

The Big Picture

Does Colonoscopy Work?



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KEYWORDS

- Colorectal cancer screening • Colonoscopy • Colorectal cancer
- Adenoma detection • Interval cancer

KEY POINTS

- Colonoscopy is the dominant colorectal screening strategy in the United States, yet its use is not supported by randomized controlled trials.
- Observational data do support a protective effect of colonoscopy and polypectomy on colorectal cancer incidence and mortality, but the level of protection in the proximal colon is variable and operator-dependent.
- Reducing operator dependence and developing new technical improvements in colonoscopy are and will remain priorities in colorectal cancer prevention.
- Ongoing quality improvement initiatives should consider regulatory factors that motivate changes in physician behavior.

Colonoscopy was first endorsed in the United States as a screening strategy for colorectal cancer in 1997.¹ This followed the publication of several observational studies of screening colonoscopy, highlighting the prevalence of adenomas in asymptomatic volunteers.^{2–5} Screening recommendations prior to this centered on structural examination of the distal colon and rectum with flexible sigmoidoscopy and noninvasive stool tests.⁶ At the time, colonoscopy was the logical extension to sigmoidoscopic screening, as it allowed complete and direct visualization of the whole colon and combined diagnosis and therapy in a single session, compared with noninvasive, two-stage screening strategies.

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Two multi-center studies in 2000 definitively established the safety and feasibility of screening colonoscopy, while highlighting the prevalence of proximal neoplasia in patients without any findings in the distal colon and rectum.^{7,8} These results, combined with academic⁹ and media attention,^{10,11} provided support for lobbying efforts by professional societies with the US Congress, which passed legislation mandating coverage for screening colonoscopy every 10 years in Medicare beneficiaries aged 50 years and older from July 1, 2001.

This law heralded the transformation of gastroenterology practice in the United States. Colonoscopy was adopted by endoscopists and patients, and in the ensuing years, it has become the dominant colorectal cancer screening strategy in the United States.¹² Screening colonoscopy is now recommended by 95% of primary care physicians,¹³ and it is estimated that approximately 12 million colonoscopies are performed each year in the United States.¹⁴

However, the position of colonoscopy as a colorectal cancer screening strategy has not been evaluated in randomized controlled trials. Detractors of screening colonoscopy highlight this lack of clinical trial evidence, together with concerns about lack of cost-effectiveness.^{15,16} In contrast, programmatic screening with flexible sigmoidoscopy is supported by high-level evidence. Four randomized controlled trials have now been performed of flexible sigmoidoscopy, all showing a reduction in distal colorectal cancer incidence and mortality.^{17–20} The challenge for colonoscopy is whether it offers any additional benefit in screening the proximal colon.

There is ample indirect evidence of a protective effect for colonoscopy on colorectal cancer. For example, population-level cancer statistics show that coincident with the establishment of screening colonoscopy in the United States, colorectal cancer incidence and mortality have progressively fallen over recent decades. A report from the US Centers for Disease Control and Prevention described an overall 30% reduction in colorectal cancer incidence between 2001 and 2010 (3.4% per year), with the greatest impact in the screening-eligible age group (3.9% per year).²¹ Colorectal cancer mortality has been falling in the United States since 1975, and this has been attributed to improvements in treatment (12%) and risk factor profiles (32%) and increases in screening (53%).²²

Other indirect evidence comes from the original study of the fecal occult blood test (FOBT). The Minnesota randomized controlled trial of FOBT was the first to establish a role for screening for colorectal cancer.²³ Although not a trial of screening colonoscopy, colonoscopy was performed in patients with positive tests, and polyps were removed. Subsequent long-term follow-up showed 17% to 20% reductions in colorectal cancer incidence compared with those who were not screened, and 22% to 32% reductions on colorectal cancer mortality at 30 years.^{24,25}

THE PROXIMAL COLON

However, the incremental benefit of colonoscopy over flexible sigmoidoscopy depends on extending the protection against colorectal cancer to the proximal colon. In the early days of screening colonoscopy, it was assumed that proximal colon protection would naturally extend from a structural examination of the whole colon. Here are reviewed the data on colorectal cancer protection from colonoscopy, focusing on protection in the proximal colon.

By definition, flexible sigmoidoscopy is a screening test of the distal colon and rectum, so any impact on the incidence of proximal cancer in sigmoidoscopy trials is attributable to colonoscopy, performed following the detection of sentinel lesions on initial index sigmoidoscopy. For example, in the US study (Prostate, Lung

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