patient needs and resources hinder CRC screening. More specifically, factors that could support CRC completion included increased insurance access, support from outside organizations, and reporting requirements to external regulators and/or funders. Emergent factors with potential to either support or hinder CRC screening included mixed experiences obtaining patient results from external health care providers and the patients′ traits and experience with completing CRC screening. Common emergent barriers in the outer setting included poor regional social determinants of health, limited colonoscopy access due to insurance and distance to facilities, and lack of patient compliance with CRC screening tests.

Table 4 details future strategies that staff suggested to improve CRC screening within SMHS. Staff most often mentioned strategies pertaining to patient education and awareness

building, making CRC screening more accessible (eg, free tests, incentives, FOBT mail-back options), supporting patient transportation, and establishing tracking and follow-up systems for noncompleted FOBT. Other strategies mentioned, but somewhat less frequently, were clinician-oriented promotion of CRC screening as a priority and having staff dedicated for CRC patient navigation.

When staff were asked to rate perceptions related to barriers their patients experience for completing CRC screenings (3-point scale; 3 = major, 2 = minor, 1 = not a problem), 4 statements rated as more major problems included "*Patient embarrassment or anxiety about screening tests*" (2.8 ± 0.4), "*Screening costs too much or insurance doesn´t pay*" (2.7 ± 0.7), "*Patient fear of finding cancer*" (2.4 ± 0.5), and "*Patient does not perceive CRC as serious threat*" (2.4 ± 0.7). Other statements such as "*Patient unaware of screening*" (1.7 ± 0.7) and "*Patient believes screening not effective*" (1.6 ± 0.5) were rated as more minor. Some staff specifically differentiated between FOBT and colonoscopies when providing a rating. In general, items related to patient embarrassment or anxiety as well as screenings costing too much or insurance not covering them were rated higher for colonoscopies than for FOBT.

Patient-Level Findings

Of the 698 invited patients, 110 (16%) signed a release form. Of these, 4 were age ineligible, 9 declined to participate, and 37 patients could not be reached. A total of 60 patients were interviewed and their characteristics are detailed in Table 1. Although the SMHS EMR data indicated that all interviewed patients were not up-to-date with CRC screening, upon interviewing patients and using standards of within 1 year for a stool-based test and 10 years for a colonoscopy, most patients (n = 33, 55%) self-reported being up-to-date with screening and fewer reported out-of-date with screening (n = 7, 12%) or unclear (n = 9, 15%). Of further interest, 49 (82%) reported ever being screened for CRC, including 33 with a colonoscopy, 10 with a stool-based test, 3 with a stool-based test and colonoscopy, 1 with a sigmoidoscopy, and 2 that were unclear.

Related to CRC screening knowledge, 42 (70%) patients correctly named or described at least 1 type of CRC screening test. Nearly all (n = 53, 88%) had heard of a colonoscopy, while half (n = 30, 50%) had heard of stool-basted tests. About half correctly reported that age 50 is recommended to start stool-based tests (n = 26, 43%) or colonoscopies (n = 30, 50%) and approximately one-third (n = 20, 30%) correctly reported that stool-based tests should be repeated annually.

Patients reported high levels of trust and long-standing relationships with their SMHS provider. Most patients (n = 48, 81%) reported being highly comfortable talking to their provider about CRC screening tests. Also, most patients (n = 44, 73%) recalled being told that they should get a CRC test.

Tables 5 and 6 illustrate quantitative and qualitative findings, respectively, relating to the HBM constructs. Among patients, perceived barriers were rated relatively low (12 items on a 5-point scale; Cronbach alpha = 0.83; 1.9 ± 1.5). The highest rated barriers included cost, no symptoms, fear, and transportation. These barriers were supported with qualitative data,

which also revealed the barrier of fear contextualized to negative personal and family experiences with colonoscopies (eg pain and complications).

Perceived CRC screening benefits rated high (5 items; Cronbach alpha = 0.74; 4.6 ± 0.9). In qualitative responses, several patients mentioned peace of mind and finding cancer early enough for treatment as CRC screening benefits.

Perceived CRC severity rated relatively high (4 items; Cronbach alpha = 0.66; 3.9 ± 1.2). Patients who rated severity more neutral often spoke of family or friends who were living CRC survivors. Also, most patients rated susceptibility as more likely (n = 12, 20%) or as likely (n = 25, 42%) when compared to the average person their age.

Finally, patients reported a high likelihood to get a stool-based test (4.7 ± 0.6) and colonoscopy (4.4 ± 1.1) if their provider would recommend it. Qualitative data related to cues to action show that patients spoke about trusting their provider, recommendations from providers, and CRC symptoms. Self-efficacy to get a CRC screening test was also high (4.6 ± 0.9) and qualitative data supported this ranking. However, self-efficacy to prevent CRC was rated much lower (3.0 ± 1.3). Patients often indicated that they did not understand the causes of CRC and felt like a CRC diagnosis was beyond their control.

Discussion

Our approach exemplifies collaboration between clinical and research partners and illustrates a rapid-cycle research process whereby contextual and practical problems within a health care delivery system were identified.[40] Likewise, understanding supports and barriers to CRC screening processes at the system/staff- and patient-levels yielded valuable information to design and evaluate future research studies and quality improvement projects in rural and underserved regions.

Across the staff interviews, there were 2 notable consistencies across all clinic sites. At the inner setting factor, there was overwhelming consistency in the confidence in SMHS culture and leadership, including the Performance Improvement Committee, to drive and support changes that could improve CRC screening. Also, issues pertaining to patient needs and resources (eg, limited colonoscopy access, poor social determinants of health) were recognized as major outer setting factors impacting CRC screenings. However, perceptions pertaining to CRC screening compatibility, relative priority, and available resources tended to vary and should also be considered as key targets for future quality improvement and research efforts.

When collectively interpreting the clinical workflow processes with other CFIR factors, 3 key potential inner level system improvements in CRC screening processes were identified. First, related to FOBT, there is no option for mailing tests, which may be related to low return rates. Second, there is no dedicated or consistent SMHS process for follow-up; therefore, FOBT follow-up is usually limited to subsequent appointments. Third, when colonoscopies are ordered, there are opportunities to improve patient navigation and to increase coordination of SMHS receiving results from external providers. Several outer setting areas for improvement were also identified, particularly related to external policies

and patient needs and resources. Given the relatively new Medicaid expansion in Virginia (effective January 2019), there are policy and reimbursement opportunities to increase Medicaid well visits to promote CRC and other cancer screenings. Also, related to relatively low patient awareness of screening recommendations and low self-efficacy to prevent CRC, focusing on patient activation with culturally appropriate and literacy-sensitive messaging is imperative and a key component of future multilevel CRC screening interventions.

Specific to the patient data, some interesting discrepancies between quantitative and qualitative data strands were apparent. Patients rated CRC screening barriers relatively low, yet articulated a myriad of barriers with specific personal examples. Alternatively, patients rated benefits to CRC screening as high, yet offered substantially less qualitative insight on potential benefits. As a whole, negative personal and family experiences with CRC screenings, and specifically colonoscopies, outweighed positive accounts. This emphasizes the need to increase CRC screening campaigns and interventions—specific to Appalachia communities—that highlight positive narratives and outcomes from early detection efforts.[50-52] Untangling and addressing the linkages from the HBM construct findings provides key contextual information to guide this process.

Several key consistencies and contradictions emerged when comparing clinician and patient data. Both staff and patients identified similar CRC screening barriers factors related to cost, fear of tests, transportation, and health literacy. These findings mirror those in previous studies.[20,53,54] However, staff rated patients′ awareness of CRC screenings as a somewhat lower issue. Yet, CRC screening knowledge and awareness deficits, especially for FOBT, were more apparent among patients. Second, patients reported high likelihood to follow through with a CRC screening test if recommended by their provider. This is in contrast to consistent compliance concerns noted by staff. Patient and provider communication challenges pertaining to compliance are evident across the literature and for multiple health outcomes,[55] yet they highlight a potential opportunity to better understand and address complex factors that contribute to CRC screening noncompliance for SMHS patients.

Strategies suggested by staff to improve CRC screening generally aligned with current research evidence on effective interventions. Outreach to increase patient uptake and access to CRC screening comprised the strategies most frequently mentioned by staff. Two specific strategy areas were education and awareness building, and lowering barriers by providing free tests and FOBT mail-back options. Outreach interventions are widely studied and recommended as effective, though components of such interventions are heterogeneous.[13,16,56] The proposed strategy of adding patient navigators is well supported in the literature. In 2 meta-analyses comparing patient navigation with usual care, CRC screening completion doubled,[13] and various health screenings including CRC increased by 2.5 times.[57] Supporting patient transportation access is a separate but related strategy, as patient transportation is a common barrier addressed by navigators.[58] Three proposed CRC strategies were based on clinician-directed changes: systems to track patients, processes to follow-up with patients, and promoting CRC screening as a high priority for staff. These strategies align with literature on quality improvement efforts such as academic detailing and practice facilitation. These approaches, often directed by external change agents, have been shown to be effective in yielding desired changes, but only when highly tailored to the

practice setting and comprehensive in addressing underlying barriers to change.[59] Combining these strategies with other interventions is recommended, as CRC screening evidence indicates that multicomponent interventions surpass the benefits of a single intervention.[13-16] Though staff did not suggest specific combinations of strategies, they saw opportunities to intervene at community, patient, and clinical staff levels. This indicates potential to develop and implement multicomponent interventions within SMHS.

Another important discovery in the execution of this research was inconsistencies in the EMR data capture regarding past CRC screening versus patient self-report. The SMHS EMR data query to identify age-eligible patients who were not up-to-date with CRC screening was established for this research. Yet of 60 interviewed patients, 49 (82%) self-reported ever being screened for CRC, and 33 (55%) were up-to-date with CRC screening. This inconsistency supports staffs' insights pertaining to frustration in coordinating and receiving patient results from external providers. Because CRC screening (ie, colonoscopy) in rural settings can often involve places of service and providers outside the patient′s primary provider health system, it can be challenging for clinics to retrieve and assemble data elements into a single screening status indicator. Data-capture barriers are not unique to SMHS and are apparent in the broader body of literature.[60] However, the extent of these barriers may be exacerbated within FQHC networks in rural, medically underserved regions.[61] Critical, rate-limiting factors seem to include reliance on external providers for colonoscopies and lack of interoperability among EMR systems to easily share reports. The latter has received relatively little attention in the literature on CRC implementation in rural practice areas where health care can be disjointed. Notably, patient′s CRC screening results must be on record and in the EMR to count toward UDS reporting requirements. As such, systematically validating CRC screening data in the EMR is an important priority, yet potentially resource intensive. This data validity finding, that cuts across several CFIR domains, helps inform future quality improvement and research efforts.

Limitations

Several study limitations should be considered. Most important, the under sampling of patients with no previous CRC screening or out-of-date CRC screening should be considered when interpreting the patient data. Despite the systematic EMR approach to identify patients and the important data gleaned from this research, additional efforts are needed to reach a representative sample of patients who are not in compliance with CRC screening guidelines. Second, the likelihood of social desirability response bias as well as self-selection bias for patients willing to participate in a cancer screening study should be considered when interpreting these findings. Finally, the unique southwest Virginia region of rural Appalachia and targeted SMHS network may limit generalizability of findings beyond this region and the FQHC system. These limitations should be considered within the key study strengths, including application of existing theory, use of a robust analysis approach, and a process guided by participatory research principles in a rural area with high cancer burden.

Advancing through steps of the rapid-cycle research process,[40] study findings have been shared with SMHS, along with evidence-based summaries from the CRC screening literature. As a result, SMHS has self-initiated solution development and implementation

strategies with a quality improvement project for mailing stool-based kits directly back to the lab and/or clinic. Troubleshooting and evaluation of this process is ongoing, including alignment with evidenced-based approaches.[62] The Leadership Team continues to meet monthly to apply research findings to plan the next steps. Notably, SMHS is planning an EMR change over the next several months. There is optimism that this EMR switch will address some of the internal challenges reported and can be leveraged as a key component of future system-level CRC screening interventions.

Conclusions

The disproportionate rates of advanced CRC in rural Appalachia are highly preventable, and perhaps most profoundly exemplify the important gaps and missed opportunities that exist in rural regions to lower cancer mortality. This mixed-methods study identified contextualized clinical workflow processes, inner setting factors, and outer setting factors that should be targeted in future quality improvement, research, and policy efforts across the multiclinic FQHC network. Likewise, this study revealed key patient barriers including cost, lack of symptoms, fear, transportation, and limited self-efficacy to prevent CRC that need to be addressed in future multilevel interventions aimed at improving CRC screening rates in rural Appalachia. By elucidating perceptions of CRC screening barriers and opportunities among patients and staff, the SMHS-UVA Cancer Control Leadership Team will be able to better adapt and implement future CRC interventions.

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Table 1

Characteristics of Staff (n = 26) and Patients (n = 60)

Staff	**n (%)**
Role/title	
Physician	3 (12%)
Nurse practitioners	7 (27%)
Clinic nursing staff	10 (38%)
Lab nursing staff	3 (12%)
Manager	1 (4%)
Administrators	2 (8%)
Length in current position	
<2 years	3 (12%)
2-5 years	10 (38%)
6-10 years	3 (12%)
>10 years	10 (38%)
Patients	n (%)
Gender	
Female	40 (67%)
Male	20 (23%)
Education	
Did not complete high school	11 (18%)
High school graduate	23 (38%)
Some college	16 (27%)
College graduate	10 (17%)
Race/ethnicity	
Non-Hispanic White	58 (97%)
Other	2 (3%)
Marital status	
Married	37 (62%)
Single, widowed, or divorced	23 (38%)
Employment status	
Working full or part time	10 (17%)
Retired	25 (42%)
Unemployed	1 (2%)
Disabled	21 (35%)
Homemaker	3 (5%)
Health insurance status	
Medicare alone	20 (33%)
Medicaid alone	9 (15%)
Medicare and Medicaid	9 (15%)
Medicare and private or other insurance	8 (13%)
Private insurance alone	7 (12%)

Staff	n (%)
Uninsured	6 (10%)
Other/don't know	1 (2%)
Financial security	
Living comfortably on present income	15 (25%)
Getting by on present income	35 (58%)
Difficulty getting by on present income	9 (15%)
Refused	1 (2%)
Health literacy: How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor of pharmacy?	
Never	30 (50%)
At least some of the time	30 (50%)
Personal history of cancer	
Yes	18 (30%)
No	42 (70%)
Family history of cancer	
Yes	51 (85%)
No	9 (15%)
Family history of CRC	
Yes	18 (30%)
No	42 (70%)

Table 2

Clinical Workflow Processes Related to Patient Completion of CRC Screening Tests Within Stone Mountain Health Services (SMHS)

CRC Process Step	Specific CRC Actions
Identification if patient needs CRC screening test	• Identify patients by age (50-75), family history, symptoms. • Part of the Medicaid Wellness Visit. • Use EMR to identify if needed.
Selection of CRC screening test	• Providers (ie, physicians and nurse practitioners) often want to choose colonoscopy as it is perceived as the better test, but patients are more willing to do FOBT. Usually provider ends up choosing the test the patient is most willing to complete. • FOBT is the most commonly ordered test compared to colonoscopy and Cologuard – FOBT: Usually the first-line screening test because of perception that patients are more accepting of the test and more likely to complete it than a colonoscopy. – Colonoscopy: A desirable first-line test if the patient is willing and/or if the patient has a strong family history, blood in stool, pain, or other abnormal findings. – Cologuard: Adoption has been slow and inconsistent across and within clinics. Those providers that use it do like it. • External (cost/transport) and internal (culture/psychological) barriers for patients to get a colonoscopy; therefore FOBT is generally better accepted by patients
How staff communicate with patient about the CRC screening test	• Providers present the pro and cons of doing the test (share reasons why important to do, CRC is easily treated when caught early, do not always have symptoms, convenience of doing it in your home, why it is recommended). • Nurses conduct basic patient education of how to complete and return FOBT test • Providers and nurses may also share their own experience of completing the test as patients
Ordering process for CRC screening test	• There are different ordering processes for the different tests, yet clinics have fairly consistent process for ordering tests. – FOBT: (1) Provider or nurse gives patient the kit; (2) note in the chart that they have provided the test; EMR is marked as “test given,” no requisition given; (3) patient returns the completed test to the clinic; (4) nurse marks order as received in EMR, prints requisition and packs with sample to LabCorp; (5) results from Labcorp are routed directly to provider. – Colonoscopy: (1) Provider enters referral in chart, (2) SMHS referral staff take care of scheduling and contacting the patient, (3) mark as completed when they receive the results. NOTE: *This process is the same for regular and urgent colonoscopies*. – Cologuard (used by only a few providers): (1) The provider enters the order, (2) the nurse sends form by fax to Cologuard, (3) Cologuard contacts the patient and sends the kit directly to them, (5) patient sends kit by mail back to Cologuard company, (6) company reports result to clinic, (7) clinic identifies as complete.
Patient actions to complete the CRC screening test	• Patients’ actions to complete the test and adherence vary by type of test. – FOBT: Completed kits are returned to the clinic (drop off at the front desk) instead of mailing directly to LabCorp. Nonreturned kits are a problem. – Colonoscopy: Once referral is made, patients are on their own to make it to the appt. No-shows are a problem. – Cologuard: Patient must mail sample (via only UPS?) within 24 hours of completion.

CRC Process Step	Specific CRC Actions
How clinics follow-up about non-completed test	• Approaches vary by test. – FOBT: No dedicated SMHS process for follow-up; therefore, FOBT follow-up usually happens at a subsequent appointment. – Colonoscopy: Referral staff contact patient to reschedule. – Cologuard: Cologuard company completes follow-up. No dedicated SMHS process for follow-up; therefore, FOBT follow-up usually happens at a subsequent appointment.
How clinics follow-up about abnormal CRC results	• Provider calls and sends a letter to the patient. • Provider starts referral process to a gastroenterologist for colonoscopy. Considerations about which facility include patient insurance, distance, and patient preference. • Most patients are compliant when their results come back abnormal and proceed to complete the colonoscopy.

Table 3

Inner Setting and Outer Setting Factors That Influence CRC Screening Within Stone Mountain Health Services (SMHS)

Emerging Factors	Specific CFIR Construct (Subconstruct)	Influence on CRC Screening Process	Representative Staff Quotes
Inner setting			
Staff report high satisfaction with SMHS as a workplace and its patient-centered mission	Culture	Support	• "I like that we are not focused on who can pay and who doesn't. It doesn't matter. Everybody is treated the same regardless." – *Staff K*
SMHS has initiated other formal and informal efforts to improve screening rates and other health behaviors (eg, Flu-FIT trial, mammogram and PAP logs, clinic-based poster campaign of local people demonstrating healthy habits)	Implementation climate (compatibility)	Support	• "It was good that we of course got that education and got that out to a lot of people. So foot traffic. You know we had a lot of people that we only see during flu season." – *Staff M* • "I do think that the posters in the exam room help because it raises awareness to things that they need to be having checked on." – *Staff Z*
SMHS has well regarded processes that support organizational changes (eg, highly active performance Improvement committee and established system for staff training)	Implementation climate (learning climate) Readiness for implementation (leadership)	Support	• "And [the Performance Improvement Committee is] made up of a nurse practitioner. It's made up of our maintenance people. It's made up of front desk people. So it's not just providers. That have input to these changes." – *Staff C* • "We usually do webinars. Which is where the training and most of the trainings is done through the webinars. And everybody at each clinic is able to hear the conversations between others. We have monthly staff meetings." – *Staff D* • "On a performance improvement committee where all the time discussing ways to improve patient care and [name deleted] has become program manager over that. I really feel like it's an active committee." – *Staff S*
Efficient EMR use is challenging due to slow speed/connectivity, and difficulties in creating reports to track multiple patients	Readiness for implementation (available resources)	Hinder	• "Sometimes our system is can be slow, which could be a little bit of the issue as well. It gets you behind. As far as everything. Because once you get behind you know you're pretty much behind. All day long." – *Staff D*
Current protocol is that patients must return FOBT test to clinic instead of mailing to company	Implementation climate (compatibility)	Hinder	• "Actually we tell them they can't mail it because they have to put the specimen in it and we actually have to put a lab requisition with it and work it through like a lab to send it to [lab vendor]." – *Staff G*
The type of patient appointment impacts the ability to consistently address CRC screening—wellness-type appointments are much more conducive than same-day acute visits	Implementation climate (relative priority; compatibility)	Support/ hinder	• "[Medicare Wellness Visit] gives us more of an opportunity to reach more because the order automatically goes in with that. And so we just automatically try to give everybody [an FOBT kit] that comes in for those visits." – *Staff G* • "[Y]ou have a patient with 10 problem list and you get to address the one, the most one that you need to use at this time. And then you end up having to say OK you might have to come another time. But for some of them they don't come another time." – *Staff T*
Outer setting			
Insurance access through Medicare (eg, wellness visits) and Medicaid (eg, state expansion) have increased	External policy and incentives	Support	• "I think the biggest thing was the [Medicare] wellness visits, they do on patients. I think that, that's really helped as far as from a nursing standpoint, my standpoint because it kind of forces you to go into

Emerging Factors	Specific CFIR Construct (Subconstruct)	Influence on CRC Screening Process	Representative Staff Quotes
ability to offer and patients to receive CRC screening			that patient's health maintenance. To look to see when the last colonoscopy was, to research if, if they've had one." – *Staff D*
			• "I mean in a lot of ways and we have our sliding fee numbers have gone down because of the Medicaid expansion. So I guess the only drawback is that there are a few that are being taken by certain specialists and things like that." – *Staff F*
Support from outside companies for follow-up (eg, Cologuard)	Cosmopolitanism	Support	• "Once we get the paper signed and send it to [the Cologuard company]. They're the ones following up with the patients saying you know have you got that done yet? You need to." – *Staff K*
Reporting requirements to external regulators and/or funders increase providers awareness of their screening metrics	External policy and incentives	Support	• "But since we have been [distributing Uniform Data Set results to providers] and they're seeing we have definitely seen improvement our meaningful use came up of each year it's come up a little bit more." – *Staff F*
Poor regional social determinants of health related to poverty, employment, transportation, insurance, interpersonal support systems	Patient needs and resources	Hinder	• "Probably most in this area will be transportation that will be their biggest [barrier]. Even though Medicaid now will provide transportation for them." – *Staff A* • "… elderly patients that are widowed or …kids living farther away, so they don't really have that support system to kind of encourage or to help bring them, as far as transportation goes to bring him to the doctor. Or the extra money to." – *Staff D* • "And I hate to say that but I do [delay FIT test]. I've done that a couple of times because like if they're in between jobs and it's hard. I mean this is a poverty area here. I have some patients a lot of patients who don't have any income coming in… I may delay a FIT test for six months or so until they're financially able to do it." – *Staff H*
Limited colonoscopy access due to insurance, distance to facilities	Patient needs and resources	Hinder	• "I've had several Medicare and Medicaid but Medicare suddenly I can't remember which one they were they couldn't cross state lines. And that really puts the other problem here when the two major or the three major health centers are all in Tennessee." – *Staff F*
Lack of patient compliance when offered or provided with test due to perceptions about CRC screening, cancer screening in general, or other reasons	Patient needs and resources	Hinder	• "I would say it helps as far as helping patients understand more, but as far as the compliance goes, I just feel like most of these mountainous people or rural community, I think the belief system is what is what kind of holds them back from being compliant." – *Staff D*
Staff members have mixed experiences obtaining results from external health care providers (ie, colonoscopy)	Cosmopolitism	Support/ hinder	• "And then we also try to get copies of those [colonoscopy] reports. Which is definitely a struggle to get the reports back after we send somebody." – *Staff K* • "The place that I go will send the results back. You have them the next day. So yeah that kind of makes my choice easy where I go. I want somebody that's going to be interactive with my provider." – *Staff E*
Traits (eg, gender) and the individual experience (eg, family history, symptoms) of patients influence the completion of CRC screening tests	Patient needs and resources	Support/ hinder	• "I feel like women are a lot more open and follow through with it. Men, and maybe it's because, in my opinion it's because we all start with screenings this early, I mean women are kind of desensitized to it because we talk about cervical, we talk about breast we are kind of used to that conversation." – *Staff M* • "Maybe not even education so much people that are. More financially stable now seem to be more open to preventative medicine than those that are not." – *Staff C*

Table 4

Staff Suggested Strategies to Improve Completion of CRC Screening Tests Within Stone Mountain Health Services (SMHS)

CRC Strategy	Count of Staff Recommending Strategy	Representative Staff Quotes
Patient education, awareness building, and outreach to increase motivation and dispel myths through in office and/or outside of office efforts	21	• "I think better or stronger patient education for screening process and benefits of the screening process, maybe provide handouts in the waiting areas or even to mail out to the patients to let them know that hey we offer this service to help teach them the benefits of actually getting the colorectal screenings regularly. [*Giving patients information out in the waiting room?*] Offering it there or in the rooms or even patients that are on Medicare or over the age of 50 try to you know send them out a pamphlet or include it with their appointment information." – *Staff B* • "One more if we had a way to do like on the TV. [OK.] Informational videos I think would be awesome……. and I like those because no matter you know like the TV or the tablet something they could watch that we you push a button, start it for them. Then you don't have to worry about people being able to read or to." – *Staff K* • "Mainly some way to educate that that they would be easily available to them that you could educate people on the importance of the screening and the rates of success if they have had screening and identify polyps let them know you know that that's could be something precancerous. Get rid of it now and then just teach them if you have more education out there." – *Staff L* • "I know we do a lot of outreach things for black lung and for blood pressure checks but I think would be great for community organizations if we offered a cancer outreach screening and education. Even partner with some of the local larger businesses. You know that set at the table in their lunch lunchroom or offered as scheduled appointments where they can have their pap smear and all that schedule for them and just big picture that'd be great to partner with some of the big businesses and corporations." – *Staff Q* • "I think we can probably do a little bit more raising awareness about colorectal cancer or maybe do like normalize it a bit more like breast cancer, and breast cancer awareness because that's so common and everybody talks about that. When it comes to something like this, especially the people in this area there's like a big stigma I think that it's hush hush and you don't want to get that done." - *Staff G*
Make CRC screening more accessible to patients by offering free tests, incentives, or mail-back option for FOBT	10	• "That [they] would be able to send it off from home with a prepaid envelope. I think would be huge." – *Staff C* • "I would say the money is always a motivator but that's for us that's not feasible." – *Staff J* • "You know we talked about that being able to mail it in and that might help streamline it a little." – *Staff M*
Establish systems that could support patient transportation barriers	9	• "Consulting with the patient to get dates that are good to try to help get them transportation scheduled prior to scheduling the appointment to ensure that they do have transportation before we actually schedule." – *Staff B* • "If they provide maybe a voucher a taxi voucher to and from." – *Staff C* • "And then you know, if there's a transportation barrier or something like that you can you can try to come up with some other transportation and things like that…" – *Staff F*
Establish a system for following up with patients about noncompleted FOBT tests	9	• "I think communication. I just think communication. Good communication with the patient and friendly reminders that of that it's needed and to get it back in first screening test back and things like that." – *Staff F* • "I mean I think it would just be a reminder. And like you kind of touched on this if they were maybe a little bit on the hesitant side maybe just that little extra. Well you know that nurse actually care enough to call me and ask me maybe it's really important that you go ahead and do this and take it back." – *Staff I* • "I really think if we had a reminder system in place like we do for our pap smears and mammogram and you know our pap smear and mammogram numbers aren't astronomical or off the charts but I think they're getter than our colorectal." – *Staff Q*

CRC Strategy	Count of Staff Recommending Strategy	Representative Staff Quotes
Establish a system for tracking noncompleted FOBT tests	8	• "OK so me I would have EMR that would show you those that are lacking kind of like a kind of we have like a little sticky up." – *Staff J* • "Well, I think maybe to concentrate on it just like we do on paps and mammograms. Establish a report of who is due, who needs one, call those people, mail them letters and keep a log of that so that it's readily available all we have to do is open a book or print off a report so that it's not so time consuming for us to have to sit down and pull up each individual patient and try to find that information." – *Staff L* • "Well one, I think we need to do a better job of tracking them and reminding them that it's due." – *Staff Q*
Increase CRC screening as priority for staff through training and practice changes	5	• "I think we just have to keep reminding our providers and the staff…. measures, our meaningful use, and trying to get everybody … to understand why it's necessary. And then for them to also stress to their own staff. It's okay for us to keep stressing it but then you have to stress it to your own staff. Why this needs to be done. And I tell them to go over it with them when you get your report card from us on what you're doing or not doing. Then you need to go and if you think you were doing this and you weren't then you just sit down with your staff and find out." – *Staff F* • "…. Everybody just do it when they are supposed to. [All the patients doing it?] And some of the providers. We do have providers that don't. They just don't order it." – *Staff P*
Have staff that could dedicate time to supporting patient navigation through the CRC screening process	5	• "I think there needs to be more nurses. I had proposed a long time ago I mentioned it to [name redacted] a while back. As you know every provider really needs two nurses, one for paperwork. So there's a lot of that, phone calls, triaging because we get a lot of phone calls for Med refills. That's very common. Even though we tell him to call the pharmacies, we still get phone calls. So that is a lot. And then the nurse that actually tries patients and does that type of work." – *Staff J* • "Just staffing maybe would be one. Like I said we all do so much and all try to pull it and help each other out doing everything. I think it might be hard to find. Just like to designate one person or if we all kind of apart to do a little bit here." – *Staff G*

Table 5

Patients' Quantitative Ratings of CRC Screening Barriers, Benefits, Severity, Susceptibility, Cues to Action, and Self-efficacy (n = 60)

Underlying Theory of Planned Behavior Domain	
Perceived barriers to CRC screening	Mean (SD)
The cost would keep you from having a CRC screening test.[a]	3.0 (1.7)
You do not need to do a CRC screening test because you have no problems or symptoms.[a]	2.1 (1.6)
You are afraid to have a CRC screening test because you might find out something is wrong.[a]	2.1 (1.6)
Transportation problems would keep you from having a CRC screening test.[a]	2.0 (1.6)
Having a colonoscopy/FS is painful.[a]	1.9 (1.4)
You do not know how to do a stool-based test (such as a FIT or FOBT).[a]	1.8 (1.5)
Collecting a stool sample to do a stool test is unpleasant for you.[a]	1.8 (1.3)
You do not have the time to do a CRC screening test.[a]	1.7 (1.4)
You are afraid to have a colonoscopy/FS because of the possibility there may be complications[a]	1.7 (1.3)
You feel anxious about having a colonoscopy/FS because you do not really understand what will be done.[a]	1.6 (1.2)
Having to follow a special diet and take a laxative or enema would keep you from having colonoscopy/FS.[a]	1.5 (1.1)
You do not have the privacy to do a stool test.[a]	1.3 (1.0)
Perceived benefits to CRC screening	Mean (SD)
Getting checked regularly for CRC increases the chances of finding cancer when it is easier to treat.[a]	4.8 (0.6)
CRC screening tests will help find CRC early.[a]	4.8 (0.7)
Finding CRC early will save your life.[a]	4.6 (0.8)
A CRC screening test will help you not worry as much about CRC.[a]	4.6 (0.9)
A CRC screening test will decrease your chances of dying from CRC.[a]	4.1 (1.3)
Perceived severity of CRC	Mean (SD)
CRC would change your whole life.[a]	4.5 (0.9)
Side effects from CRC would last a long time.[a]	3.9 (1.1)
The thought of CRC scares you.[a]	3.9 (1.4)
You would not live longer than 5 years with CRC.[a]	3.3 (1.1)
Perceived susceptibility of CRC *(compared to the average person [man/woman] your age, how likely are you to get CRC?)*	n (%)
More likely	12 (20%)
As likely	25 (42%)
Less likely	12 (20%)
Don't know	11 (18%)
Cues to action for CRC screening	Mean (SD)
How likely it is that you would get a stool based CRC screening test if your doctor, nurse, or other health professional recommended it?[b]	4.7 (0.6)

Underlying Theory of Planned Behavior Domain	
How likely it is that you would get a colonoscopy/FS CRC screening test if your doctor, nurse, or other health professional recommended it?[b]	4.4 (1.1)
Self-efficacy	Mean (SD)
How confident you are that you know how to get a regular CRC screening test?[c]	4.6 (0.9)
How confident you are that you can prevent yourself from getting CRC?[c]	3.0 (1.3)

[a]Strongly disagree (1) to strongly agree (5).

[b]Highly unlikely (1) to highly likely (5).

[c]Lowest confidence (1) to highest confidence (5).

Table 6

Patients' Qualitative Perspectives Related to CRC Screening Barriers, Benefits, Cues to Action, and Self-efficacy (n = 60)

Specific Theory of Planned Behavior Constructs	Representative Patient Quotes
Perceived barriers to CRC screening	
Cost/Insurance	• "I've got crappy insurance. And, if they don't find if they do it and don't find. If they do the test and don't find nothing, its free. But if they go in there and find more polyps, you're charged so you know." – *Male, age 55-60*
	• "We do live, what I consider these days a third world country we're, we're backwoods, so the cost based on the insurances that I'm able to get. I know that it affects me on how often if the doctor does not prescribe it. I won't volunteer because of the cost." – *Male, age 60-65*
	• "The only thing that stops me on a lot of stuff right now is insurance. I don't have Medical insurance as of yet. I am disabled and no medical insurance so I have to search around for places that will get me help. That would be the only thing to slow me up." – *Male, age 55-60*
Transportation	• "Right now I have, there's four of us living in the house. We normally have two vehicles; we've had one broken down since January. Two of the four of us work and vehicles aren't around when you need it. … I have my two grandsons living here and that's a tough deal when neither of them have the vehicle. We're trying to get them to have jobs." – *Female, age 65-70*
Not necessary if there aren't symptoms	• "Because if there are no symptoms and no problems of any type, I can't see just searching in there to have stuff done." – *Female, age 55-60*
Fear of diagnosis	• "Well you know, sometimes you get it in your head that you don't really want to know, then you want to know. and you know…you figure that if you know you're going to be scared to death. Especially if you had a bunch in your family that passed away. I believe that there is a cure out there for cancer but you've got to have a whole lot of money to get it." – *Male, age 65-70*
Fears and beliefs about the procedure	• "Yeah I was scared the first time. Some say they hurt. Some say they didn't. Fear of the unknown." – *Female, age 55-60*
	• "My brother in law He had one [colonoscopy] and they found some polyps and took i guess a scrape or whatever they did and he got an infection. So that was a pretty big deal for him. It was serious." – *Male, age 65-70*
	• "I've got friends that have had colonoscopies that have ended up in ICU because their colon or stomach was damaged during the procedure, and that's another reason I won't do it." – *Female, age 65-70*
Perceived benefits to CRC screening	
Peace of mind because can know or catch early	• "The peace of my mind means a lot to me, and the raising of my children. I want to be here for them. As long as I can, and my wife." – *Male, age 60-65*
	• "Because a lot of it is curable, if you catch it in time." – *Male, age 60-64*
Cues to action for CRC screening	
Trust/respect their provider	• "You know I really, really like [provider's name]. And you know whatever she tells me I try to do it." – *Female, age 60-65*
Guidance from provider	• "Well I mean as far as actually get the test done I believe that all I would really need to do is get in touch with my doctor and she would make the arrangements and everything for me. I would like to think that. That's why I said a five." – *Female, age 60-65*
If have symptoms	• "Well I'll tell you if I told him I was having any symptoms and he recommended one I would certainly do it." – *Female, age 70-75*

Specific Theory of Planned Behavior Constructs	Representative Patient Quotes
Self-efficacy to get a regular CRC screening test	
FIT test is simple (high efficacy)	• "I didn't use to like to do that [stool based screening] and then they showed me how easy it was it wasn't like what I thought it was going to be." – *Female, age 60-65* • "It [stool based screening] seems a lot easier with no preparation. No drinking that stuff and having to go to the hospital and having to have a driver. So it would be a lot simpler." – *Female, age 55-60*
Self-efficacy to prevent getting CRC	
Lack of knowledge (low efficacy)	• "I think it's very serious for anyone to look at especially for someone who doesn't and understand the causes. Right. I don't know. I have no clue what would cause colorectal cancer so I wouldn't have any idea how to you know take general preventative measures." – *Female, age 65-70*
Not all factors are in their control (low efficacy)	• "I mean nobody is going to prevent something they don't know is going to happen. What's going to happen. I mean you know the week after I got back from the gastroenterologist I could've got it." – *Male, age 55-60* • "Well, I don't know at this point in my life if I can prevent myself from getting it, you know, I'm 62." – *Female, age 60-65* • "Because I for one thing I feel that genetics, genetics have a lot to do with things. And I think screenings alone don't prevent those things." – *Female, age 65-70*