

## BRIEF REPORT

# Patient, Clinician, and Communication Factors Associated with Colorectal Cancer Screening

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**Introduction:** Screening for colorectal cancer is beneficial. Yet, screening remains suboptimal, and underserved populations are at greater risk for not being appropriately screened. Although many barriers to screening are understood, less is known about how the decision-making process on whether to receive colonoscopy or stool testing influences screening.

**Methods:** As part of a randomized controlled trial to test engaging underserved populations in preventive care through online, personalized, educational material, 2417 patients aged 50 to 74 years were randomly selected from the 70,998 patients with an office visit the year prior and mailed a survey to assess decision-making for colorectal cancer screening. Twenty practices in practice-based research networks from 5 diverse states participated. Survey data were supplemented with electronic health record data.

**Results:** Among respondents, 64% were or became up to date with screening within 3 months of their office visit. The main factor associated with being up to date was the length of the patient-clinician relationship (<6 months vs 5+ years: odds ratio [OR], 0.49; 95% CI, 0.30-0.80). Sharing the decision about screening options with the clinician was a predictor for being up to date compared with patients who made the decision for themselves (OR, 1.75; 95% CI, 1.27-2.44). Only 36% of patients reported being given a choice about screening options. Traditional factors like race, employment, insurance, and education were not associated with screening.

**Conclusions:** Having a long-term relationship with a primary care clinician and sharing decisions may be key drivers to ensure evidence-based preventive care for underserved populations. (J Am Board Fam Med 2020;33:779-784.)

**Keywords:** Colorectal Cancer, Decision-Making, Early Detection of Cancer, Mass Screening, Physician-Patient Relations, Practice-Based Research, Primary Health Care, Surveys and Questionnaires, Vulnerable Populations

## Introduction

Colorectal cancer screening saves lives; yet, less than two-thirds of Americans who should be screened are up to date with screening.<sup>1</sup> Minorities, individuals

living in poverty, uninsured, and Medicaid beneficiaries disproportionately suffer greater morbidity and mortality from colorectal cancer.<sup>2</sup> Although there is some debate as to whether biologic factors contribute to disparities in colorectal cancer outcomes for minorities, there is clear evidence that a lack of screening, delays in starting screening, inadequate follow-up of abnormal results, and treatment delays

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are all factors.<sup>3,4</sup> Accordingly, a major focus of care has been to ensure that all adults age 50 to 74 years complete colon cancer screening.

Top barriers to screening include not knowing that screening is indicated, not being told by a clinician to be screened, financial concerns, misconceptions on benefits and harms of screening, fear about finding cancer, and test-specific barriers (eg, not wanting to handle stool or not wanting to do a bowel preparation).<sup>5</sup> Interventions such as one-on-one education, clinician and patient alerts and reminders, reduced out-of-pocket expenses, and reduced structural barriers have all been shown to increase screening rates.<sup>6</sup>

Although the barriers to screening are well documented and there are interventions to promote screening, less is known about the relative importance of patient, clinician, health system, and communication factors associated with recommended screening, particularly for more underserved populations. Knowing the relative importance of these barriers may help to inform which interventions should be prioritized for implementation.

## Methods

As part of a randomized controlled trial to evaluate engaging underserved patients in preventive care, we analyzed electronic health records (EHRs) and patient survey responses about clinical encounters. The full study protocol has been previously published, and the study and survey were approved by the Virginia Commonwealth University Institutional Review Board (HM15307).<sup>7</sup>

This study was conducted in 2 practice-based research networks (PBRNs): the Virginia Ambulatory Care Outcomes Research Network and the OCHIN community health information network. Twenty safety net practices and community health centers in 5 states with a wide geographic distribution participated. Among 70,998 patients seen for an office visit between November and July 2016, 4336 patients aged 40 to 75 were randomly mailed a survey, of which 2417 included questions about the colorectal cancer screening decision-making process.

Survey questions asked patients about their demographics, desired and actual locus of decision-making control,<sup>8</sup> satisfaction with clinician communication,<sup>9</sup> decisional conflict,<sup>10</sup> length of patient-clinician relationship (ie, “How long have you been going to your doctor?”), and the single-item quality of life question.

Locus of decision-making included 5 options: “I prefer to make the decision,” “I prefer to make the decision after considering my clinician’s opinion,” “I prefer to share the decision with my clinician,” “I prefer for my clinician to make the decision after considering my opinion,” and “I prefer my clinician to make the decision.”<sup>8</sup> Satisfaction with clinician communication was assessed using the 4 clinician communication questions from the Consumer Assessment of Health care Providers and Systems Clinician & Group Survey.<sup>9</sup> Response options included never, sometimes, usually, and always, which are scored as 1, 2, 3, and 4, respectively. Decisional conflict was assessed using the 10-question simplified Decisional Conflict Scale. Questions were grouped into 4 subscales and scored per standard protocol, with an overall score under 25 being correlated with a greater likelihood of patients being able to make a decision, and a score over 37 being correlated with a greater likelihood that a patient will not be able to make a decision.<sup>10</sup>

EHR data included diagnoses, colorectal cancer screening tests and dates, race/ethnicity, and insurance type. Being up to date with screening was based on the 2016 US Preventive Services Task Force recommendation 3 months after the index office visit (eg, colonoscopy within 10 years and stool test within 1 year).<sup>1</sup> Information about clinician characteristics (age, gender, race/ethnicity, specialty training, and concordance with patient) were collected from PBRN member records.

Associations between clinician, patient, and decision-making characteristics and being up to date with colorectal cancer screening were compared. Categorical variables were summarized with frequencies, and continuous variables were summarized with means and standard deviations.  $\chi^2$  tests compared frequencies, except in cases of small sample sizes, for which Fisher’s exact test was used. *t* test compared differences in means between patients who were and were not up to date. Analyses were completed using the SAS version 9.4 software (Cary, NC) in January 2019.

## Results

Of 2417 patients mailed surveys with colorectal cancer screening questions, 1068 completed the survey (44%), and we were able to match EHR data for 959 patients eligible for screening. A total of 587 of 959 patients (61%) were up to date with

**Table 1. Association between Patient Characteristics and Colorectal Cancer Screening Up-to-Datedness.\***

Characteristic	Number of Patients Up to Date (n = 618) <sup>†</sup>	Number of Patients Not Up to Date (n = 341) <sup>†</sup>	P Value
Female	391 (63.3%)	201 (58.9%)	.19
Age	61.7 (5.7)	60.8 (5.8)	<b>.02</b>
Race			‡.15
Asian	7 (1.1%)	5 (1.5%)	
Black	205 (33.4%)	89 (26.6%)	
White	397 (64.8%)	239 (71.3%)	
Other	4 (0.7%)	2 (0.6%)	
Hispanic	12 (2.0%)	10 (3.0%)	.32
Insurance			.22
Commercial	229 (37.1%)	127 (37.2%)	
Medicaid	73 (11.8%)	52 (15.3%)	
Medicare	257 (41.6%)	123 (36.1%)	
Uninsured	59 (9.5%)	39 (11.4%)	
Occupational status			.50
Employed	241 (39.6%)	140 (41.4%)	
Unemployed	33 (5.4%)	18 (5.3%)	
Homemaker	12 (2.0%)	7 (2.1%)	
Student	1 (0.2%)	1 (0.3%)	
Retired	214 (35.1%)	99 (29.3%)	
Disabled	108 (17.7%)	73 (21.6%)	
Marital status			.62
Married	316 (51.9%)	164 (48.8%)	
Living as married	20 (3.3%)	10 (3.0%)	
Divorced	134 (22.0%)	77 (22.9%)	
Widowed	46 (7.5%)	31 (9.2%)	
Separated	19 (3.1%)	6 (1.8%)	
Single, never been married	74 (12.2%)	48 (14.3%)	
Education			.86
Less than 8 <sup>th</sup> grade	22 (3.6%)	13 (3.9%)	
Completed some high school	43 (7.1%)	23 (6.9%)	
High school graduate/GED <sup>§</sup>	143 (23.5%)	87 (26.2%)	
Some college	166 (27.3%)	92 (27.7%)	
College degree or higher	234 (38.5%)	117 (35.2%)	
Quality of life			.71
Excellent	41 (6.7%)	18 (5.4%)	
Very good	180 (29.3%)	99 (29.5%)	
Good	250 (40.7%)	138 (41.1%)	
Fair	122 (19.9%)	64 (19.0%)	
Poor	21 (3.4%)	17 (5.0%)	
Duration of patient-clinician relationship			<b>.02</b>
Less than 6 months	41 (6.7%)	36 (10.6%)	
6 months to a year	43 (7.0%)	31 (9.1%)	
1 to 3 years	132 (21.4%)	84 (24.6%)	
3 to 5 years	110 (17.9%)	66 (19.3%)	
5 or more years	289 (47.0%)	124 (36.4%)	

\*959 patients eligible for cancer screening from 20 community health centers completed the survey.

<sup>†</sup>Percentages report the characteristics of those who are (or are not) up to date for each category.

<sup>‡</sup>Indicates Fisher's exact test used in place of  $\chi^2$  test.

<sup>§</sup>GED, General Educational Development.

Bolded *p* values are statistically significant.

**Table 2. Association between Patient-Reported Decision-Making and Colorectal Cancer Screening Up-to-Datedness (n = 959)**

Survey Response	Number of Patients Up to Date (n = 618)*	Number of Patients Not Up to Date (n = 341)*	P Value
Were given a choice about screening options	192 (57.5%)	142 (42.5%)	<b>&lt;.01</b>
Locus of decision-making control			<b>&lt;.01</b>
How patients want to make decision			<b>&lt;.01</b>
I prefer to make the final decision myself or after seriously considering my doctor's opinion.	283 (59.7%)	191 (40.3%)	
I prefer that my doctor and I share the responsibility for making the final decision.	264 (70.8%)	109 (29.2%)	
I prefer my doctor make the final decision or makes the final decision after seriously considering my opinion.	61 (67.8%)	29 (32.2%)	
How decision was actually made			<b>&lt;.01</b>
I made the final decision myself or after seriously considering my doctor's opinion.	301 (59.5%)	205 (40.5%)	
My doctor and I shared the responsibility for making the final decision	190 (72.0%)	74 (28.0%)	
My doctor made the final decision or made the final decision after seriously considering my opinion.	74 (74.0%)	26 (26.0%)	
Concordance between preferred and actual locus of decision control	399 (65.5%)	210 (34.5%)	.75
Clinician communication <sup>†</sup>			
How often did your doctor explain things in a way that was easy to understand?	3.8 (0.5)	3.7 (0.6)	.05
How often did your doctor listen carefully to you?	3.8 (0.5)	3.7 (0.5)	.52
How often did your doctor show respect for what you had to say?	3.8 (0.5)	3.7 (0.6)	.20
How often did your doctor spend enough time with you?	3.7 (0.6)	3.6 (0.7)	.14
Overall average score	3.8 (0.5)	3.7 (0.5)	.18
Decisional conflict score <sup>‡</sup>			
Uncertainty subscale	18.2 (29.3)	21.4 (31.3)	.13
Informed subscale	37.1 (38.5)	36.6 (37.1)	.86
Value clarity subscale	30.7 (36.6)	36.2 (37.1)	.03
Support subscale	18.6 (28.5)	21.2 (28.7)	.19
Overall score	26.2 (29.0)	28.6 (28.8)	.25

\*Percentages compare the percent up to date versus the percent not up to date for each row.

<sup>†</sup>Satisfaction with clinician communication scores range from 0 to 4. Response options included never, sometimes, usually, and always, which are scored as 1, 2, 3, and 4, respectively.<sup>9</sup>

<sup>‡</sup>Decisional conflict score ranges from 0 to 100, with 0 being no decisional conflict and 100 being extreme decisional conflict.<sup>10</sup> An overall score under 25 is correlated with a greater likelihood of patients being able to make a decision, and score over 37 is correlated with a greater likelihood that a patient will not be able to make a decision.

Bolded *p* values are statistically significant.

screening at the time of their visit and 31 (3%) became up to date within 3 months (overall up to date rate of 64%). Table 1 shows patient characteristics for patients who were and were not up to date. Age (odds ratio [OR], 1.03; 95% confidence interval [CI], 1.01–1.05) and length of the patient-clinician relationship (<6 months vs 5+ years: OR, 0.49; 95% CI, 0.30–0.80; 6 to 12 months vs 5+ years: OR, 0.60; 95% CI, 0.36–0.99; 1 to 3 years vs 5+ years: OR, 0.67; 95% CI, 0.48–0.95) were associated

with being up to date, and there was no evidence of associations between being up to date and other clinician and patient factors.

Table 2 shows the patient report of colorectal cancer screening discussions. Only 36% of patients reported being given a choice about the type of screening test. Patients generally preferred to make their screening decision independently (51%) or share the decision with their clinician (40%). A total of 71% of patients reported that the locus of control

for their decision was consistent with how they wanted to make decisions. Although patients reported high satisfaction with clinician communication, 33% reported high decisional conflict (ie, score above 37), with greater uncertainty for the “informed” and “value clarity” subscales.

Patients who shared the decision with their clinician about screening options were more likely to be screened than those who reported independently making the decision (OR, 1.75; 95% CI, 1.27–2.41). Even those who let their clinician make the decision for them were more up to date than those who made the decision themselves (OR, 1.94; 95% CI, 1.20–3.13).

## Discussion

In this sample of practices that care for more underserved patients, the longer the patient-clinician relationship, the more likely a patient was to be screened for colorectal cancer. Sharing the decision about how to be screened or even letting the clinician make the decision further increased a patient’s chance of being screened, suggesting that the trust established through these relationships may be a key driver in patients overcoming barriers to get recommended screening. Patient trust in their clinician and clinician knowledge of the patient have long been shown to improve not only patient satisfaction but also adherence with care.<sup>11</sup> These findings are further consistent with multiple studies that have linked the continuity of both primary care and specialty care relationships with reduced disease-specific and all-cause mortality.<sup>12</sup> Others have shown that the receipt of primary care specifically is associated with improved quality of care, better health care experiences, lower costs, and even increased life expectancy.<sup>13–15</sup> The clinician-patient relationship may be a key factor that leads to these benefits.

In this population, more traditional patient-level barriers to screening (race, employment, insurance, and education) and practice or clinician factors were not associated with being up to date.<sup>16</sup> Clearly, on a national level, they remain significant barriers to colorectal cancer screening. However, in this sample of PBRN practices that are participating in research, are likely working on systems to improve evidence-based care, and where patients have a primary care clinician and have had an office visit, these barriers may be less significant. This

idea is supported by the finding that the colorectal cancer screening rate was higher than national averages. Furthermore, now that first dollar coverage for colorectal cancer cost is mandated by the Affordable Care Act, cost may be less of a barrier; also, with multiple screening options, logistics may be less of a barrier. Another study in safety net practices found the top barrier for not receiving any screening was patients not knowing they were due for screening or their clinician not recommending screening.<sup>17</sup> The longer clinician-patient relationships and greater clinician involvement in decisions observed in this study may be addressing these barriers.

A key strength of this study is that it uniquely linked the patient-reported process for care delivery (eg, decision-making) to the outcome of being up to date on colorectal cancer screening. Most prior studies have focused solely on patient-reported barriers to screening. In addition, this study examines multiple levels of influence on screening—the clinician, patient, and decision-making. A limitation is that we lacked power to compare subgroups of patients or factors influencing the receipt diagnostic follow-up. Of interest would be to compare those who were not up to date before the visit and became up to date with those who remained not up to date. Future work is needed to compare these groups of patients.

Overall, having a long-term relationship with a primary care clinician seems important to help ensure that more underserved patients get evidence-based preventive care. Promoting longitudinal patient-clinician relationships may be 1 strategy for reducing health inequities.

*To see this article online, please go to: <http://jabfm.org/content/33/5/779.full>.*

## References

1. Bibbins-Domingo K, Grossman DC, Curry SJ, et al. Screening for colorectal cancer: US Preventive Services Task Force recommendation statement. *JAMA* 2016;315:2564–75.
2. Gupta S, Sussman DA, Doubeni CA, et al. Challenges and possible solutions to colorectal cancer screening for the underserved. *J Natl Cancer Inst* 2014;106:dju032.
3. Doubeni CA, Rustgi A. Racial disparities in colorectal cancer survival: is elimination of variation in care the cure? *J Natl Cancer Inst* 2015;107:djv229.
4. Laiyemo AO, Doubeni C, Pinsky PF, et al. Race and colorectal cancer disparities: health-care

- utilization vs different cancer susceptibilities. *J Natl Cancer Inst* 2010;102:538–46.
5. Jones RM, Woolf SH, Cunningham TD, et al. The relative importance of patient-reported barriers to colorectal cancer screening. *Am J Prev Med* 2010;38:499–507.
  6. Sabatino SA, Lawrence B, Elder R, et al. Effectiveness of interventions to increase screening for breast, cervical, and colorectal cancers: nine updated systematic reviews for the guide to community preventive services. *Am J Prev Med* 2012;43:97–118.
  7. Krist AH, Aycokk RA, Etz RS, et al. MyPreventiveCare: implementation and dissemination of an interactive preventive health record in three practice-based research networks serving disadvantaged patients—a randomized cluster trial. *Implementation Sci* 2014;9:181.
  8. Degner LF, Sloan JA, Venkatesh P. The control preferences scale. *Can J Nurs Res* 1997;29:21–43.
  9. Agency for Healthcare Research and Quality. CAHPS clinician & group surveys. Available from: <https://www.ahrq.gov/cahps/surveys-guidance/cg/index.html>. Accessed November 2014.
  10. O'Connor A. *Decisional Conflict Scale*. 4th ed. Ottawa: University of Ottawa; 1999.
  11. Safran DG, Taira DA, Rogers WH, Kosinski M, Ware JE, Tarlov AR. Linking primary care performance to outcomes of care. *J Fam Pract* 1998;47:213–20.
  12. Pereira Gray DJ, Sidaway-Lee K, White E, Thorne A, Evans PH. Continuity of care with doctors—a matter of life and death? A systematic review of continuity of care and mortality. *BMJ Open* 2018;8:e021161.
  13. Levine DM, Landon BE, Linder JA. Quality and experience of outpatient care in the United States for adults with or without primary care. *JAMA Intern Med* 2019;179:363.
  14. Basu S, Berkowitz SA, Phillips RL, Bitton A, Landon BE, Phillips RS. Association of Primary Care Physician Supply With Population Mortality in the United States, 2005–2015. *JAMA Intern Med* 2019;179:506.
  15. Phillips RL, Dodoo MS, Green LA, et al. Usual source of care: an important source of variation in health care spending. *Health Aff (Millwood)* 2009;28:567–77.
  16. Jones RM, Devers KJ, Kuzel AJ, Woolf SH. Patient-reported barriers to colorectal cancer screening: a mixed-methods analysis. *Am J Prev Med* 2010;38:508–16.
  17. Muthukrishnan M, Arnold LD, James AS. Patients' self-reported barriers to colon cancer screening in federally qualified health center settings. *Prev Med Rep* 2019;15:100896.