



Primary care clinicians' perceptions of colorectal cancer screening tests for older adults

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ABSTRACT

Colonoscopy is an effective screening test for colorectal cancer but is associated with significant risks and burdens, especially in older adults. Stool tests, which are more convenient, more accessible, and less invasive, can be important tools to improve screening. How clinicians make decisions about colonoscopy versus stool tests in older patients is not well-understood.

We conducted semi-structured interviews with primary care clinicians throughout Maryland in 2018–2019 to examine how clinicians considered the use of stool tests for colorectal cancer screening in their older patients. Thirty clinicians from 21 clinics participated. The mean clinician age was 48.2 years. The majority were physicians (24/30) and women (16/30). Four major themes were identified using qualitative content analysis: (1) Stool test equivalency - although many clinicians still considered colonoscopy as the test of choice, some clinicians considered stool tests equivalent options for screening. (2) Reasons for recommending stool tests - clinicians reported preferentially using stool tests in sicker/older patients or patients who declined colonoscopy. (3) Stool test overuse - some clinicians reported recommending stool tests for patients for whom guidelines do not recommend any screening. (4) Barriers to use - perceived barriers to using stool tests included lack of familiarity, unreturned stool test kits, concern for accuracy, and concern about cost.

In summary, clinicians reported preferentially using stool tests in sicker and older patients and mentioned examples of potential overuse. Additional studies are needed on how to better individualize the use of different colorectal screening tests in older patients.

1. Introduction

Colorectal cancer (CRC) is the third most common cancer diagnosis among men and women in the United States (Thanikachalam and Khan, 2019; Mármol et al., 2017; Amersi et al., 2005), and older adults are disproportionately affected by this disease - 42% of new CRC diagnoses are in patients 65 years and older (Nee et al., 2020). In fact, older patients (65+) are observed to have larger adenomatous polyps which may lead to higher rates of colorectal cancer in this population (Day and Velayos, 2015). Although screening for colorectal cancer offers the potential of early detection and reduction of cancer-related mortality and morbidity, it also can lead to harms and burdens for patients (Walter and Covinsky, 2001; Eckstrom et al., 2013; Wilt et al., 2015). Balancing the benefits and harms of screening can be particularly challenging in older

adults for several reasons. The risks of screening increase with age and with accumulation of chronic conditions which is common for older adults (Day et al., 2011a). Older adults often have competing health priorities and may have limited life expectancy from other health conditions that then reduce their likelihood to benefit from screening (Lee et al., 2013). Further, older adults have heterogeneous health status and health trajectories even among those with the same age (Reuben, 2009). Therefore, it is critical to individualize the screening decision to maximize benefit and avoid harm.

In the United States, large-scale screening programs have led to a significant decrease in CRC mortality (Siegel et al., 2017; Arnold et al., 2017). However, CRC screening of older adults remains challenging with literature showing that both under- and over-screening exist (Cokkinides et al., 2003; Seeff et al., 2002; Predmore et al., 2018).

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Appropriate CRC screening in older adults requires balancing the long-term benefits of screening with significant, often short-term, harms and communicating these benefits and harms with patients so they can make informed decisions (Kotwal and Schonberg, 2017). Older patients are at higher risks for complications and harms from screening colonoscopies (Kahi et al., 2007; Ho et al., 2017; Lin, 2014). Colonoscopy in older adults is associated with greater risk of perforation, gastrointestinal bleeding, and cardiovascular/pulmonary complications (Day et al., 2011b; Reumkens et al., 2016; Kim et al., 2019). Stool tests, which are more accessible and less invasive, offer important advantages over colonoscopy and the potential to reduce screening-related harms and burdens, especially for older adults.

In contrast to countries where systematic CRC screening occurs in the context of national health programs, CRC screening practices are much more heterogeneous in the United States (Navarro et al., 2017). In this context, clinicians play a critical role in CRC screening decisions of older adults (Hoffman et al., 2010). For over a decade, colonoscopy has been clinicians' preferred modality for CRC screening (Young and Womeldorph, 2013). Previous literature explored clinicians' perspectives on the use of older stool tests, such as fecal occult blood test (FOBT), and found that clinicians reported favorable attitudes of recommending colonoscopy relative to stool tests (Zapka et al., 2012; McGregor et al., 2010). Major barriers of using older stool tests included the potential to miss cancers, lack of patient acceptance, and concern about too many false positives (McGregor et al., 2010). These prior studies did not focus on older adults. Other studies explored clinicians' decision-making about CRC screening in older adults but focused on the decision to screen or not to screen and did not focus on the use of different types of screening tests (Lewis et al., 2013; Dalton et al., 2015).

More recently, newer stool tests with improved efficacy and accuracy have been developed, such as the fecal immunochemical test (FIT) and multitarget stool DNA test (mt-sDNA, commercially known as Cologuard). It is unclear how clinicians considered using stool screening for CRC among older adults (65+) given the improved technology and test options. This interview study aimed to address this knowledge gap by examining clinicians' perceptions of different CRC screening test options in older adults.

2. Methods

2.1. Study sample

As part of a larger mixed-methods study that explored decision-making about stopping routine cancer screening in older adults (Schoenborn et al., 2020a, 2020b), we conducted semi-structured in-depth interviews with clinicians who provided primary care to adults age 65+, including physicians, certified registered nurse practitioners, and physician assistants. In this paper, we focus on parts of the interviews where we explored clinician perceptions of CRC screening test options in older adults. This project was approved by the Johns Hopkins School of Medicine institutional review board.

2.2. Data collection

From October 2018 to May 2019, primary care clinicians were recruited via email from 3 academic primary care clinics, 3 geriatric clinical programs (an ambulatory clinic, a house-call program for homebound older adults, and a Program for All-inclusive Care of the Elderly), 20 community primary care clinics affiliated with Johns Hopkins Medicine, and 16 non-affiliated private practices in Maryland. We used maximum variation sampling to recruit clinicians from different clinic sites who varied in age, gender, clinician type, and specialty. One-on-one interviews with clinicians were performed in conference rooms and were audio-recorded. Clinician demographics were also collected from a brief survey.

The interview guide was pilot tested with two general internal

medicine faculties to ensure clarity and appropriateness. The interviews were semi-structured, meaning that questions developed a priori as part of the interview guide were asked but there were also spontaneous discussions that followed the flow of a specific interview conversation which allowed for new topics to emerge. As part of the larger study, the interviewer stated at the beginning of the interview that we wanted to know how primary care clinicians thought about cancer screening decisions in older patients (65+). We identified specific patients of each clinician with and without recent screening ahead of the interview and asked how the clinician arrived at the cancer screening decisions in each patient. We then asked more generally about how the clinicians considered cancer screening decisions in their older patients. Specific to this project, if the clinicians did not spontaneously mention stool tests when they discussed CRC screening in older patients, we then asked about how they considered stool tests compared to colonoscopies. We mentioned stool tests in general and also specifically asked about the newer options, including FIT and mt-sDNA. The interview questions are included in the Appendix.

2.3. Statistical analysis

From May to August 2019, the clinician interview audio-recordings were transcribed verbatim and analyzed using Atlas.ti textual data analysis software. The transcripts were iteratively reviewed and assessed for the emergence of new ideas or themes; data collection continued until no novel ideas were emerging and theme saturation was reached (Crabtree and Miller, 1999). Standard techniques of qualitative content analysis were used to code the transcripts (Hsieh and Shannon, 2005; Boeije, 2002). A preliminary coding scheme based on the interview guide was iteratively refined and applied to analyze the data using the constant comparative approach (Qaseem et al., 2019). All transcripts were coded independently by at least two investigators (NS, RP, JM). Content analysis generated major themes and sub-themes. The coders had regular meetings to discuss discrepancies until 100% agreement was reached by consensus.

3. Results

Thirty primary care clinicians from 21 different clinic sites participated in the study (Table 1). The mean clinician age was 48.2 years. The majority of clinicians were physicians (24/30) and women (16/30). Clinician specialties included 17 internal medicine, 6 family medicine, 2 medicine/pediatrics, 5 geriatric medicine. Interviews averaged 40 min.

Most of the participants' comments on stool screening focused on the newer test options. This was true even when the comments were unprompted – i.e. when we asked about CRC screening in general – or when prompted about stool tests in general without mentioning specific test types. Only three participants commented on FOBT specifically and we did not find thematic differences between these comments and those that focused on the newer testing options. Content analysis revealed four major themes and subthemes; these are presented below and illustrated using representative quotes.

- (1) Stool Test Equivalency: although many clinicians still considered colonoscopy as the test of choice, some clinicians considered stool tests equivalent options for screening.

Most clinicians primarily reported recommending colonoscopy for CRC screening and viewed that as the gold standard screening test; they then offered stool tests only as a secondary alternative in specific circumstances which we elaborate upon below in Theme 2. One clinician said: "It's usually colonoscopy first; if they're reluctant for whatever reason then we are switching to Cologuard now."

In contrast, a few clinicians viewed the stool tests as equivalent options for CRC screening in comparison to a colonoscopy. They described that they would present both colonoscopy and stool test options to

Table 1

Primary care clinician participant characteristics (From 2018 to 2019 in Maryland).

Characteristics	Number (%) / Mean (SD)
Age, years	48.2 (10.0)
Female sex	16 (53%)
Race	
White	18 (60%)
African American	6 (20%)
Asian	5 (17%)
Other	1 (3%)
Degree	
MD	21 (70%)
DO	3 (10%)
Certified Registered Nurse Practitioner	5 (17%)
Physician's Assistant	1 (3%)
Years since completing training	17.5 (10.2)
Specialty	
Internal Medicine	17 (57%)
Family Medicine	6 (20%)
Medicine/Pediatrics	2 (7%)
Geriatrics	5 (17%)
Number of clinic sessions (one 4-hour session) per week	7.4 (2.4)
Clinician affiliation	
Academic	11 (37%)
Group practice	14 (47%)
Private practice	5 (17%)
Self-reported proportion of patients aged 65 + in patient panel	
<25%	6 (24%)
25%–49%	10 (40%)
50%–74%	3 (12%)
>75%	6 (24%)

*Adapted from prior publication involving the same study population (Schoenborn et al., 2020a).

patients and asked the patients to decide. A clinician reported: “I consider them [stool test and colonoscopy] equal as far as their utility as screening tests, so I present them both to the patient and I say whatever you will actually get done is what I support you doing. And for most it's been the stool FIT test.”

- (2) Reasons for Recommending Stool Tests: clinicians reported preferentially using stool tests in sicker/older patients or patients who declined colonoscopy.

3.1. Patients at high risk for colonoscopy

Clinicians said that they primarily resorted to stool tests in patients who were older or otherwise considered too high risk for a colonoscopy because of their existing medical conditions. One clinician mentioned recommending colonoscopies until age 70 and recommending stool tests in patients older than 70: “I have a tighter [threshold] for colonoscopy.... Generally, I don't think of it for anyone ... after the age of 70 but if I am thinking about some kind of colon screening, then I'm thinking something less invasive so then I go for Cologuard.”

Other clinicians commented on using stool tests in patients with comorbidities that would make colonoscopy too risky or in patients who are on blood thinners. One clinician described considering the stool tests as much safer than colonoscopy: “I am a big fan of the FIT test... the risk benefit ratio is much better with the FIT test particularly in older patients. You have patients taking diuretics or patients that are a little hypotensive anyway, to think about putting them through a colonoscopy prep gives me pause. So, I would say if I have somebody that I'm on the fence with and I can do a FIT test instead of a colonoscopy I would encourage that for them.”

3.2. Patient burden

Many older patients often had mobility and/or transportation challenges that made it burdensome to get to the facility for a colonoscopy. A

clinician described choosing stool tests for a patient with schizophrenia whose son was already quite burdened with taking her to appointments: “Her son has to take off of work ...every time she goes anywhere... For the colonoscopy, people have to take off the whole day.”

3.3. Patient choice

Patient preference was a strong influence on the choice of screening tests. A clinician said: “I get patients that do ask about [stool tests], and I tell them that it's your personal preference.”

Clinicians often mentioned offering stool tests as alternatives when patients refused to undergo colonoscopy for various reasons: “So, the Cologuard we use quite a bit mostly in patients who are reluctant to have an invasive procedure.”

- (3) Potential Stool Test Overuse: some clinicians recommended stool tests for patients for whom guidelines do not recommend screening, suggesting potential overuse.

In patients with clearly limited life expectancies for whom guidelines do not recommend screening (Wolf et al., 2018; Rex et al., 2017), some clinicians mentioned that they stopped all screening including stool tests. One clinician commented that stool tests should not be ordered if patients would not be candidates for the downstream tests or treatment: “If the patient is too sick to have a colonoscopy no matter what... then don't offer a Cologuard. Because what are you gonna do if the guy is 90-years-old and you offer Cologuard and it's positive, what do you do then? ... In my mind, you only offer the Cologuard if you are actually gonna do something based on the result.”

However, other clinicians still suggested recommending stool tests for screening in patients with limited life expectancies because the upfront risk is low, especially if a patient requested to continue screening. A clinician commented on still offering stool screening in patients with advanced emphysema based on the patient's request for continued screening: “I used to have a lady with emphysema was on oxygen who's in her late 70 s and... she wanted colon cancer screening and we did Cologuard.”

One clinician commented on ordering stool tests in order to meet quality metrics that she was under pressure to meet: “We get scored on how well we are screening patients... up to the age of 70. If they are [under] 70 and I don't think they should have any more colorectal cancer screening I might still ask them to get a FIT so that my quality numbers are appropriate rather than having them just not be tested at all.”

- (4) Barriers to Use: barriers to using stool tests included lack of familiarity, unreturned stool test kits, concern for accuracy, and concern about cost.

Some clinicians were not very familiar with the newer stool tests. One clinician reported: “We are not using the [newer stool tests] here just quite yet. I guess they're not that common so I'm not that familiar with them. I'm still gonna [use] classic colonoscopy. I do know that there's new technology... but we are not that familiar so I don't know how reliable it is. I guess I need to do more research on that.”

Some commented that stool tests often do not get returned when they are ordered. A clinician stated: “It's hard to get people to do FIT tests; we hand out a lot of FIT tests that never get returned.”

Further, some clinicians were concerned that the stool tests are not as effective as colonoscopy in detecting advanced adenomas that are crucial in cancer prevention. One clinician explained: “[Cologuard] picks up like 90% of colon cancer but it only picks up about 15% of advanced polyps which is really what you want to find because you don't really care once they've had cancer already well then you're sort of behind the 8 ball. You're really trying to pick these up the advanced adenoma stage where they can remove the adenoma and hopefully prevent them from getting cancer.”

Lastly, some clinicians were concerned that stool tests are not cost-

effective since the newer options are almost as expensive as a colonoscopy. One clinician stated: “Current pricing [of] Cologuard is almost as expensive as a colonoscopy...if it comes up abnormal, then you still have to go back to the invasive diagnostic test so you’re spending more money that way.”

4. Discussion

4.1. Main findings

We examined primary care clinicians’ perceptions around CRC screening options in older adults. The findings of our study add to the literature since prior literature that examined clinicians’ views about stool screening tests did not focus on older patients nor the newer stool test options, including FIT and mt-sDNA (Zapka et al., 2012; McGregor et al., 2010). We found that clinicians still considered newer stool tests as secondary alternatives to colonoscopy and more often used stool tests in patients who were too high risk for colonoscopy, including sometimes in patients with limited life expectancies for whom guidelines recommend stopping screening (Wolf et al., 2018; Rex et al., 2017).

4.2. Interpretation of results

The new stool tests were developed under the premise that they would help improve the under-utilization of CRC screening (Issaka et al., 2019). Prior studies show mixed results regarding whether clinicians would be willing to use the newer stool tests if available (Redwood et al., 2019; Von Wagner et al., 2018). In our study, most clinicians mentioned that they would recommend colonoscopy as the initial CRC screening option while reserving the stool tests for patients who are not good candidates for colonoscopy. Specifically, clinicians reported using the stool tests more often in older patients with serious comorbidities and functional impairments for whom colonoscopy would be too risky, too burdensome, or who declined colonoscopies. These populations are not representative of the general population in which the stool tests were developed and validated (Issa and Nouredine, 2017), and these findings highlight the important question whether the efficacy of these tests can be generalized to these more vulnerable populations. This is an important knowledge gap, which coupled with the fact that most randomized trials of CRC screening have not included older adults (Wilson, 2010), highlight the uncertainty around the potential benefit versus harm these screening tests provide for these vulnerable older adults. Although clinicians reported that patient choice was a strong influence in choosing stool tests versus colonoscopy, they more often mentioned recommending stool tests after patient decline colonoscopy and less often reported that they would discuss all options equally. Future work may explore strategies to help clinicians more consistently present the pros and cons of all CRC screening options, which is important element of shared decision making.

There are previous reports on misuse of FOBT where patients did not meet criteria for CRC screening (Fisher et al., 2005; Carlson et al., 2011). Specifically, one study found that significant number of stool tests were performed in older veterans whose were not able to complete follow up colonoscopies due to comorbidities or were not interested in follow up colonoscopies (Carlson et al., 2011). Our findings raise a similar concern about the potential overuse of FIT and mt-sDNA tests in older patients with limited life expectancy since these tools are non-invasive and have low risks upfront. Better clinician education may be needed to coach clinicians to consider not only the harms related to the initial screening test but also the downstream cascade of more invasive tests and treatment. Further, it is important that clinicians discuss the downstream consequences of stool testing, such as follow up colonoscopies, with patients so patients can make informed decisions. Another contributor to the potential overuse of stool tests could be that CRC screening guidelines are changing, with more recent literature and guidelines emphasizing the consideration of health status and life expectancy in addition to simply age. Prior work has shown that clinicians may not be

as familiar with the newer paradigm of considering life expectancy and face barriers applying it in clinical practice (Schoenborn et al., 2020c, 2016). Currently there are no specific forums for systematic dissemination of cancer screening guidelines and it is incumbent on individual clinicians and/or health systems to seek and learn new information through scientific journals, professional/scientific meetings, or other Continuing Medical Education opportunities, none of which are necessarily topic or guideline specific. Identifying strategies to help clinicians stay informed and to implement newer screening methods and guidelines is an important next step. Some clinicians reported they were ordering these stool tests due to pressures of quality metrics. Recently, the National Committee for Quality Assurance (NCQA) made changes to exclude older adults with frailty and advanced illness from a number of quality measures, including CRC screening, which is a promising start to better align quality measurement and optimal patient care (Insurance, 2020).

Clinicians provided a number of reasons for the limited recommendation of stool tests. Barriers to using newer stool tests are similar to those previously reported with respect to FOBT screening (McGregor et al., 2010). The cited lack of knowledge about these tests could be improved by more extensive clinician education. Un-returned tests by patients could be targets for patient-facing interventions. Studies that directly target patients such as postcard reminders, call reminders, or directly mailed test kits to patients have shown promise to improve completion of stool tests (Coronado et al., 2018a, 2018b, 2020c; Mosen et al., 2010; Church et al., 2004). Clinicians raised valid concerns that stool tests were not accurate in detecting advanced adenomas. Future developments in stool screening tests need to focus on detecting advanced adenomas. Lastly, literature has shown that socioeconomically disadvantaged older adults are less likely to participate in FOBT (Weinrich et al., 1998). Given the relative high cost of the newer stool test options, some clinicians raised concern about the cost-effectiveness of this screening approach since a colonoscopy would still be needed in those who test positive with the stool tests. A modeling study among the Medicare population showed that the current cost of mt-sDNA every 3 years is \$350 but needs to be \$40–\$60 per test for it to be considered cost-effective (Lansdorp-Vogelaar et al., 2010).

4.3. Limitations

This study has several limitations. First, the sample size of participants was relatively small. The results may not be representative of clinicians’ perceptions elsewhere with different practice settings and socio-demographic characteristics. The results are likely specific to the clinicians within the US healthcare system and may not be applicable to those within other healthcare systems that employ population-based screening programs. In addition, given the small sample size, we are not able to comment on how clinicians’ responses may differ by participant characteristics (full time vs. part time, clinician specialties, etc). However, qualitative studies are designed to explore rich and in-depth information for hypothesis generation in areas where little is known (Crabtree and Miller, 1999). Third, the interviews were subject to social desirability bias; however, we attempted to limit this by communicating with the interviewees that their identity will be kept confidential. Fourth, the interviews focused on clinician perspectives and did not explore patient perspectives or shared decision making. Lastly, we assessed clinicians’ self-reports about their cancer screening decisions and recommendations but did not assess actual practice.

5. Conclusion

Though stool tests are increasingly being implemented as part of CRC screening, they are preferentially being used in older and sicker patients. Further research is needed in guiding clinicians to better individualize the use of different colorectal screening tests in older patients.

CRedit authorship contribution statement

Reuben Park: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Cynthia M. Boyd:** Funding acquisition, Validation, Writing - review & editing. **Craig E. Pollack:** Validation, Writing - review & editing. **Jacqueline Massare:** Data curation, Investigation, Methodology, Writing - review & editing. **Youngjee Choi:** Writing - review & editing. **Nancy L. Schoenborn:** Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Visualization, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Code of ethics: This project was approved by the Johns Hopkins School of Medicine institutional review board (IRB00164175). Physicians signed written informed consent.

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Appendix A. Supplementary data

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