

Colorectal Cancer Screening: Keeping the Options Open

The quantity and quality of evidence supporting the effectiveness of colorectal cancer screening now rivals that of Pap smears and mammography screening. **Table 1** synthesizes what we now know. Three large randomized trials were highly consistent in showing mortality reductions with screening fecal occult blood test (FOBT) and colonoscopic follow-up of positive results.¹⁻³ One small trial,⁴ several case-control studies,⁵⁻⁸ and one cohort study⁹ were consistent in showing both incidence and mortality reductions with sigmoidoscopy screening.

Evidence for the effectiveness of the two other approaches, colonoscopy and double-contrast barium enema (DCBE), is less direct and rests primarily on the studies of FOBT and sigmoidoscopy. Given the relative length of the instruments, it is not surprising that colonoscopy is more sensitive than sigmoidoscopy.^{10, 11} It seems highly plausible to extrapolate the proven benefits of sigmoidoscopy to the entire colon for colonoscopy, particularly when results of the three FOBT trials are considered (studies designed on the assumption that colonoscopic screening could lower colorectal cancer mortality rates). The goal of the FOBT is simply to make colonoscopic screening more efficient by identifying those most likely to benefit. The evidence for DCBE is limited to descriptive studies showing that it has a relatively high sensitivity (50% to 94%) when compared with endoscopy for cancer and larger adenomatous polyps.^{12, 13} Compared with FOBT, DCBE's sensitivity is much higher for adenomas and at least as high for cancer. It therefore seems plausible that screening with DCBE should also provide benefit when positive results are followed up with endoscopic polypectomy or surgery.

In this issue of *ecp*, Erban and colleagues¹⁴ show that, despite this evidence, levels of colorectal cancer screening remain well below those for Pap smear and mammography. In this 1998 survey of Massachusetts residents, only 51% of adults aged 50 years and older reported being current with any form of colorectal screening. The authors' approach, of reporting on combined exposure to any of the several choices for screening, is highly useful. It is consistent with current guidelines, as cited by the authors, which recommend that patients and physicians select from a menu of effective screening options; it also provides the best assessment of the coverage of a population by an effective screening method.

The authors point out that having a variety of approaches, which differ in recommended screening intervals, complicates measurement of screening performance by providers. This may be unfortunate, in that systematic measurement and reporting has proven to be an effective means of raising mediocre performance levels for other prevention measures. However, deficits in available evidence and even greater deficits in the widespread availability of screening continue to preclude designation of a single, "best," national approach to colorectal cancer screening.

With respect to the evidence, uncertainty about the relative benefits and risks of the available approaches is an important reason to preserve the menu of screening options. Flexible sigmoidoscopy and FOBT screening appear to give roughly equivalent mortality reductions. For sigmoidoscopy, 60% to 90% of screened patients benefit, but only for the 50% to 60% of tumors that lie within reach of the sigmoidoscope. For FOBT, clinical trials find a 15% to 33% mortality reduction for patients with

TABLE 1

Evidence Supporting the Effectiveness of Colorectal Cancer Screening Tests*

TEST	QUALITY OF EVIDENCE†	BENEFIT/COMMENTS
FOBT	I	33% reduction in colorectal cancer mortality with annual rehydrated FOBT ¹
	I	15%–18% reduction in colorectal cancer mortality with biennial, unrehydrated FOBT ^{2, 3}
Sigmoidoscopy	I	80% reduction in colorectal cancer incidence with flexible sigmoidoscopy ⁴
	II	60%–95% reduction in mortality for cases of distal colorectal cancer ^{5–9}
Colonoscopy	III	Sensitivity 27%–47% greater than that of 60-cm flexible sigmoidoscopy for advanced adenomas ^{10, 11}
DCBE	III	Sensitivity for adenomatous polyps lower than that of colonoscopy but much higher than that of FOBT ^{12, 13}

*DCBE = double-contrast barium enema; FOBT = fecal occult blood test.

† I = randomized, controlled trial; II = controlled observational study (case-control or cohort); III = descriptive study.

cancer anywhere in the colon and rectum. These reductions are achieved despite substantial noncompliance with screening and colonoscopic follow-up of positive results in the trials. It is reasonable to expect that persons who comply with both screening and follow-up would enjoy a somewhat greater reduction in risk. We do not know whether or by how much combining FOBT with flexible sigmoidoscopy could further reduce mortality. Some added benefit seems probable in that sigmoidoscopy should discover many adenomas and early cancers that do not bleed, and FOBT should confer some added protection against proximal tumors unaccompanied by distal marker lesions discoverable at sigmoidoscopy. However, this added benefit may be quite small. Empirical studies are needed to establish and quantify any benefit and to determine if the combination is cost-effective and acceptable to patients.

Arguments for colonoscopy as a primary screening strategy for adults at average risk have been advanced by two recent studies^{10, 11} that showed, not surprisingly, that screening colonoscopy detects between 27% and 47% more important pathologic conditions than a flexible sigmoidoscopy screening strategy. Again, the absolute gain may be small, particularly for younger and lower-risk persons, and the safety and acceptability of primary colonoscopy screening are yet to be fully established.

A second, no less critical, reason to maintain the current variety of screening options is the state of the screening infrastructure in the United States. Persistently low levels of screening with sigmoidoscopy are undoubtedly due, in part, to the complexities of arrang-

ing screening, either in the primary care physician's office or through referral to a specialist. Low reimbursement rates for screening sigmoidoscopy¹⁵ are a further deterrent to active endoscopic screening. Large-scale referral for screening colonoscopy would very quickly overwhelm available resources in nearly all U.S. settings, regardless of reimbursement rates. A deficit of skilled and willing colonoscopists would quickly lead to long queues, and it is unclear whether enough people could be recruited and trained to perform these examinations. Large endoscopic screening units, staffed by nonphysician endoscopists and supervised by gastroenterologists, may ultimately provide a safe and affordable solution. However, very few of these exist today,¹⁶ and there are none for colonoscopy.

On the brighter side, a 51% current screening level is far from no screening and these figures appear similar to national rates.¹⁷ Colorectal cancer incidence has been declining in the United States since 1985,^{18, 19} with earlier and larger decreases for distal than for proximal cancer. Some have suggested that this pattern is due, at least in part, to the effects of screening.^{20–22} The data presented by Erban and coworkers lend some credence to these suggestions. Given the relatively high effectiveness of colorectal screening, exposure of half the population could reasonably be expected to lead to detectable decreases in cancer incidence. The surprisingly high figure of a 20% lifetime exposure to colonoscopy, often done after a positive FOBT or sigmoidoscopy, may well contribute to the modest decreases in proximal cancer.

For the present, we are fortunate to have several effective strategies for colorectal screening because it gives alternatives to patients, who differ in their subjective and objective risk for colorectal cancer and in their willingness to tolerate screening tests, and to primary care physicians, for whom availability of the screening options varies widely. Until the superiority and feasibility of a single approach to screening is clearly demonstrated, there is good reason to guard against efforts to prematurely anoint a single strategy. Efforts to further increase colorectal cancer screening are needed. For now, these efforts should assess the screening resources available in specific settings and encourage patients to choose from the available alternatives. Meanwhile, the search for an optimal approach to colorectal cancer screening, in terms of effectiveness, safety, acceptability, and costs, should continue.

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