PERSPECTIVE

Bringing an Organizational Perspective to the Optimal Number of Colorectal Cancer Screening Options Debate

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Improving colorectal cancer (CRC) screening rates represents a challenge for primary care providers. Some have argued that offering a choice of CRC screening modes to patients will improve the currently low adherence rates. Others have raised concerns that offering numerous CRC screening options in practice could overwhelm patients and thus dampen enthusiasm for screening. In this article we assemble evidence to critically evaluate the relative merit of these opposing views. We find little evidence to support the hypothesis that the number of options offered will affect adherence (either positively or negatively), or that expanding the modalities offered beyond FOBT and colonoscopy will improve patient satisfaction. Therefore, we assert future decisions about the number of CRC screening modes to offer would more productively be focused on considerations such as what benefit the health-care organization would derive from offering additional modes, and how this change would affect other critical components of a successful screening program such as timely diagnosis. In light of these organizational level considerations, we agree with the assertion made by others that a screening program limited to FOBT and colonoscopy is likely to be ideal in most settings.

KEY WORDS: colorectal neoplasms; mass screening; choice behavior; decision making; organizational decision making.

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INTRODUCTION

Colorectal cancer (CRC) screening represents a challenge for many primary care practice settings. Nationally, 53% of age-eligible individuals have been screened in a manner consistent with guidelines¹. Improving on these rates is complicated by the fact that current guidelines equally endorse multiple screening modes^{2–4}. Depending on the guideline, the list of endorsed options includes anywhere from three to six of the following: fecal occult blood tests (FOBT) annually; fecal DNA

every 3 years; sigmoidoscopy, computed tomographic (CT) colonography, or double contrast barium enema every 5 years; sigmoidoscopy every 5 years with high sensitivity FOBT every 3 years; or colonoscopy every 10 years^{2–4}. Given the lack of empirical evidence to support the superiority of any one mode over others, the US Preventive Services Task Force (USPSTF) and others have explicitly recommended involving patients in the choice of which CRC screening mode to use^{2,4}, and at least one large, integrated health-care system has formalized this recommendation into policy⁵. However, recent observational studies suggest that the majority of patients are not asked about their preferences^{6–8} or offered a choice of CRC screening mode⁸, that the majority of providers recommend only one or two CRC screening options to their patients⁹, and that when a choice is offered, it tends to be limited to FOBT and colonoscopy⁹. Would more systematically offering a choice of all endorsed CRC screening modes be beneficial? The answer to this question has been the subject of some debate in the CRC screening literature.

Many (including the USPSTF) have argued that providing patients with a choice of mode will increase CRC screening adherence^{4,10–12}. This perspective has been challenged by concerns that “information overload” resulting from too many options might lead some patients to opt out of screening altogether^{13,14}. Below we critically evaluate the relative merit of these opposing views, and make an assertion that future decisions about the number of CRC screening modes to offer in practice would more productively be focused on organizational level considerations thus far neglected in the debate on this issue.

Some theoretical support for the assertion that a choice of CRC screening modes will increase adherence can be derived from Self-Determination Theory^{15,16}, which asserts autonomy is an important determinant of intrinsic motivation. Providing options will, in theory, increase feelings of autonomy and sense of control over one's outcomes, both of which have been shown to enhance intrinsic motivation to perform or act on any choices made¹⁶.

Additional support for a positive association between choice and adherence can be derived from classic utility theory^{17,18}, which asserts that people are motivated to act on things that maximize their unique preferences, or “utilities.” Extending this assumption to health behavior, if there is variation in preferences regarding the most desirable attributes of a product or service across individuals and these attributes can be varied across products or services, then offering a wide variety of products or services (representing a range of potentially desirable attributes) will be preferable because it

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will increase the likelihood that each individual will find and act on an option that satisfies his or her unique preferences. Studies comparing preferences for four or more recommended CRC screening options do suggest there is variation in mode preferences and the value patients assign to attributes related to preferences^{11,19–25}. However, evidence that the vast majority of patients prefer either FOBT or colonoscopy^{20–23,25} calls into question the value of investing in the more rarely preferred screening modalities, particularly in settings where high adherence rates have already been achieved using a screening approach emphasizing a single mode^{26–28}.

An argument for a negative association between choice and adherence can be derived from Self-Regulation theory, which posits that making a choice is a self-regulatory process that requires cognitive effort. Choices that are particularly complex (due for example to a large volume of options) can lead to cognitive overload, which can exhaust finite cognitive resources that might otherwise be directed toward motivation, and thereby dampen enthusiasm to make a selection^{29–31}. Decision scientists would argue that decision support interventions (such as decision aids) that break complex decisions into discrete, manageable steps will reduce cognitive overload, thereby reducing any negative effects of numerous options on motivation and adherence.

In the general literature, there is strong evidence for a benefit of *some choice* (versus none) on outcomes. A meta-analysis of 41 studies examined the effect of choice on motivation and found a statistically significant positive association between some choice and intrinsic motivation¹⁶. In the CRC screening literature the evidence to support the benefits of choice is less decisive. Three randomized trials have compared adherence rates across experimental groups offered some versus no choice of mode (Table 1, rows 1–3). In the first two studies there were no significant differences across experimental groups^{32,33}. In the third trial, the colonoscopy only group had significantly lower screening rates than the FOBT or colonoscopy choice group, but the FOBT only group did not³⁴. One randomized trial compared experimental groups receiving a five-option, computer-based decision aid to a usual care control group and found significantly higher screening intention scores in both intervention groups (Table 1, row 4)³⁵. However, it is not clear whether the intervention effect was due to choice or the information on CRC and the benefits of screening provided in the decision aid.

Two randomized trials from the CRC screening specific literature comparing groups offered a choice of 5–6 screening modes with and without decision support provide an opportunity to examine whether the effect of choice on adherence is more favorable when decision support is offered (Table 1, rows 4–5). The findings from these two studies are equivocal. The first study, which used an interview-based decision tool for intervention subjects and examined adherence using medical records 2–3 months post intervention found no significant difference in adherence across groups³⁶. The second study, which used a web-based tool and examined adherence 6 months post intervention using self-reported data, found higher adherence in the decision support group³⁷.

Finally, there is no evidence in the limited available literature to support an effect (either positive or negative) of the *number of options* on motivation or behavior. The meta-analysis mentioned above found no significant association between the number of

options (categorized as 2, 3–5, or 5+) and motivation¹⁶, and we found only one CRC screening study that evaluated the effect of the number of options presented. This pilot study of 62 patients compared screening intentions of those randomized to a two-option versus a five-option computer-based decision aid and found no significant differences in intention scores across groups³⁸. Furthermore, the very small differences in intention scores are unlikely to result in meaningful differences in adherence. Although one additional randomized trial evaluated the effect of a three-option CRC screening decision aid on adherence, this study does not adequately assess the effects of choice because the intervention included a provider prompt³⁹.

Given the above evidence, we argue that an association between choice and CRC screening adherence cannot be a decisive argument for or against offering a choice of screening options in practice. Other considerations will therefore need to be taken into account in selecting a CRC screening strategy.

We posit that the most likely reason that a choice of CRC screening mode is not more frequently offered in practice is that there remain significant organizational level barriers to doing so, including resource constraints associated with providing all screening modes (particularly colonoscopy)^{14,40–42} and concerns about the additional burden that adequately educating patients about multiple modes might place on providers⁴³. Although web-based and other self-administered CRC screening decision aids offer the potential to support patient choice while minimizing the burden placed on primary care providers³⁷, integrating these approaches into routine care will still require a significant practice change in most settings. Lessons learned from the Robert Wood Johnson Foundation Pursuing Perfection initiative⁴⁴ suggest that organizational impetus is an important factor in determining successful practice change. Achieving this impetus for change in settings (including most European countries, and at least to large integrated health-care systems in the United States)^{26,27,45} that currently emphasize a single or reduced set of screening strategies will require a compelling argument for what benefits will accrue to the organization or population by making the change. Will it increase adherence, reduce costs, attract young healthy patients, enhance patient or provider satisfaction, or produce some other valued benefit? We have already established that offering a choice is unlikely to affect adherence, and as we articulate further below, adherence is just once piece of the larger puzzle that makes up a successful screening program. The screening-eligible population primarily consists of an older, higher risk demographic that would likely not to be attractive to health insurers. If offering a choice of screening mode would require additional time investments from primary care providers, it is unlikely to increase job satisfaction. Because any change in practice will require additional time, resources, and leadership from the health care organization, it is unlikely that offering a choice of CRC screening modes would be cost saving. Finally, given that the vast majority of patients prefer either FOBT or colonoscopy, expanding the options offered beyond these two is unlikely to improve satisfaction. Therefore, where the impetus for change will come from to support a switch from a single or reduced modality screening program to one that offers all endorsed modes is not readily apparent.

From our perspective, one of the most compelling rationales for the optimal number of CRC screening modes is a consider-

Table 1. Randomized Controlled Trials Evaluating the Effect of Unsupported Choice on CRC Screening Motivation and/or Adherence

Author	Design	Decision support	Motivation (p-value)	Adherence rate (p-value)
Segnan 2005 ³³	1. Mailed FOBT 2. Clinic FOBT 3. Flexible sigmoidoscopy (FS) 4. FS+FOBT 5. Choice of FOBT, FS	NA	NA	1. 30% 2. 28% 3. 28% 4. 28% 5. 27% (NS)
Multicentre Australian Colorectal-Neoplasia Group 2006 ³²	1. FOBT 2. FS+FOBT 3. CT Colography 4. Colonoscopy (COL) 5. Choice w/ mailed FOBT 6. Choice w/o mailed FOBT	NA	NA	1. 27% 2. 14% (<0.001) 3. 16% (0.005) 4. 18% (0.02) 5. 19% (0.03) 6. 23% (0.30) (p-value vs FOBT)
Inadomi 2010 ³⁴	1. COL 2. FOBT 3. Choice of FOBT/COL	NA	NA	1. 38% (p<0.001) 2. 67% NS 3. 70% (p-value vs choice)
Schroy 2010 ³⁵	1. Usual care 2. Choice of 5 modes w/ tailored risk assessment 3. Choice of 5 modes w/o tailored risk assessment	Interactive computer-based with and without tailored risk assessment	Mean intention score 1. 3.9 2. 4.4 3. 4.3 (P<0.001)	NA
Dolan 2002 ³⁶	1. Choice of 5 modes 2. Choice of 5 modes with decision support	Analytic hierarchy interview at time of visit	NA	1. 52% 2. 49% (P=1.0)
Ruffin 2007 ³⁷	1. Choice of 4 modes w/o decision support 2. Choice of 4 modes w/ decision support	Interactive web-based viewed at home	NA	1. 38% 2. 64% (p=0.035)
Griffith 2008 ³⁸	1. Choice of 5 endorsed modes 2. Choice of FOBT or COL	Computer-based viewed in decision support lab	Mean interest score 1. 1.8 2. 1.9 (p=0.76)	NA

ation that has not yet been raised in recent debates about the ideal CRC screening program. The dialogue thus far has focused primarily on the first steps of the screening process—the decision to be screened and the selection of a modality. However, the most effective screening programs are those designed with an appreciation of the fact that screening is a process that begins but does not end with the choice of mode or even the completion of a screening test. To be effective at reducing mortality, positive CRC screening results must be followed by diagnostic evaluation and, if necessary, effective treatment and/or surveillance; and negative CRC screening tests need to be repeated over time. Recent evidence suggests that many individuals screened positive for CRC fail to receive appropriate and timely diagnostic evaluation^{46–58}, surveillance^{52,59}, and treatment^{52,53,60}, and that repeat screening rates are far from optimal⁶¹. Closing these gaps is essential to reducing CRC mortality rates and as much a part of building an effective CRC screening program as facilitating screening selection and completion. Several studies point to the importance of timely notification procedures⁵⁸, reminders⁶², tracking systems^{58,63}, and documented agreements across services involved in CRC screening, diagnosis, surveillance, and treatment to facilitate care coordination and communication for addressing these gaps⁶³. The challenges of successfully executing these elements increase as the number of services involved increases. Arguably, an organization should only offer those CRC screening modes for which they have standardized systems and capacity in place to assure that: (1) effective communication and coordination of

care across these various services is achieved, and (2) any warranted diagnostic evaluation, surveillance (including repeat screening), or treatment is completed.

CONCLUSION

Our review of the evidence suggests the number of CRC screening options offered is unlikely to appreciably affect adherence either positively or negatively, and that patient satisfaction is unlikely to be improved by offering more modes than FOBT and colonoscopy. Therefore, we agree with the assertion made by others¹⁴ that a program offering these two options will likely be ideal in most settings. However, given the weak support for the rationale commonly provided for limiting the number of choices (namely that too many options could dampen enthusiasm for screening), we think a stronger rationale lies in its superior feasibility after considering the full spectrum of processes essential to an effective screening program. Further, we recommend that organizations focus on creating effective and efficient processes to support the entire continuum of care from screening decision support to treatment for *one* CRC screening mode before considering adding additional modes to the mix. To expand a phrase used frequently in the literature on this topic, the best CRC screening test is not just the one that gets done, but the one for which adequate follow-up (including appropriate and timely

diagnostic evaluation, repeat screening, surveillance, and treatment) can be assured.

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