

# Colorectal Cancer Screening: How Are We Doing and How Can We Improve?

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## ABSTRACT

*Colorectal cancer (CRC) is a disease of epidemic proportions. It is associated with significant morbidity, mortality, and healthcare costs. Fortunately, through screening and surveillance, this potentially lethal cancer can be eradicated. The success of any CRC screening program depends on appropriate use of CRC screening guidelines. This article presents results of a physician survey designed to identify misperceptions and deficient practices concerning CRC screening, and it recommends possible solutions to correct them. The goal is to improve the effectiveness of screening for CRC and to prevent some of its associated morbidity, mortality, and costs.*

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## INTRODUCTION

Colorectal cancer (CRC) is a disease of epidemic proportion. It is the fourth leading cancer and the second leading cause of cancer-related death in the United States. In 2000, the American Cancer Society (ACS) predicts 133,600 new cases of CRC (men 65,000; women 66,800) and 47,700 deaths (23,100 in men and 24,600 in women). Thus, CRC is the third most common cause of cancer-related death in both men and women, surpassed only by lung and prostate cancer in men and by lung and breast cancer in women. The 1994–1996 ACS data suggest that 5.6% (1 in 18) of the adult US population is at risk for developing CRC. Contrary to the popular belief of male predominance, the risk of developing CRC is almost equal in men and women.<sup>1</sup>

Fortunately, CRC is a highly preventable cancer. Various professional medical associations have published guidelines for CRC screening,<sup>2-4</sup> which is both clinically and cost-effective. Appropriate and correct use of these guidelines could eradicate CRC. Unfortunately, inadequate understanding of these guidelines and lack of evidence-

based use of CRC screening tests result in inappropriate morbidity, mortality, and healthcare costs.<sup>5</sup>

## MATERIALS AND METHODS

An anonymous structured questionnaire was mailed to 2,310 primary care physicians (family practitioners and internal medicine physicians) from across the US and followed 1 week later by a reminder postcard. Physicians were selected at random from a national database using stratified sampling. Questions were related to personal and practice demographics, use of the fecal occult blood test (FOBT), and other CRC screening and surveillance practices. We asked the physicians if they had undergone—or would undergo—CRC screening at an appropriate age, and for their preferred CRC screening modality. We also asked for their opinions on six hypothetical patients who may or may not have been candidates for CRC screening or surveillance.

Three recognized national authorities on CRC screening (Drs. J.H. Bond, University of Minnesota, R.W. Burt, University of Utah, and D.K. Rex, Indiana University) independently reviewed and validated the questions and provided their expert opinions on the questions posed in the questionnaire. We noted the level of agreement among these three experts on the hypothetical patients presented and used their collective opinions—as well as published national guidelines on CRC screening—as the “gold standard.”

## RESULTS

Responses were received from 417 (19.5%) physicians. Of these, 212 (51%) were family practitioners and 188 (45%) were internal medicine physicians. Seventeen (4%) identified themselves as other than primary care physicians. Table 1 lists other demographic characteristics of the respondents.

### TALKING POINTS

Physicians

Pharmacy

Formulary

Cancer Nurses

*The two most important misperceptions or practice deficiencies that were discovered by this survey are inappropriate use of the fecal occult blood test and use of screening tests on patients who were inappropriate candidates.*

*Despite the proven effectiveness of colorectal cancer (CRC) screening, participation in and compliance with CRC screening programs remains poor.*

*Colonoscopy every 10 years, although not yet a standard practice, is the most effective method for CRC screening and for preventing the morbidity and mortality associated with CRC.*

*The decision to screen for CRC is a collective one, and should only be made after full discussion with the patient.*

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**“The two most important misperceptions or practice deficiencies that were discovered by this survey are inappropriate use of the FOBT... and use of screening tests, knowingly and unknowingly, on patients who were inappropriate candidates due to advanced age or significant comorbidities.”**

The results showed that 85.1% of respondents offered or performed some form of CRC screening “routinely,” 12.2% did so “sometimes,” and 2.7% “never” did. Results also showed that 54.4% of respondents performed flexible sigmoidoscopy (FS) themselves. In a typical week, 62.3% of respondents doing FS performed less than two; only 4% performed more than five. When asked about managed care, 77% of respondents felt that this had not affected their CRC screening practices, while 11% felt that they were doing more and 12% felt they were doing less CRC screening in a managed care environment. Two thirds of respondents reported problems with reimbursement for CRC screening.

For asymptomatic individuals at average risk for CRC, 42.4% of respondents started CRC screening at age 40, and 48.5% at age 50. Eight point five percent either did not specify a starting age for CRC screening or offered it to patients of any age. When asked about a patient’s age in relation to stopping CRC screening, 49.8% of respondents never stopped CRC screening irrespective of patients’ ages while 14.1% never considered stopping CRC screening or expressed no

opinion. CRC screening was stopped by 18.7% of the respondents when patients were between 75 and 85 years of age, and by 8.7% of respondents when patients were over 85 years of age. Another 8.7% of respondents stopped CRC screening depending on their patients’ general physical condition. Our invited experts recommended stopping CRC screening at age 75 in otherwise healthy individuals, or earlier depending on a patient’s general health status.

When asked about which CRC screening tests they recommended for their average-risk patients, 24.3% of respondents stated that they only performed an annual FOBT; 45.3% performed annual FOBT with FS every 3–5 years; 2.2% recommended a barium enema (BE) every 5 years; 2.2% recommended colonoscopy every 10 years. Thus, 74% of respondents gave an acceptable response to this question. The percent of respondents who stated that they would order or perform FS if a screening FOBT was positive was 26%.

When asked about their personal CRC screening, 81.5% of respondents said they underwent CRC screening at an age they considered appropriate. As to their preferred CRC screening modality, 51.3% chose an annual FOBT with FS every 3–5 years, while 23.4% chose an annual FOBT only, 22.4% preferred colonoscopy at 10-year intervals, and 2.9% chose a BE at 5-year intervals. Thus, all respondents who answered this question selected appropriate CRC screening tests for themselves; one out of four opted for a full colonic evaluation with a colonoscopy or BE.

The overwhelming majority of respondents, 91.6%, performed FOBT in their own offices. Only 56.4% reported that they provided patients with appropriate dietary advice before performing a FOBT, while 47.7% said they advised patients to stop nonsteroidal anti-inflammatory drugs before a FOBT. Only 15.9% reported that they told patients to stop anticoagulant therapy before performing a FOBT.

For a positive FOBT in an average-risk patient, 51.8% recommended colonoscopy, 16.3% recommended FS, 6.9% recommended a repeat FOBT, and 25% recommended BE with or without FS. The majority, 82.5%, performed FOBT on stool samples obtained during digital rectal examination (DRE). To follow up a positive FOBT at DRE, 38.2% of respondents would order colonoscopy, 27.1%

**TABLE 1. DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDING PHYSICIANS**

	Respondents (%)
Male	82
White	76
<u>Subspecialty</u>	
Internal medicine	51
Family practice	45
Other	4
<u>Type of practice</u>	
Solo	33.6
Single or multispecialty group	63.5
University hospital	2.9
<u>Population of the community in which they practiced</u>	
<50,000	55.1
51–100,000	21.4
>100,000	23.5
<u>Years in practice</u>	
<5	3.6
5–10	19.1
>10	77.3

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would order FS, 16.2% would order FS and BE, and 18.6% would simply repeat the FOBT.

Regarding other uses for the FOBT, 83.3% of respondents use it to evaluate abdominal pain, 93.9% for alteration in bowel habit, 84.2% for diarrhea, 69% for hematemesis, and 74% for hematochezia. Table 2 lists results on how respondents would proceed with hypothetical patients.

**DISCUSSION**

The two most important misperceptions or practice deficiencies that were discovered by this survey are inappropriate use of the FOBT for reasons other than CRC screening, which is its only validated use, and use of screening tests, knowingly or unknowingly, on patients who were inappropriate candidates due to advanced age or significant comorbidities.<sup>5</sup> The same findings have repeatedly emerged in our subsequent surveys of primary care trainees and gastroenterologists.<sup>6,7</sup> The former shows a lack of understanding of the use and purpose of the FOBT. The latter implies a lack of understanding of the basic principles of screening. Our discussion will focus on basic principles of screening, various screening tests pertinent to CRC screening, and suggestions to overcome these pitfalls in practice.

**Screening, Surveillance, and Case Findings**

Screening is the process for detecting asymptomatic disease in healthy individuals at average risk for it. The disease to be screened for should be a significant public health problem with a long latency and with effective treatments available. There should be evidence that early detection and expeditious treatment can change the disease’s natural history. There should also be a test available to accurately diagnose the disease in its early asymptomatic stage in individuals with a positive result on screening. The test should be simple, acceptable to asymptomatic people, and cost-effective. Often confused with screening, surveillance is the process of searching for asymptomatic disease among individuals who are considered at increased risk. The investigation of symptomatic individuals is called case finding.<sup>8</sup>

These three terms—screening, surveillance, and case finding—have different connotations and should not be confused. Although CRC comfortably meets the criteria for screening, individuals to be screened must

be suitable candidates for treatment if the disease—or its precursors—are detected. Individuals who are not suitable for surgical treatment of CRC because of significant comorbidity and those who choose not to have treatment should not be screened. Screening such individuals exposes them to the risks of screening procedures without any subsequent benefit.

**Colorectal Cancer Screening Guidelines**

In February 1997, the Agency for Healthcare Policy and Research (AHCPR) convened an expert multidisciplinary panel headed by Drs. S. J. Winawer and R. H. Fletcher. This panel appraised all available evidence and released recommendations on CRC screening and surveillance. Their recommendations have since been endorsed by various national societies.<sup>2</sup> CRC screening tests that were recommended included annual FOBT, annual FOBT with FS every 5 years, air contrast barium enema (ACBE) every 5 years, and colonoscopy every 10 years. Screening should start at age 50 in average-risk individuals and at age 40 in patients with a positive family history of CRC. Each approach is effective for CRC screening; annual FOBT has the lowest potential effectiveness and is the least costly, while colonoscopy every 10 years has the greatest potential effectiveness but is the most costly.<sup>2</sup>

**TABLE 2. NATIONAL EXPERTS AND RESPONDING PHYSICIANS WITH CORRECT RESPONSE IN REGARD TO HYPOTHETICAL PATIENTS**

Hypothetical Patient	National Experts	Respondents (%)
Individual at average risk for CRC with a positive FOBT	Colonoscopy or FS + BE	78
Patient with ulcerative colitis with total colonic involvement for >10 years	Annual colonoscopy with biopsy	22
Patient with an adenomatous colon polyp diagnosed 10 years ago	Colonoscopy or FS + BE	87
Patient with metastatic breast cancer	No CRC screening	12
Patient with inoperable 3-vessel CAD	No CRC screening	7
Elderly nursing home patient with advanced Parkinson’s disease	No CRC screening	49

CRC=colorectal cancer; FOBT=fecal occult blood test; FS=flexible sigmoidoscopy; BE=barium enema; CAD=coronary artery disease.

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In May 1997, the ACS published its updated guidelines supporting and largely concurring with the multidisciplinary panel's guidelines.<sup>3</sup> In April 2000, the American College of Gastroenterology published its CRC screening recommendations. They include colonoscopy every 10 years as the preferred strategy for CRC screening in average-risk individuals.<sup>4</sup> The different recommendations of these professional associations are summarized in Table 3.

**Colorectal Cancer Screening Tests**

FOBT is currently an integral part of CRC screening. There is no evidence for its use or effectiveness in clinical situations other than CRC screening, although many physicians use it to evaluate various gastrointestinal symptoms.<sup>5-7</sup> FOBT should be performed on three separate stool specimens that were spontaneously voided and not obtained by DRE. Specimens should only be collected after the patient has followed appropriate dietary restrictions. The FOBT utilizes the pseudoperoxidase activity of hemoglobin for the oxidative conversion of a colorless compound, guaiac, to a colored one. It is extremely sensitive for the detection of small amounts of blood in feces, although it lacks the specificity needed for a true diagnostic

test. Foods containing pseudoperoxidase or peroxidase activity, such as nonhuman hemoglobins, include rare red meat and some uncooked vegetables such as broccoli, turnip, cauliflower, radish, and cantaloupe. A diet containing one or more of these items may result in a false-positive result, and patients must avoid these foods for 3 days before the FOBT. Reducing substances, such as ascorbic acid, interfere with the oxidation of guaiac and may produce a false-negative result. Therefore, they should also be avoided.

FOBT may be used alone or in combination with FS for CRC screening. Individuals who have a positive FOBT result should undergo a full colonic evaluation with colonoscopy or, if unavailable, with ACBE and FS. FS alone is inadequate to properly evaluate a patient with a positive FOBT. Recent studies suggest that CRC screening programs based on FS could miss over half of polyps or cancers in the right side of the colon.<sup>9,10</sup> FS can only examine the left side of the colon up to the level of the splenic flexure. Individuals who are found to have one or more adenomatous polyps on FS should have colonoscopy and removal of all identified polyps throughout the colon. FS every 5 years alone or in conjunction with FOBT can be used for CRC screening and is specifically recommended by the ACS.<sup>3</sup>

ACBE every 5 years is another possible strategy for CRC screening. Patients found to have colon polyps on ACBE require colonoscopy and polypectomy. In view of the increasing prevalence of adenomatous colon polyps with age, it is likely that one quarter of individuals who undergo ACBE every 5 years will eventually need colonoscopy, although this assumes that ACBE would correctly identify polyps in all patients.

Colonoscopy every 10 years is probably the most effective means of CRC screening. It allows complete examination of the colon, removal of any polyps, and biopsy of any mucosal abnormalities including suspected cancer. Although colonoscopy is currently the most expensive procedure, an examination at 10-year intervals has been found to be the most effective and the most cost-effective strategy for preventing CRC.<sup>11,12</sup> This strategy offers us the best chance to eradicate sporadic CRC.

Average-risk individuals who undergo colonoscopy for screening or evaluation of any

**TABLE 3. SUMMARY OF PRINCIPAL RECOMMENDATIONS IN NATIONAL COLORECTAL CANCER SCREENING GUIDELINES**

**1997 AHCPR Colorectal Cancer Screening Guidelines<sup>2</sup>**

- Screening should begin at age 50
- Recommended methods include:
  - Colonoscopy every 10 years\*
  - Double-contrast BE every 5 to 10 years
  - FOBT and FS combined
  - FS every 5 years
  - FOBT each year on two samples from each of three consecutive stools; a special diet can reduce rate of false-positive results

**1997 ACS Colorectal Cancer Screening Guidelines<sup>3</sup>**

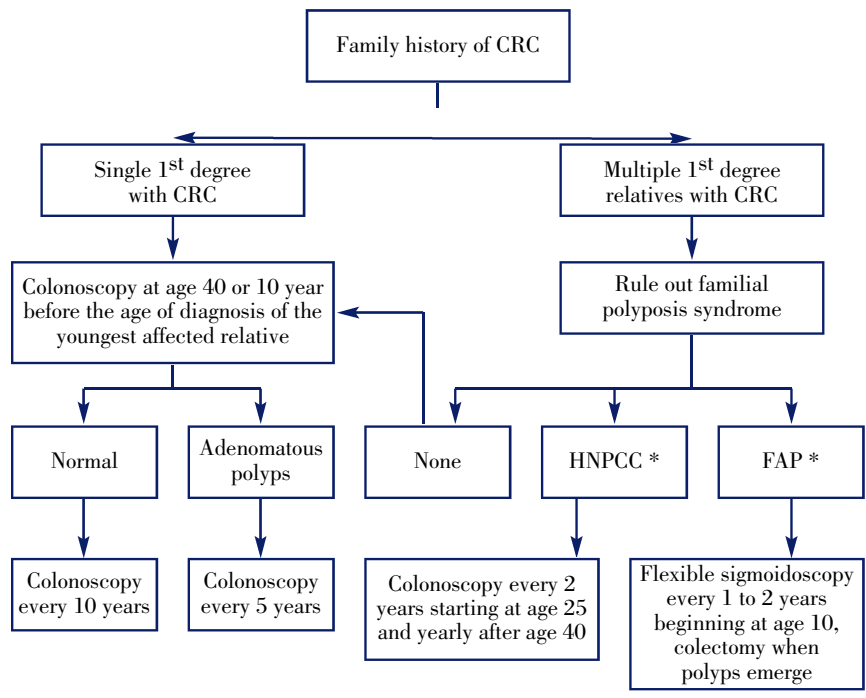
- Screening should begin by age 50
- Recommended methods include:
  - Annual FOBT with flexible sigmoidoscopy every 5 years
  - Colonoscopy every 10 years
  - Double-contrast BE every 5 to 10 years
  - DRE should be performed at the time of colonoscopy, ie, every 5 to 10 years
  - No need for annual FOBT in those opting for total colon evaluation for CRC screening

\*American College of Gastroenterology's preferred screening strategy.<sup>4</sup>

AHCPR=Agency for Health Care Policy and Research; BE=barium enema; FOBT=fecal occult blood test; FS=flexible sigmoidoscopy; ACS=American Cancer Society; DRE=digital rectal examination; CRC=colorectal cancer.

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**FIGURE 1. CRC SURVEILLANCE STRATEGY IN INDIVIDUALS WITH A FAMILY HISTORY OF COLORECTAL CANCER<sup>2,4</sup>**



\* Recommend genetic testing and genetic counseling

CRC=colorectal cancer; HNPCC=hereditary non-polyposis colorectal cancer; FAP= familial adenomatous polyposis.

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gastrointestinal symptoms and do not have polyps or CRC do not need to undergo annual FOBT or any other screening tests for 8–10 years. After that, CRC screening should be reinitiated with a strategy of choice.<sup>3</sup>

**Surveillance Strategies**

A family history of CRC or a personal history of colon polyps, CRC, or chronic inflammatory bowel disease (IBD) involving the colon increases the risk of developing CRC and requires full colonic examination with colonoscopy. The combination of FS and ACBE may be used as an alternative if colonoscopy is not available. However, CRC in IBD typically arises in flat lesions called areas of dysplasia and not from adenomatous polyps. Hence, patients with IBD can only be adequately surveyed with colonoscopy and random mucosal biopsies for histologic evaluation for dysplasia. The recommendations for surveillance in such high-risk individuals are given in Table 4 and Figure 1.<sup>2,4</sup>

**Participation and Compliance With CRC Screening Programs**

Despite the proven effectiveness of CRC screening, participation in and compliance with CRC screening programs remain poor. Data from the National Health Interview Survey (NHIS) and Behavioral Risk Factor

**TABLE 4. COLORECTAL CANCER SURVEILLANCE RECOMMENDATIONS IN HIGH-RISK INDIVIDUALS.<sup>2,4</sup>**

Clinical situation	Recommendations
Personal history of adenomatous polyps	Colonoscopy every 5 years
Personal history of colon cancer	Clearing colonoscopy at the time of diagnosis; thereafter, every 5 years
Personal history of IBD	Annual colonoscopy with random biopsies
Pancolitis	Starting after 8 years of disease
Left-sided colitis	Starting after 16 years of disease
Ulcerative proctitis	Normal risk/standard screening

IBD=inflammatory bowel disease.

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Surveillance System (BRFSS) demonstrate low CRC screening rates in the general population.<sup>13,14</sup> The best data on screening rates in the general population come from the NHIS—a household personal interview survey conducted in a sample of the civilian, noninstitutionalized US population in 1987 and 1992. Although there was an interval improvement in CRC screening rates between 1987 and 1992, rates for FOBT in the preceding year and for FS in the preceding 3 years in individuals aged 50 years and older were only 17.3% and 9.4%, respectively.<sup>13</sup> A telephone survey of 38,000 people aged 50 or older conducted in 1993 through the BRFSS revealed higher screening rates than the NHIS data; however, these did not exceed 40% for any of the population subgroups surveyed.<sup>14</sup>

A recent survey sponsored by the US-based Colon Cancer Alliance of more than 5,400 patients, relatives, and other members of the public revealed that 64% of respondents diagnosed with CRC were diagnosed because of symptoms and not because of screening. Many physicians had not previously discussed CRC risk or screening with their patients. This survey highlights the important role that primary care physicians have in educating their patients and in allaying their anxiety about CRC screening. A more active role of primary care physicians might improve patient participation.

**SUMMARY**

CRC is a significant and preventable healthcare problem. Screening for CRC is

clinically and economically effective and justifiable. Colonoscopy every 10 years, although not yet a standard practice, is the most effective method for CRC screening and for preventing the morbidity and mortality associated with CRC. By eliminating the confusion and complacency associated with proper use of the FOBT and hence with a screening program based on the FOBT, a colonoscopy-based screening program should save substantial healthcare resources and cost. However, in the absence of the necessary expertise and/or resources, screening that properly utilizes locally available strategies is better than no screening.

Screening should be offered only to individuals without significant comorbidity and who would be candidates for surgical treatment if colon cancer is discovered. However, the decision to screen is a collective one, and should only be made after full discussion with the patient. The FOBT should be reserved for CRC screening since that is its only validated use. Indiscriminate use of FOBT outside the realms of CRC screening results in significant and unnecessary morbidity, mortality, and healthcare costs, and should be strongly discouraged. A recent audit of FOBT use at four university teaching hospitals revealed that FOBT is performed for reasons other than CRC screening, positive test results are inappropriately followed up, and the diagnostic yield of FOBT in such situations is very low.<sup>15</sup> Further efforts to discuss CRC screening with all eligible individuals will improve compliance with this highly effective and important intervention.

**APPENDIX Selected Survey Questions Answered by Physicians Participating in This Study**

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At what age should colorectal cancer screening (CRCS) begin in an asymptomatic individual at *average risk* for colorectal cancer? \_\_\_\_\_

Indicate (by circling) the *single most appropriate method* with which to begin CRCS in an *asymptomatic individual at average risk*.

- A) Colonoscopy
- B) Flexible sigmoidoscopy alone
- C) Fecal occult blood test (FOBT) alone
- D) Fecal occult blood test and flexible sigmoidoscopy
- E) Barium enema

When should screening stop in an asymptomatic individual at average risk for colorectal cancer? (Assume that screening has been uniformly negative).

- A) Age 70–75
- B) Age 76–80
- C) Age 81–90
- D) Age >90
- E) Screening should never be stopped
- F) Decision to stop screening is not based on age

The following questions concern the *fecal occult blood test* (FOBT)—eg, “hemocult”. Please circle either “Yes” or “No” for each question.

- A) Do you perform FOBT on a clinic patient at routine visits Yes / No
- B) Do you perform FOBT on stool samples obtained at a digital rectal examination? Yes / No
- C) Do you regard FOBT as part of a routine physical exam in a patient being admitted to hospital for another problem? Yes / No
- D) Do you perform FOBT on patients in the emergency room? Yes / No
- E) Do you provide patients with dietary instructions before FOBT? Yes / No
- F) Do you recommend stopping aspirin before FOBT? Yes / No
- G) Would you stop anticoagulant therapy before FOBT? Yes / No

A 55-year-old asymptomatic individual at average risk for colorectal cancer has a positive FOBT. How should this be further investigated? Please circle the single best option.

- A) Repeat the FOBT
- B) Flexible sigmoidoscopy
- C) Flexible sigmoidoscopy and repeat FOBT
- D) Barium enema
- E) Colonoscopy

Do you perform FOBT for the evaluation of following symptoms?

- Abdominal pain Yes / No
- Weight loss Yes / No
- Diarrhea Yes / No
- Constipation Yes / No
- Rectal bleeding Yes / No
- Hematemesis Yes / No
- Melena Yes / No

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