



INSTITUTE FOR CLINICAL
SYSTEMS IMPROVEMENT

Twelfth Edition
June 2008

Health Care Guideline: Colorectal Cancer Screening

The information contained in this ICSI Health Care Guideline is intended primarily for health professionals and the following expert audiences:

- physicians, nurses, and other health care professional and provider organizations;
- health plans, health systems, health care organizations, hospitals and integrated health care delivery systems;
- health care teaching institutions;
- health care information technology departments;
- medical specialty and professional societies;
- researchers;
- federal, state and local government health care policy makers and specialists; and
- employee benefit managers.

This ICSI Health Care Guideline should not be construed as medical advice or medical opinion related to any specific facts or circumstances. If you are not one of the expert audiences listed above you are urged to consult a health care professional regarding your own situation and any specific medical questions you may have. In addition, you should seek assistance from a health care professional in interpreting this ICSI Health Care Guideline and applying it in your individual case.

This ICSI Health Care Guideline is designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and is not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition. An ICSI Health Care Guideline rarely will establish the only approach to a problem.

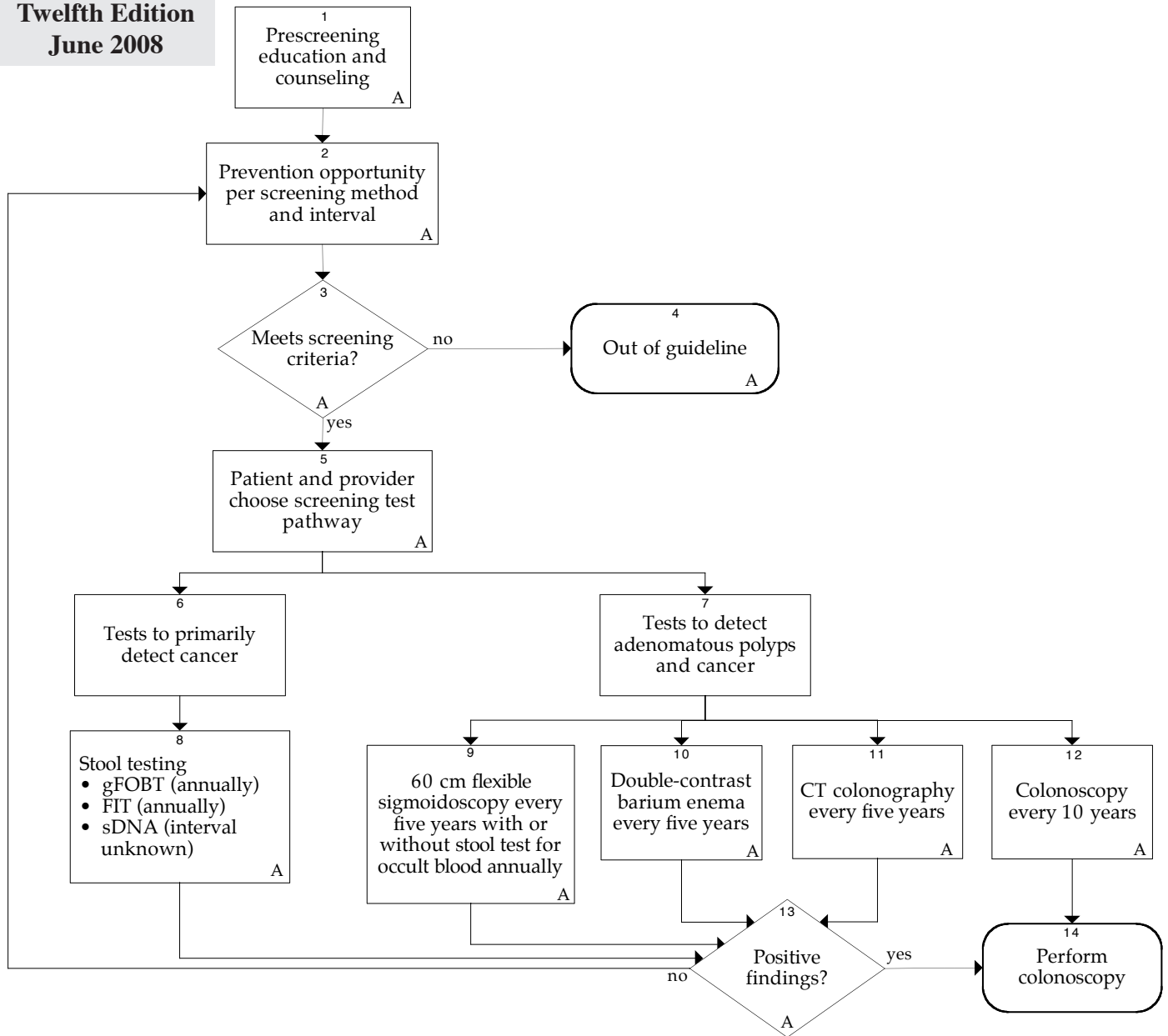
Copies of this ICSI Health Care Guideline may be distributed by any organization to the organization's employees but, except as provided below, may not be distributed outside of the organization without the prior written consent of the Institute for Clinical Systems Improvement, Inc. If the organization is a legally constituted medical group, the ICSI Health Care Guideline may be used by the medical group in any of the following ways:

- copies may be provided to anyone involved in the medical group's process for developing and implementing clinical guidelines;
- the ICSI Health Care Guideline may be adopted or adapted for use within the medical group only, provided that ICSI receives appropriate attribution on all written or electronic documents; and
- copies may be provided to patients and the clinicians who manage their care, if the ICSI Health Care Guideline is incorporated into the medical group's clinical guideline program.

All other copyright rights in this ICSI Health Care Guideline are reserved by the Institute for Clinical Systems Improvement. The Institute for Clinical Systems Improvement assumes no liability for any adaptations or revisions or modifications made to this ICSI Health Care Guideline.

Screening Algorithm

A = Annotation



Criteria for routine screening for colorectal cancer

The patient meets the following criteria:

- 50 years old, or if African American, 45 years old
- No personal history of polyps and/or colorectal cancer
- No personal history of inflammatory bowel disease
- No family history of colorectal cancer in:
 - One first-degree relative diagnosed before age 60, or
 - Two first-degree relatives diagnosed at any age
- No family history of adenomatous polyps in:
 - One first-degree relative diagnosed before age 60

Table of Contents

Work Group Leader

John Mageli, MD
*Internal Medicine,
Aspen Medical Group*

Work Group Members

Family Medicine

Scott Boyers, MD
Sanford Health
Christopher Carlson, MD
Camden Physicians
Jerome Potts, MD
*Hennepin County Medical
Center*

Gastroenterology

Irshad Jafri, MD
*HealthPartners Medical
Group*
Theresa Smith, MD
*St. Mary's/Duluth Clinic
Health Systems*
Joseph Tombers, MD
Minnesota Gastroenterology

Radiology

John Barlow, MD
Mayo Clinic

Measurement/ Implementation Advisor

Penny Fredrickson
ICSI

Facilitator

Melissa Marshall, MBA
ICSI

Algorithms and Annotations	1-13
Algorithm (Screening).....	1
Foreword	
Scope and Target Population.....	3
Clinical Highlights and Recommendations	3
Priority Aims	4
Key Implementation Recommendations.....	4
Related ICSI Scientific Documents	4
Disclosure of Potential Conflict of Interest.....	4
Introduction to ICSI Document Development.....	5
Description of Evidence Grading.....	5
Annotations	6-13
Supporting Evidence	14-19
Brief Description of Evidence Grading.....	15
References	16-19
Support for Implementation	20-26
Priority Aims and Suggested Measures.....	21
Measurement Specifications	22-23
Key Implementation Recommendations	24
Knowledge Resources	24
Resources Available	25-26

Foreword

The ICSI Colorectal Cancer Screening work group is a subgroup of the ICSI Preventive Services work group.

Scope and Target Population

This guideline addresses appropriate screening methodology for colorectal cancer in patients 50 years of age and older, and age 45 and older for African Americans.

Clinical Highlights and Recommendations

Routine screening for colorectal cancer

- The patient meets the following criteria:
 - 50 years old, or if African American, 45 years old
 - No personal history of polyps and/or colorectal cancer
 - No personal history of inflammatory bowel disease
 - No family history of colorectal cancer in:
 - one first-degree relative diagnosed before age 60, or
 - two first-degree relatives diagnosed at any age
 - No family history of adenomatous polyps in:
 - One first-degree relative diagnosed before age 60

A single first-degree relative diagnosed with colorectal cancer after age 60 may put an individual at a slightly increased risk and may warrant starting colorectal cancer screening at age 40. A single first-degree relative with an adenomatous polyp diagnosed after age 60 may put the individual at a slightly increased risk and may also warrant starting colorectal cancer screening at age 40 (*Ahsan, 1998 [C], Winawer, 1996 [C]*).

(*Annotation #3, Aim #1*)

- Colorectal cancer screening is recommended for all patients 50 years of age and older – age 45 and older for African Americans – using one of the following methods, based on joint decision-making by patient and provider:
 - Stool testing
 - Guaiac-based fecal occult blood testing (gFOBT) annually
 - Fecal immunochemical testing (FIT) annually
 - Stool DNA testing (sDNA) interval unknown
 - 60 cm flexible sigmoidoscopy every five years with or without stool test for occult blood annually
 - Double-contrast barium enema every five years
 - CT colonography every five years
 - Colonoscopy every 10 years

(*Annotations #5, 8, 9, 10, 11, 12; Aim #2*)

Priority Aims

1. Increase the number of patients age 50 and older who are up to date with colorectal cancer screening. (*Annotation #3*)
2. Increase the number of patients who have had appropriate screening for colorectal cancer using a screening test method discussed and agreed upon by both the patient and his/her physician. (*Annotation #5*)

Key Implementation Recommendations

The following system changes were identified by the guideline work group as key strategies for health care systems to incorporate in support of the implementation of this guideline.

1. Establish processes for both identifying age-appropriate individuals who have not undergone appropriate screening and contacting these patients to encourage them to do so (examples may include chart reminders, computer-generated reminder letters, etc.)

Related ICSI Scientific Documents

Related Guidelines

- Preventive Services for Adults

Technology Assessment Reports

- Computed Tomographic Colonography for Detection of Colorectal Polyps and Neoplasms. (#58, 2004)
- Genetic Testing for Hereditary Nonpolyposis Colorectal Cancer (HPNCC). (#64, 2002)

Disclosure of Potential Conflict of Interest

ICSI has adopted a policy of transparency, disclosing potential conflict and competing interests of all individuals who participate in the development, revision and approval of ICSI documents (guidelines, order sets and protocols). This applies to all work groups (guidelines, order sets and protocols) and committees (Committee on Evidence-Based Practice, Cardiovascular Steering Committee, Women's Health Steering Committee, Preventive & Health Maintenance Steering Committee, Respiratory Steering Committee and the Patient Safety & Reliability Steering Committee).

Participants must disclose any potential conflict and competing interests they or their dependents (spouse, dependent children, or others claimed as dependents) may have with any organization with commercial, proprietary, or political interests relevant to the topics covered by ICSI documents. Such disclosures will be shared with all individuals who prepare, review and approve ICSI documents.

John Barlow received a honorarium/consulting fee from MedicTrainer (London, England).

No other work group members have potential conflicts of interest to disclose.

Introduction to ICSI Document Development

This document was developed and/or revised by a multidisciplinary work group utilizing a defined process for literature search and review, document development and revision, as well as obtaining and responding to ICSI members.

For a description of ICSI's development and revision process, please see the Development and Revision Process for Guidelines, Order Sets and Protocols at <http://www.icsi.org>.

Evidence Grading System

A. Primary Reports of New Data Collection:

- Class A: Randomized, controlled trial
- Class B: Cohort study
- Class C: Non-randomized trial with concurrent or historical controls
Case-control study
Study of sensitivity and specificity of a diagnostic test
Population-based descriptive study
- Class D: Cross-sectional study
Case series
Case report

B. Reports that Synthesize or Reflect upon Collections of Primary Reports:

- Class M: Meta-analysis
Systematic review
Decision analysis
Cost-effectiveness analysis
- Class R: Consensus statement
Consensus report
Narrative review
- Class X: Medical opinion

Citations are listed in the guideline utilizing the format of (*Author, YYYY [report class]*). A full explanation of ICSI's Evidence Grading System can be found at <http://www.icsi.org>.

Algorithm Annotations

Screening Algorithm Annotations

1. Prescreening Education and Counseling

This guideline represents the work group's contribution to colorectal cancer screening and must be seen within the larger context of all preventive health activities. The work group acknowledges the important role played by education and outreach efforts in helping to increase the number of risk-appropriate individuals who present themselves for colorectal cancer screening, thereby increasing the rate of early detection of this disease.

2. Prevention Opportunity per Screening Method and Interval

Nearly every patient contact for any reason should be used as a possible prevention opportunity. Relying upon routine "checkup" appointments for the delivery of these services will clearly miss many patients, especially those who may need them the most. A prevention opportunity may be any visit to a provider that provides the opportunity for conducting the screening process, a preventive services visit and outreach to patients who historically do not come in for visits. It is important to consider ways to remind patients of their need for these services at other times than during office visits.

Colorectal cancer screening is ranked as a Level I service in the ICSI Preventive Services for Adults guideline. A Level I service is a preventive service that providers and care systems must deliver (based on the best evidence).

3. Meets Screening Criteria?

Since the term screening implies testing of asymptomatic individuals at average risk within the population, patients who are symptomatic or who have a history of gastrointestinal symptoms or disease may be excluded from this screening activity. Providers must make an individual decision on a case-by-case basis.

The best data available support screening starting at age 50. No older age limit has been clearly established, although 80 has been suggested. The decision to stop screening would clearly be influenced by comorbidities, patient preferences and expected life span (at least 8 to 10 years to warrant continued screening).

The patient meets the following criteria:

- 50 years old, or if African American, 45 years old (*Agrawal, 2005 [R]*)
- No personal history of polyps and/or colorectal cancer
- No personal history of inflammatory bowel disease (*Winawer, 2003 [R]*)
- No family history of colorectal cancer in:
 - One first-degree relative diagnosed before age 60 or
 - Two first-degree relatives diagnosed at any age (*Fuchs, 1994 [B]*)
- No family history of adenomatous polyps in:
 - One first-degree relative diagnosed before age 60

A single first-degree relative diagnosed with colorectal cancer after age 60 may put an individual at a slightly increased risk and may warrant starting colorectal cancer screening at age 40. A single first-degree relative

with an adenomatous polyp diagnosed after age 60 may put the individual at a slightly increased risk and may also warrant starting colorectal cancer screening at age 40 (*Ahsan, 1998 [C], Winawer, 1996 [C]*).

4. Out of Guideline

Patients who do not meet the screening criteria in Annotation # 3, "Meets Screening Criteria?" may be at higher risk than average risk for colorectal cancer, and their management is not discussed in this guideline.

5. Patient and Provider Choose Screening Test Pathway

Screening intervals apply to patients between 50 years and older, or age 45 and older for African Americans, without clinical factors that place them at increased risk for colorectal cancer. Clinical groups may decide internally as to which screening pathway will be offered routinely at their site. Alternatively, individual clinicians may advise each patient as to which pathway might be most suitable, and with the patient's preference in mind, choose one of the pathways recommended in subsequent annotations.

When a provider suggests a specific screening pathway for colorectal cancer screening, the patient should be involved in the decision. The patient should be shown the choices and should receive information and/or advice on what the test can and cannot prove. The patient should also be informed as to what the follow-up on a positive test might involve.

Evidence from randomized controlled studies alone is insufficient to determine which screening test (flexible sigmoidoscopy or fecal occult blood test) produces greater benefit (or if both are more beneficial than either alone). However, the value of either in detecting colorectal cancer or adenomatous polyps has been proven. At this time, the choice of using one (or both) of these tests should be based on the judgment of the clinician including informed patient choice. In particular, attention is directed to the high rate of false-positive fecal occult blood tests and the failure of flexible sigmoidoscopy alone to screen the entire colon. As yet unproven is which screening test leads to the most efficient and effective use of colonoscopy.

Fecal occult blood tests, even when combined with flexible sigmoidoscopy, fail to detect colorectal cancer in at least 24% of those with cancer (*Lieberman, 2001 [C]*).

The time interval for the development of malignant changes in adenomatous polyps is estimated at 5 to 25 years. Therefore, the work group has reached a conservative decision to recommend repeating the flexible sigmoidoscopy screening at five-year intervals. Some authors suggest that 10-year intervals would be adequate (*Selby, 1992 [C]*).

If the provider and patient desire an examination of the whole colon, this can be accomplished by either colonoscopy, CT colonography or in some situations, double-contrast barium enema. If the sigmoid colon is not well visualized on double-contrast barium enema, a flexible sigmoidoscopy should be obtained. The interval between examinations with flexible sigmoidoscopy combined with double-contrast barium enema is five years. The interval between examinations with colonoscopy is 10 years. The interval between examinations with CT colonography is five years. None of these strategies, however, is supported by direct evidence that they reduce mortality from colorectal cancer.

The recent American Cancer Society recommendations conclude that there is now sufficient data to include CT colonography as an acceptable option for colorectal cancer screening, and the recommended screening interval is every five years (*Lieberman, 2008 [R]*).

Colonoscopy involves a higher risk of perforation than flexible sigmoidoscopy. If conscious sedation is used, there is risk of complications related to medication as well as a requirement for a period of postprocedure recovery and providing a driver for transport home after the procedure (*Imperiale, 2000 [C]; Lieberman, 2000 [C]*).

8. Stool Testing

Guaiac-Based Fecal Occult Blood Testing (gFOBT) Annually

There are currently two commercially available methods for testing stool for occult blood: the guaiac-based tests (gFOBT) and immunochemical-based tests (FIT). Guaiac-based tests detect hemoglobin through the pseudoperoxidase activity of heme. Therefore, these tests are not specific for lower intestinal bleeding or even for human blood. The immunochemical-based tests react to human globin and therefore do not require the same dietary restrictions recommended for the guaiac-based fecal occult blood testing. Stool tests for occult blood are designed to detect cancers that may bleed periodically. The goal is to detect these cancers at an early stage that is amenable to therapy and thereby decrease mortality from colorectal cancer. Stool tests are not particularly effective in detecting precancerous polyps, particularly those under 1 cm to 2 cm in size.

There have been prospective randomized controlled trials demonstrating that guaiac-based tests reduce mortality from colorectal cancer by 15% to 33% (*Hardcastle, 1996 [A]; Kronborg, 1996 [A]; Mandel, 1993 [A]*). The Minnesota Colon Cancer Control Study (*Mandel, 2000 [A]*) also noted a 20% decline in the incidence of colorectal cancer after 18 years of follow-up, presumably because of the detection and removal of polyps in those undergoing colonoscopy for evaluation of a positive stool guaiac test.

There is considerable variability reported in the literature on the sensitivity and specificity of available guaiac-based stool tests. The reported sensitivity for detecting colorectal cancer with a single guaiac-based stool test ranges from 12.9% to 79.4% (*Allison, 1996 [C]; Imperiale, 2004 [C]*). Tests with high sensitivity (such as Hemoccult SENSE) are preferred over lower sensitivity tests (such as Hemoccult II) to detect as many occult colorectal cancers as possible. Rehydration of guaiac-based fecal occult blood testing is not recommended because of the increase in false-positives and the impact hydration has on the ability to accurately read the test. Testing stool obtained on rectal exam is not an acceptable form of colorectal cancer screening as this has the potential to miss over 90% of colorectal cancers (*Collins, 2005 [C]*).

Patients using a high sensitivity guaiac-based fecal occult blood tests are generally instructed to avoid non-steroidal anti-inflammatory medications and more than one aspirin per day for seven days prior to testing. To avoid false-positive results from dietary factors the manufacturer of Hemoccult SENSE also recommends patients avoid red meat (beef, lamb and liver) for three days prior to testing and on the day of testing. In addition, vitamin C in excess of 250 mg per day should not be consumed for three days prior to testing or on the day of testing. Vitamin C can interfere with the pseudoperoxidase reaction, resulting in a false-negative test. Patients are instructed to collect two samples from three separate bowel movements for testing.

Advantages of guaiac-based fecal occult blood test are that it is readily available in most clinical setting and there is minimal risk to the patient when performing the test. Providers and patients need to be aware that studies demonstrating a reduction in colorectal cancer mortality with guaiac-based fecal occult blood testing followed a program of annual testing over an extended period of time with colonoscopic evaluation of all positive results. Patients choosing to do guaiac-based fecal occult blood test for colorectal cancer screening should do this annually and be willing to have a colonoscopy if any guaiac-based fecal occult blood testing is positive. Repeat stool testing after a positive guaiac-based fecal occult blood testing is not appropriate nor is follow up with a test other than colonoscopy.

Fecal Immunochemical Testing (FIT) Annually

Immunochemical stool tests to detect occult blood in stool use one or more monoclonal antibodies to human globin. These tests were developed to try to improve the specificity of stool testing for occult blood and to eliminate the need for dietary restrictions recommended for guaiac-based tests. Because human hemoglobin is digested in the stomach and small intestine, fecal immunochemical testing is more selective for colonic bleeding than are the guaiac-based tests. There have not been any randomized controlled trials of the effects of fecal immunochemical testing on mortality from colorectal cancer. Levi 2007 in a study of 1,000

ambulatory patients undergoing colonoscopy reported a sensitivity of 94.1% and specificity of 87.5% of a quantitative fecal immunochemical testing for colorectal cancer. A study of almost 6,000 patients undergoing flexible sigmoidoscopy comparing fecal immunochemical testing with a high-sensitivity guaiac-based fecal occult blood testing (Hemoccult SENSA) found a sensitivity of 81.8% for fecal immunochemical testing and 64.3% for guaiac-based fecal occult blood testing for colorectal cancer. However, the sensitivity of guaiac-based fecal occult blood testing for advanced adenomas was 41.3%, as compared to a lower sensitivity of 29.5% for fecal immunochemical testing in the same study (*Allison, 2007 [C]*). Studies comparing fecal immunochemical testing to high-sensitivity guaiac-based fecal occult blood testing (*Allison, 2007 [C]*; *Gopalswamy, 1994 [C]*; *Greenberg, 2000 [C]*; *Levi, 2007 [D]*; *Smith, 2006 [C]*; *Wong, 2003 [C]*) have not found a significant difference in sensitivity or specificity between the two test methods.

The fecal immunochemical testing does not require dietary modification for patients and as with the guaiac-based test, is readily available in most clinical settings. These tests do not involve significant risk to the patient. However, just as with the guaiac-based tests, adherence to annual testing is necessary and patients with a positive test need to undergo colonoscopy.

This test employs immunochemical methods to test for blood in the stool. As it detects human globulin, this test is more specific and has low false-positive rates compared to the guaiac-based fecal occult blood test. For the same reason, the fecal immunochemical test does not yield false-negative results in the presence of high-dose vitamin C supplementation and is more specific for lower gastrointestinal bleeding (*Allison, 2007 [C]*).

Stool DNA Testing (sDNA) Interval Unknown

Cells from the mucosal surface of the colon are shed into the lumen of the colon, and DNA alterations seen in colorectal cancer and in adenomas can be detected using a multitargeted DNA assay. Currently there is only one commercial stool DNA test for colorectal cancer in the U.S.: PreGen-Plus, available through Laboratory Corporation. This test is a second version of the original test; the majority of studies looking at the sensitivity and specificity of stool DNA were done with the first version of the test (*Ahlquist, 2000 [C]*; *Brand, 2004 [C]*; *Calistri, 2003 [D]*; *Imperiale, 2004 [C]*; *Syngal, 2006 [C]*; *Tagore, 2003 [C]*). The sensitivity for detecting colorectal cancer in these studies was 52% to 91% and the specificity was 93% to 97%. There is currently a single study using the second version of the test that reports a sensitivity of 70% for detecting colorectal cancer (*Whitney, 2004 [C]*).

Patients choosing this option for colorectal cancer screening need to be aware that one complete bowel movement is collected and needs to be stored in the refrigerator or frozen until returned to the lab in a collection container supplied by the manufacturer. Stool sample sizes of less than 30 grams are not sufficient and the stool needs to reach the lab within 72 hours of the collection time. This test is currently not Food and Drug Administration (FDA) approved and reimbursement by insurers may be variable. The manufacturer recommends an interval of five years for stool DNA testing, but there is not a consensus regarding the testing interval. Any positive test needs to be evaluated with colonoscopy. It is currently unknown how to manage patients who have a positive stool DNA test but a negative colonoscopy (*Levin, 2008 [R]*).

Neoplastic cells contained in layered DNA are continuously shed into the large bowel lumen. This test employs the detection of such cells in the stool with known DNA alterations leading to carcinogenesis. This test has statistically better sensitivity than the guaiac-based fecal occult blood test (*Imperiale, 2004 [C]*). This test is not widely available, and there are still several unanswered questions related to its use: How frequently should the test be repeated after an initial negative one? What is the significance of a positive test, with a negative colonoscopy (*Levin, 2008 [R]*)?

9. 60 cm Flexible Sigmoidoscopy Every Five Years with or without Stool Test for Occult Blood Annually

Case-controlled trials of flexible sigmoidoscopy have demonstrated a 60% to 80% reduction in colorectal cancer mortality (*Newcomb, 1992 [C]; Selby, 1992 [C]*). There are ongoing prospective randomized controlled trials of screening flexible sigmoidoscopy, but the final results are not yet available (*Gondal, 2003 [A]; Segman, 2002 [A]; UK Flexible Sigmoidoscopy Screening Trial Investigators, 2002 [A]; Weissfeld, 2005 [A]*). Flexible sigmoidoscopy can detect colorectal cancer and adenomatous polyps to the level of insertion of the scope. It is recommended that the scope be inserted to the splenic flexure or beyond 40 cm for the exam to be considered adequate (*Levin, 2008 [R]*).

Patients who have adenomas of any size found at the time of sigmoidoscopy should undergo full colonoscopy because left-sided adenomatous polyps are associated with an increased risk of more proximal polyps or cancers (*Imperiale, 2000 [C]; Lieberman, 2001 [C]*). Recent recommendations by the American Cancer Society state that endoscopists performing flexible sigmoidoscopy should be skilled in obtaining biopsies of polyps, or if biopsies are not obtained, all patients with polyps greater than 5 mm should be further evaluated with full colonoscopy (*Levin, 2008 [R]*). The consensus of this work group was that all patients with polyps not completely removed at the time of sigmoidoscopy should undergo colonoscopy.

The accuracy of flexible sigmoidoscopy, as well as colonoscopy, is dependent on the training and skill of the endoscopist as well as the quality of the bowel preparation. It is recommended that providers exceed the minimum number of training exams delineated in the American Society for Gastrointestinal Endoscopy guidelines before conducting flexible sigmoidoscopies without supervision (*Levin, 2008 [R]; Levin, 2005 [R]*). Studies comparing flexible sigmoidoscopy to colonoscopy have found that the shorter exam is 60% to 70% sensitive for colorectal cancer and advanced adenomas, as compared to the complete exam. Providers and patients should be aware that some patient populations have a higher prevalence of right-sided lesions. Significant lesions are more common in the proximal or right colon after the age of 65 (*Levin, 1999 [D]*). Women are more likely to have proximal or right-sided adenomas or colorectal cancer than are men (*Schoenfeld, 2005 [B]*). Ethnicity may also affect the distribution of lesions in the colon. African Americans may have more proximal lesions as compared to Whites (*Cordice, 1991; Nelson, 1997 [C]*). Whites may have more proximal lesions when compared with Hispanics and Asians (*Francois, 2006 [D]; Theuer, 2001 [C]*). Those groups at higher risk of proximal lesions may benefit from visualization of the entire colon with colonoscopy or CT colonography rather than flexible sigmoidoscopy.

Flexible sigmoidoscopy can be preformed alone as a screening test every five years or combined with annual stool occult blood testing, either guaiac-based fecal occult blood testing or fecal immunochemical testing. If the combination of the two tests is chosen by the patient and their provider, it is preferable to do the stool occult blood testing first. If a positive stool test is detected, the patient should go directly to colonoscopy, thereby avoiding an unnecessary sigmoidoscopy.

Patients should be aware of the limitations of flexible sigmoidoscopy. Only the left side of the colon will be seen with flexible sigmoidoscopy. In most clinical practices, flexible sigmoidoscopy is performed as an office procedure without sedation. This can be associated with some discomfort during and after the exam (*Zubarik, 2002 [B]*). However, some patients may prefer an exam without sedation so that they can drive or return to work after the procedure. Flexible sigmoidoscopy does require the use of a bowel prep. The risk of colonic perforation with sigmoidoscopy without biopsy or polypectomy is less than 1 in 20,000 (*Levin, 2002 [B]; UK Flexible Sigmoidoscopy Screening Trial Investigators, 2002 [A]*). Lesions can be missed on sigmoidoscopy, and advanced neoplasia has been found within three years of an exam in published studies (*Schoen, 2003 [R]*). Patients should understand that finding polyps on a flexible sigmoidoscopy will result in the need for colonoscopy.

10. Double-Contrast Barium Enema Every Five Years

A double-contrast barium enema (DCBE) or a fluoroscopic barium enema by a radiologist with specialized training in gastrointestinal procedures may be performed. The fluoroscopic barium enema should be performed in conjunction with proctoscopy or flexible sigmoidoscopy (*Saito, 1989 [C]*; *Steine, 1993 [C]*).

There are no studies evaluating whether screening by barium enema alone reduces mortality from colorectal cancer in people at average risk for the disease. This option is based on evidence that screening double-contrast barium enema and fluoroscopic barium enema by a gastrointestinal radiologist can image the entire colon and detect cancers and large polyps almost as well as colonoscopy or flexible sigmoidoscopy.

The screening method of double-contrast barium enema does have some limitations. In a study by Johnson, et al., it was found to be less accurate than well-performed CT colonography (*Johnson, 2003 [C]*). Many radiologists have found that decreasing frequency of performance of this examination means that radiologist performance skills, and training of new radiologists to perform this test, are decreasing and the quality of this examination is more dependent on a high-quality bowel preparation than the quality of CT colonography and colonoscopy are dependent on a high-quality bowel preparation.

11. CT Colonography Every Five Years

CT colonography (virtual colonoscopy) has been developed to provide a minimally invasive total colon evaluation with accuracy similar to colonoscopy. It is currently recommended as a test that detects adenomatous polyps and cancer by the joint guideline from the American Cancer Society, the U.S. Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology (*Levin, 2008 [R]*). It allows evaluation of the entire colon. Currently, however, CT colonography is being performed and reimbursed as a colorectal cancer screening procedure at only a few sites.

The other nationally approved radiographic method of total colon evaluation, double-contrast barium enema, has been shown to be inferior to CT colonography for polyp detection in over 800 asymptomatic persons at greater than average risk for colorectal cancer (*Johnson, 2003 [C]*). A recent meta-analysis confirmed that the sensitivity and specificity of the CT colonography for polyps greater than or equal to 6 mm are greater than the sensitivity and specificity of double-contrast barium enema for these polyps (*Sosna, 2008 [C]*).

However, the more important question is the performance of CT colonography in a screening population in comparison to colonoscopy. The most impressive screening CT colonography performance for polyp detection in an asymptomatic population was documented by Pickhardt, et al, in 2003 (*Pickhardt, 2003 [C]*). This study, performed on over 1,200 asymptomatic adults with an average risk of colon cancer, demonstrated a CT colonography sensitivity of 94% for polyps measuring at least 1 cm.

Two meta-analyses of cumulative published CT colonography performance data from 2005 suggested a per-patient sensitivity for large polyps (greater than or equal to 10 mm) of 85%-93% and a per-patient specificity for large polyps of 97%. The cumulative sensitivity for invasive colorectal cancer was 96% (*Halligan, 2005 [M]*; *Mulhall, 2005 [M]*).

Although the complete results have not yet been published, the preliminary results of the ACRIN Study 6664: National CT Colonography Trial demonstrated 90% sensitivity and 86% specificity for larger polyps (greater than or equal to 10 mm) in over 2,500 patients examined at 15 centers. State-of-the-art techniques were combined with specialized training of participating radiologists before the initiation of the trial.

How rapidly CT colonography becomes a common screening test for colorectal cancer will depend on reimbursement for the test, training of radiologists and a nationwide effort by the American College of Radiology to monitor and improve CT colonography quality.

Additionally, CT colonography is the best total colonic imaging examination in the following clinical situations: after incomplete screening or diagnostic colonoscopy; for anticoagulated patients who cannot safely discontinue anticoagulation therapy; and for patients who refuse endoscopy. In many locations, CT colonography is not available, and barium enema can be performed in the situations described above.

The limitations with CT colonography include the fact that the radiologists must be qualified to perform and interpret CT colonography by undergoing training and demonstrating competence prior to performing and interpreting this test (*Pickhardt, 2003 [C]*); another limitation is that patients will need to undergo colonoscopy if the CT colonography demonstrates a colonic polyp 1 cm or larger and possible for a colonic polyp 0.6 cm or larger (depending on physician and patient preference).

12. Colonoscopy Every 10 Years

Colonoscopy allows evaluation of the entire colon and has the advantage of being both a diagnostic and therapeutic procedure. Biopsies can be obtained and polypectomies can be performed to remove precancerous and early-stage cancerous lesions. There have not been any prospective randomized controlled trials of screening colonoscopy. However, there is significant evidence that detection and removal of adenomatous polyps leads to a reduction in the incidence of colorectal cancer. The National Polyp Study reported a reduction in colorectal cancer incidence of 76% to 90% after clearing colonoscopy (*Winawer, 1993 [B]*). The reductions in colorectal cancer incidence reported in studies of fecal occult blood testing and flexible sigmoidoscopy are attributed to the fact that those individuals with positive screening tests then went on to colonoscopy and removal of precursor lesions. National consensus guidelines suggest an interval of 10 years between colonoscopies after a negative exam for the average-risk population (*Winawer, 2003 [R]*).

Baker et al. studied asymptomatic patients who had colonoscopies because of a family history of colon cancer. The study concluded that colonoscopy is indicated for individuals 40 years of age and older who have a first-degree relative with colon cancer (*Baker, 1990 [D]*).

13. Positive Findings?

A positive guaiac-based fecal occult blood test, fecal immunochemical test or stool DNA test all require further evaluation with colonoscopy. Use of another screening modality such as repeating a stool test, barium enema, flexible sigmoidoscopy or CT colonography is not appropriate. The management of the patient with a positive stool DNA test but a negative colonoscopy is unknown at this time and will need to be individualized for each patient.

A positive finding on flexible sigmoidoscopy would be an adenomatous polyp of any size and would warrant further evaluation with colonoscopy (*Imperiale, 2000 [C]*; *Lieberman, 2001 [C]*). From the standpoint of colorectal cancer screening, diverticula and small left-sided hyperplastic polyps are not precursors to cancer and do not need further evaluation. Large hyperplastic polyps proximal to the splenic flexure may be precursors to cancer and additional follow-up may be warranted (*Ferrández, 2004 [D]*; *Huang, 2004 [R]*). There are currently no published or society-endorsed guidelines regarding follow-up of concerning hyperplastic polyps. Characteristics of hyperplastic polyps that should raise concern are multiple hyperplastic polyps proximal to the sigmoid colon, large size (greater than 10 mm – as a frame of reference, most biopsy forceps open to a width of 7 mm), a family history of hyperplastic polyposis syndrome or a family history of colorectal cancer. Follow-up of these patients at this time is individualized but should be at least as aggressive as follow-up for patients with adenomatous polyps (*Snover, 2005 [R]*).

Current American Cancer Society recommendations are that any polyp of 6 mm or greater size seen on double-contrast barium enema should be evaluated with colonoscopy (*Levin, 2008 [R]*).

Patients found to have a polyp of 10 mm or larger on CT colonography should be referred for colonoscopy. Patients with three or more polyps of 6 mm or greater should also be referred for colonoscopy. The American

Algorithm Annotations

Cancer Society guidelines recommend colonoscopy for any patient with a polyp of 6 mm or greater size (*Levin, 2008 [R]*).

If a patient has one or more polyps greater than or equal to 6 mm demonstrated by double-contrast barium enema or CT colonography, colonoscopy will be recommended. Clinicians should be aware that radiologists do not usually report polyps less than or equal to 5 mm by CT colonography, although there is no multidisciplinary consensus regarding the reporting and management of these small polyps. Clinicians should also be aware that CT colonography provides technically limited images of the entire abdomen and pelvis; therefore, a positive finding outside of the colon (extracolonic) may require additional evaluation even though the colon test is negative.

Document Drafted
Feb – Jun 1994

First Edition
May 1995

Second Edition
Feb 1997

Third Edition
Feb 1998

Fourth Edition
Feb 1999

Fifth Edition
Feb 2000

Sixth Edition
Jul 2001

Seventh Edition
Jul 2002

Eighth Edition
Jul 2003

Ninth Edition
Jul 2004

Tenth Edition
Jul 2005

Eleventh Edition
Jul 2006

Twelfth Edition
Begins Jul 2008

Original Work Group Members

Suzanne Bennett, MPH
Health Education
**Park Nicollet Medical
Foundation**

Geri Bergeron, RN
Adult Nursing
Group Health, Inc.

Rick Carlson, MS
Measurement Advisor
Group Health, Inc.

Philip Disraeli, MD
Family Practice
River Valley Clinics

Bryon J. Dockter, RN, MSA
Facilitator
The Bryter Group

Peter Ganzer, MD
Internal Medicine
Park Nicollet Medical Center

Mark Larson, MD
Gastroenterology
Mayo Clinic

Paula Roe
BHCAG Representative
Norwest Corporation

Michael Shaw, MD
Gastroenterology
Park Nicollet Medical Center

Lyn S. Souter, CLS
Laboratory
Group Health, Inc.

Robert Titzler, MD
*Family Practice, Work Group
Leader*

Group Health, Inc.

Released in June 2008 for Twelfth Edition.

The next scheduled revision will occur within 24 months.

Availability of references

References cited are available to ICSI participating member groups on request from the ICSI office. Please fill out the reference request sheet included with your guideline and send it to ICSI.

Contact ICSI at:

8009 34th Avenue South, Suite 1200; Bloomington, MN 55425; (952) 814-7060; (952) 858-9675 (fax)
Online at <http://www.ICSI.org>

Brief Description of Evidence Grading

Individual research reports are assigned a letter indicating the class of report based on design type: A, B, C, D, M, R, X.

A full explanation of these designators is found in the Foreword of the guideline.

References

- Agrawal S, Bhupinderjit A, Bhutani MS, et al. Colorectal cancer in African Americans. *Am J Gastroenterol* 2005;100:515-23. (Class R)
- Ahlquist DA, Skoletsky JE, Boynton KA, et al. Colorectal cancer screening by detection of altered human DNA in stool: feasibility of a multitarget assay panel. *Gastroenterology* 2000;119:1219-27. (Class C)
- Ahsan H, Neugut AI, Garbowski GC, et al. Family history of colorectal adenomatous polyps and increased risk for colorectal cancer. *Ann Intern Med* 1998;128:900-05. (Class C)
- Allison JE, Sakoda LC, Levin TR, et al. Screening for colorectal neoplasms with new fecal occult blood tests: update on performance characteristics. *J Natl Cancer Inst* 2007;99:1762-70. (Class C)
- Allison JE, Tekawa IS, Ransom LJ, Adrian AL. A comparison of fecal occult-blood tests for colorectal-cancer screening. *N Engl J Med* 1996;334:155-59. (Class C)
- Baker JW, Gathright JB Jr, Timmcke AE, et al. Colonoscopic screening of asymptomatic patients with a family history of colon cancer. *Dis Colon Rectum* 1990;33:926-30. (Class D)
- Brand RE, Ross ME, Shuber AP. Reproducibility of a multitarget stool-based DNA assay for colorectal cancer detection. *Am J Gastroenterol* 2004;99:1338-41. (Class C)
- Calistri D, Rengucci C, Bocchini R, et al. Fecal multiple molecular tests to detect colorectal cancer in stool. *Clin Gastroenterol Hepatol* 2003;1:377-83. (Class D)
- Collins JF, Lieberman DA, Durbin TE, et al. Accuracy of screening for fecal occult blood on a single stool sample obtained by digital rectal examination: a comparison with recommended sampling practice. *Ann Intern Med* 2005;142:81-85. (Class C)
- Federici A, Rossi PG, Borgia P, et al. The immunochemical faecal occult blood test leads to higher compliance than the guaiac for colorectal cancer screening programmes: a cluster randomized controlled trial. *J Med Screen* 2005;12:83-88. (Class A)
- Ferrández A, Samowitz W, DiSario JA, et al. Phenotypic characteristics and risk of cancer development in hyperplastic polyposis: case series and literature review. *Am J Gastroenterol* 2004;99:2012-18. (Class D)
- Francois F, Park J, Bini EJ. Colon pathology detected after a positive screening flexible sigmoidoscopy: a prospective study in an ethnically diverse cohort. *Am J Gastroenterol* 2006;101:823-30. (Class D)
- Fuchs CS, Giovannucci EL, Colditz GA, et al. A prospective study of family history and the risk of colorectal carcinoma. *N Engl J Med* 1994;331:1669-74. (Class B)
- Gondal G, Grotmol T, Hofstad B, et al. The Norwegian colorectal cancer prevention (NORCCAP) screening study: baseline findings and implementations for clinical work-up in age groups 50-64 years. *Scand J Gastroenterol* 2003;38:635-42. (Class A)
- Gopalswamy N, Stelling HP, Markert RJ, et al. A comparative study of eight fecal occult blood tests and hemoquant in patients in whom colonoscopy is indicated. *Arch Fam Med* 1994;3:1043-48. (Class C)
- Greenberg PD, Bertario L, Gnauck R, et al. A prospective multicenter evaluation of new fecal occult blood tests in patients undergoing colonoscopy. *Am J Gastroenterol* 2000;95:1331-38. (Class C)
- Halligan S, Altman DG, Taylor SA, et al. CT colonography in the detection of colorectal polyps and cancer: systematic review, meta-analysis, and proposed minimum data set for study level reporting. *Radiol* 2005;237:893-904. (Class M)

References

- Hardcastle JD, Chamberlain JO, Robinson MHE, et al. Randomised controlled trial of faecal occult-blood screening for colorectal cancer. *Lancet* 1996;348:1472-77. (Class A)
- Huang CS, O'Brien MJ, Yang S, Farraye FA. Hyperplastic polyps, serrated adenomas, and the serrated polyp neoplasia pathway. *Am J Gastroenterol* 2004;99:2242-55. (Class R)
- Imperiale TF, Ransohoff DF, Itzkowitz SH, et al. Fecal DNA versus fecal occult blood for colorectal-cancer screening in an average-risk population. *N Engl J Med* 2004;351:2704-14. (Class C)
- Imperiale TF, Wagner DR, Lin CY, et al. Risk of advanced proximal neoplasms in asymptomatic adults according to the distal colorectal findings. *N Engl J Med* 2000;343:169-74. (Class C)
- Johnson CD, Harmsen WS, Wilson LA, et al. Prospective blinded evaluation of computed tomographic colonography for screen detection of colorectal polyps. *Gastroenterology* 2003;125:311-19. (Class C)
- Kronborg O, Fenger C, Olsen J, et al. Randomised study of screening for colorectal cancer with faecal occult blood test. *Lancet* 1996;348:1467-71. (Class A)
- Levi Z, Hazazi R, Vilkin A, et al. A quantitative immunochemical fecal occult blood test for colorectal neoplasia. *Ann Intern Med* 2007;146:244-55. (Class D)
- Levin B, Lieberman DA, McFarland B, et al. American cancer society guidelines for screening and surveillance for the early detection of colorectal cancer and adenomatous polyps, 2008. *CA Cancer J Clin* 2008;58:1-31. (Class R)
- Levin TR, Conell C, Shapiro JA, et al. Complications of screening flexible sigmoidoscopy. *Gastroenterology* 2002;123:1786-92. (Class B)
- Levin TR, Farraye FA, Schoen RE, et al. Quality in the technical performance of screening flexible sigmoidoscopy: recommendations of an international multi-society task group. *Gut* 2005;54:807-13. (Class R)
- Lieberman DA, Weiss DG, Bond JH, et al. Use of colonoscopy to screen asymptomatic adults for colorectal cancer. *N Engl J Med* 2000;343:162-68. (Class C)
- Lieberman DA, Weiss DG, for the Veterans Affairs Cooperative Study Group 380. One-time screening for colorectal cancer with combined fecal occult-blood testing and examination of the distal colon. *N Engl J Med* 2001;345:555-60. (Class C)
- Mandel JS, Bond JH, Church TR, et al. Reducing mortality from colorectal cancer by screening for fecal occult blood. *N Engl J Med* 1993;328:1365-71. (Class A)
- Mandel JS, Church TR, Bond JH, et al. The effect of fecal occult-blood screening on the incidence of colorectal cancer. *N Engl J Med* 2000;343:1603-07. (Class A)
- Mulhall BP, Veerappan GR, Jackson JL. Meta-analysis: computed tomographic colonography. *Ann Intern Med* 2005;142:635-50. (Class M)
- Nakama H, Fattah A, Zhang B, Kamijo N. Digital rectal examination sampling of stool is less predictive of significant colorectal pathology than stool passed spontaneously. *Eur J Gastroenterol Hepatol* 2000;12:1235-38. (Class C)
- Nelson RL, Dollear T, Freels S, Persky V. The relation of age, race, and gender to the subsite location of colorectal carcinoma. *Cancer* 1997;80:193-97. (Class C)
- Newcomb PA, Norfleet RG, Storer BE, et al. Screening sigmoidoscopy and colorectal cancer mortality. *J Natl Cancer Inst* 1992;84:1572-75. (Class C)
- Pickhardt PJ, Choi JR, Hwang I, et al. Computed tomographic virtual colonoscopy to screen for colorectal neoplasia in asymptomatic adults. *N Engl J Med* 2003;349:2191-200. (Class C)

References

- Saito Y, Slezak P, Rubio C. The diagnostic value of combining flexible sigmoidoscopy and double-contrast barium enema as a one-stage procedure. *Gastrointest Radiol* 1989;14:357-59. (Class C)
- Schoen RE, Papachristou GI. Screening intervals for colonic neoplasia. *Curr Opin Gastroenterol* 2003;19:51-56. (Class R)
- Schoenfeld P, Cash B, Flood A, et al. Colonoscopic screening of average-risk women for colorectal neoplasia. *N Engl J Med* 2005;352:2061-68. (Class B)
- Segnan N, Senore C, Andreoni B, et al. Baseline findings of the Italian multicenter randomized controlled trial of "once-only sigmoidoscopy" – SCORE. *J Natl Cancer Inst* 2002;94:1763-72. (Class A)
- Selby JV, Friedman GD, Quesenberry CP Jr, et al. A case-control study of screening sigmoidoscopy and mortality from colorectal cancer. *N Engl J Med* 1992;326:653-57. (Class C)
- Smith A, Young GP, Cole SR, Bampton P. Comparison of a brush-sampling fecal immunochemical test for hemoglobin with a sensitive guaiac-based fecal occult blood test in detection of colorectal neoplasia. *Cancer* 2006;107:2152-59. (Class C)
- Snover DC, Jass JR, Fenoglio-Preiser C, Batts KP. Serrated polyps of the large intestine: a morphologic and molecular review of an evolving concept. *Am J Clin Pathol* 2005;124:380-91. (Class R)
- Soetikno RM, Kaltenbach T, Rouse RV, et al. Prevalence of nonpolypoid (flat and depressed) colorectal neoplasms in asymptomatic and symptomatic adults. *JAMA* 2008;299:1027-35. (Class D)
- Sosna J, Sella T, Sy O, et al. Critical analysis of the performance of double-contrast barium enema for detecting colorectal polyps ≥ 6 mm in the era of CT colonography. *AJR* 2008;190:374-85. (Class C)
- Steine S, Stordahl A, Lunde OC, et al. Double-contrast barium enema versus colonoscopy in the diagnosis of neoplastic disorders: aspects of decision-making in general practice. *Fam Pract* 1993;10:288-91. (Class C)
- Syngal S, Stoffel E, Chung D, et al. Detection of stool DNA mutations before and after treatment of colorectal neoplasia. *Cancer* 2006;106:277-83. (Class C)
- Tagore KS, Lawson MJ, Yucaitis JA, et al. Sensitivity and specificity of a stool DNA multitarget assay panel for the detection of advanced colorectal neoplasia. *Clin Colorectal Cancer* 2003;3:47-53. (Class C)
- Theuer CP, Taylor TH, Brewster WR, et al. The topography of colorectal cancer varies by race/ethnicity and affects the utility of flexible sigmoidoscopy. *Am Surg* 2001;67:1157-61. (Class C)
- UK Flexible Sigmoidoscopy Screening Trial Investigators. Single flexible sigmoidoscopy screening to prevent colorectal cancer: baseline findings of a UK multicentre randomised trial. *Lancet* 2002;359:1291-300. (Class A)
- Weissfeld JL, Schoen RE, Pinsky PF, et al. Flexible sigmoidoscopy in the PLCO cancer screening trial: results from the baseline screening examination of a randomized trial. *J Natl Cancer Inst* 2005;97:989-97. (Class A)
- Whitney D, Skoletsky J, Moore K, et al. Enhanced retrieval of DNA from human fecal samples results in improved performance of colorectal cancer screening test. *J Mol Diagn* 2004;6:386-95. (Class C)
- Winawer S, Fletcher R, Rex D, et al. Colorectal cancer screening and surveillance: clinical guidelines and rationale – update based on new evidence. *Gastroenterology* 2003;124:544-60. (Class R)
- Winawer SJ, Zauber AG, Gerdes H, et al. Risk of colorectal cancer in the families of patients with adenomatous polyps. *N Engl J Med* 1996;334:82-7. (Class C)

References

Winawer SJ, Zauber AG, O'Brien MJ, et al. Randomized comparison of surveillance intervals after colonoscopic removal of newly diagnosed adenomatous polyps. *N Engl J Med* 1993b;328:901-06. (Class A)

Wong BCY, Wong WM, Cheung KL, et al. A sensitive guaiac faecal occult blood test is less useful than an immunochemical test for colorectal cancer screening in a Chinese population. *Aliment Pharmacol Ther* 2003;18:941-46. (Class C)

Zubarik R, Ganguly E, Benway D, et al. Procedure-related abdominal discomfort in patients undergoing colorectal cancer screening: a comparison of colonoscopy and flexible sigmoidoscopy. *Am J Gastroenterol* 2002;97:3056-61. (Class B)

This section provides resources, strategies and measurement specifications for use in closing the gap between current clinical practice and the recommendations set forth in the guideline.

The subdivisions of this section are:

- Priority Aims and Suggested Measures
 - Measurement Specifications
- Key Implementation Recommendations
- Knowledge Resources
- Resources Available

Priority Aims and Suggested Measures

1. Increase the number of patients age 50 and older who are up to date with colorectal cancer screening.

Possible measures for accomplishing this aim:

- a. Percentage of patients age 50 and older who are up to date with colorectal cancer screening.
 - b. Percentage of African American patients age 45 and older who are up to date with colorectal cancer screening.
2. Increase the number of patients who have had appropriate screening for colorectal cancer using a screening test method discussed and agreed upon by both the patient and his/her physician.

Possible measure for accomplishing this aim:

- a. Percentage of adult patients with documentation that one of the following screening methods was performed:
 - FOBT occult blood test yearly
 1. Annual guaiac-based fecal occult blood test with high test sensitivity for cancer, or
 2. Annual fecal immunochemical test with high test sensitivity for cancer
 - Flexible sigmoidoscopy every five years
 - Double-contrast barium enema (DCBE) every five years
 - Computed tomographic colonography every five years
 - Colonoscopy every 10 years
 - Stool DNA testing (interval unknown)*

* The manufacturer recommends an interval of five years for stool DNA testing, but there is not consensus on testing intervals.

Measurement Specifications

Possible Success Measure #1a

Percentage of patients age 50 and older who are up to date with colorectal cancer screening.

Population Definition

Patients age 50 and older.

Data of Interest

Denominator: # of patients who were up to date with colorectal cancer screening at the time of their last visit.

Priority Aims and Suggested Measures

Possible Success Measure #1b

Percentage of African American patients age 45 and older who are up to date with colorectal cancer screening.

Population Definition

African American patients age 45 and older.

Data of Interest

Denominator: # of African American patients who were up to date with colorectal cancer screening at the time of their last visit

Numerator: Patients in the denominator, having one or more of the following screenings

- Occult blood test yearly
 1. Annual guaiac-based fecal occult blood test with high test sensitivity for cancer, or
 2. Annual fecal immunochemical test with high test sensitivity for cancer
 - Flexible sigmoidoscopy every five years
 - Double-contrast barium enema (DCBE) every five years
 - Computed tomographic colonography every five years
 - Colonoscopy every 10 years

Method/Source of Data Collection

A random sample of at least 10 patient medical records per month. The status of the individuals is most likely collected with chart abstract data. However, an individual's status may be collected with administrative data and augmented with chart abstraction.

A lack of data on an individual is interpreted as not up to date and is not counted in the numerator but is included in the denominator.

Notes

The goal of this measure is to determine up to date status of those seen. It will not measure those not seen by a medical group.

Key Implementation Recommendations

The following system change was identified by the guideline work group as key strategies for health care systems to incorporate in support of the implementation of this guideline.

1. Establish processes for both identifying age-appropriate individuals who have not undergone appropriate screening and contacting these patients to encourage them to do so (examples may include chart reminders, computer-generated reminder letters, etc.)

Knowledge Products and Resources

Criteria for Selecting Resources

The following resources were selected by the Colorectal Cancer Screening guideline work group as additional resources for providers and/or patients. The following criteria were considered in selecting these resources.

- The site contains information specific to the topic of the guideline.
- The content is supported by evidence-based research.
- The content includes the source/author and contact information.
- The content clearly states revision dates or the date the information was published.
- The content is clear about potential biases, noting conflict of interest and/or disclaimers as appropriate.

Resources Available to ICSI Members Only

ICSI has a wide variety of knowledge resources that are *only* available to ICSI members (these are indicated with an asterisk in far left-hand column of the Resources Available table). In addition to the resources listed in the table, ICSI members have access to a broad range of materials including tool kits on CQI processes and Rapid Cycling that can be helpful. To obtain copies of these or other Knowledge Resources, go to <http://www.icsi.org/knowledge>. To access these materials on the Web site, you must be logged in as an ICSI member.

The resources in the table on the next page that are not reserved for ICSI members are available to the public free-of-charge.

Resources Available

*	Author/Organization	Title/Description	Audience	Websites/Order Information
	American Cancer Society	American Cancer Society: Provides the public with accurate, up to date information on cancer.	Health Care Professionals; Patients and Families	http://www.americancancersociety.org
*	CentraCare	CentraCare Report #22: "Improvement Case Report on Improving Colon Cancer Screening Rates" (October 2001).	Health Care Professionals	http://www.icsi.org
	Centers for Disease Control	Centers for Disease Control: CDC promotes colorectal cancer (cancer of the colon and rectum) prevention by building partnerships, encouraging screening, supporting education and training, and conducting surveillance and research.	Health Care Professionals; Patients and Families	http://www.cdc.gov
	Founding members include the Minnesota Medical Association and seven non-profit Minnesota health plans: Blue Cross and Blue Shield of Minnesota/Blue Plus, First Plan of Minnesota, HealthPartners, Medica, Metropolitan Health Plan, PreferredOne and UCare.	MN Community Measurement: MN Community Measurement is Minnesota's source for information on health care quality.	Health Care Professionals; Patients and Families	http://www.mncm.org
*	ICSI	Preventive Services Focus Group: #9 (1999)	Health Care Professionals	http://www.icsi.org
	Mayo Clinic	Mayo Clinic: Mayo Clinic is the first and largest integrated, not-for-profit group practice in the world.	Health Care Professionals; Patients and Families	http://www.mayoclinic.org/colon-cancer/
	The National Comprehensive Cancer Network	The NCCN, a not-for-profit alliance of 21 of the world's leading cancer centers, is dedicated to improving the quality and effectiveness of care. Provided to patients with cancer.	Health Care Professionals; Patients and Families	http://www.nccn.org

* Available to ICSI members only.

Resources Available

*	Author/Organization	Title/Description	Audience	Websites/Order Information
	National Institute of Health	The National Cancer Institute: Coordinates the National Cancer Program, which conducts and supports research, training, health information dissemination, and other programs with respect to the cause, diagnosis, prevention, and treatment of cancer, rehabilitation from cancer, and the continuing care of cancer patients and the families of cancer patients.	Health Care Professionals	http://www.cancer.gov
*	Park Nicollet Health Systems	Park Nicollet Health Systems: This is a pamphlet containing information around colorectal cancer screening and why it is important for patients to be appropriately screened.	Patients and Families	http://www.icsi.org

* Available to ICSI members only.