



Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria™ for screening for colorectal cancer.

BIBLIOGRAPHIC SOURCE(S)

Glick SN, Ralls PW, Balfe DM, Bree RL, DiSantis DJ, Kidd R, Levine MS, Megibow AJ, Mezwa DG, Saini S, Shuman WP, Greene FL, Laine LA, Lillemoe K. Screening for colorectal cancer. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):231-7. [22 references] [PubMed](#)

COMPLETE SUMMARY CONTENT

SCOPE

METHODOLOGY - including Rating Scheme and Cost Analysis

RECOMMENDATIONS

EVIDENCE SUPPORTING THE RECOMMENDATIONS

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

QUALIFYING STATEMENTS

IMPLEMENTATION OF THE GUIDELINE

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT

CATEGORIES

IDENTIFYING INFORMATION AND AVAILABILITY

SCOPE

DISEASE/CONDITION(S)

Colorectal cancer

GUIDELINE CATEGORY

Diagnosis
Screening

CLINICAL SPECIALTY

Family Practice
Gastroenterology
Internal Medicine
Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for colorectal cancer

TARGET POPULATION

Patients with colorectal cancer

INTERVENTIONS AND PRACTICES CONSIDERED

1. Barium enema
 - Double-contrast
 - Single-contrast
2. Computed tomography
 - Computed tomography colonography 2D
 - Computed tomography colonography 3D
 - Computed tomography colonography 2D and 3D
3. Ultrasound: hydrocolonography

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis and screening

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, primarily using the National Library of Medicine's MEDLINE database. The developer identified and collected the major applicable articles.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Delphi Method)
Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed to reach agreement in the formulation of the Appropriateness Criteria. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty (80) percent agreement is considered a consensus. If consensus cannot be reached by this method, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

Cost-effectiveness analysis has demonstrated that the double-contrast barium enema (DCBE) performed every five to ten years costs less than \$22,000 per life year saved for a possible range of natural history, far below the standard of

\$40,000. Double-contrast barium enema every five years always cost less than \$14,000 per life year saved. Even in individuals with a family history, DCBE performed every five years has been shown to be the most cost-effective screening strategy.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria and the Chair of the ACR Board of Chancellors.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria™

Clinical Condition: Colorectal Cancer Screening

Variant 1: Average risk (age >50).

Radiologic Exam Procedure	Appropriateness Rating	Comments
Barium enema		
Double-contrast (5 years)	8	
Double-contrast (10 years)	8	
Single-contrast (5 years)	4	
Single-contrast (10 years)	4	
Computed Tomography		
Computed tomography colonography 2D	2	Investigational technique.
Computed tomography colonography 3D	2	Investigational technique.
Computed tomography colonography 2D and 3D	2	Investigational technique.
Ultrasound		
Hydrocolonography	2	

<p><u>Appropriateness Criteria Scale</u></p> <p>1 2 3 4 5 6 7 8 9</p> <p>1=Least appropriate 9=Most appropriate</p>

Variant 2: Moderate risk – first-degree family history of cancer or adenoma.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Barium enema		
Double-contrast (5 years)	8	
Double-contrast (10 years)	6	
Single-contrast (5 years)	4	
Single-contrast (10 years)	4	
Computed Tomography		
Computed tomography colonography 2D	2	Investigational technique.
Computed tomography colonography 3D	2	Investigational technique.
Computed tomography colonography 2D and 3D	2	Investigational technique.
Ultrasound		
Hydrocolonography	2	

<p><u>Appropriateness Criteria Scale</u></p> <p>1 2 3 4 5 6 7 8 9</p> <p>1=Least appropriate 9=Most appropriate</p>

Variant 3: Moderate risk – personal history of adenoma or carcinoma.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Barium enema		
Double-contrast (5 years)	8	

Double-contrast (10 years)	6	
Single-contrast (5 years)	4	
Single-contrast (10 years)	2	
Computed Tomography		
Computed tomography colonography 2D	2	Investigational technique.
Computed tomography colonography 3D	2	Investigational technique.
Computed tomography colonography 2D and 3D	2	Investigational technique.
Ultrasound		
Hydrocolonography	2	
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 4: Average risk following fecal occult blood test

Radiologic Exam Procedure	Appropriateness Rating	Comments
Barium enema		
Double-contrast	8	
Single-contrast	4	
Computed Tomography		
Computed tomography colonography 2D	2	Investigational technique.
Computed tomography colonography 3D	2	Investigational technique.
Computed tomography colonography 2D and 3D	2	Investigational technique.
Ultrasound		
Hydrocolonography	2	

Appropriateness Criteria Scale

1 2 3 4 5 6 7 8 9

1=Least appropriate 9=Most appropriate

Variant 5: High risk – hereditary nonpolyposis colorectal cancer.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Barium enema		
Double-contrast (every 1-2 years at age 20, annually at age 40)	8	
Single-contrast (every 1-2 years at age 20, annually at age 40)	4	
Computed Tomography		
Computed tomography colonography 2D	2	Investigational technique.
Computed tomography colonography 3D	2	Investigational technique.
Computed tomography colonography 2D and 3D	2	Investigational technique.
Ultrasound		
Hydrocolonography	2	

Appropriateness Criteria Scale

1 2 3 4 5 6 7 8 9

1=Least appropriate 9=Most appropriate

Variant 6: High risk – ulcerative colitis.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Barium enema		
Double-contrast (1 year)	6	
Double-contrast (2 years)	6	
Single-contrast (1 year)	4	

Single-contrast (2 years)	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1 =Least appropriate 9=Most appropriate		

Excerpted by the National Guideline Clearinghouse (NGC).

Summary

Double-Contrast Barium Enema

The double-contrast barium enema is generally regarded as the most accurate imaging study for colorectal neoplasms. There are no studies in which the double-contrast barium enema has been used for primary screening evaluation. However, it has been assessed in the workup of a positive fecal occult blood test and in adenoma surveillance. All other information is derived from symptomatic individuals. The best data for performance in the detection of cancer comes from studies in which the imaging history, within a specified interval, of diagnosed cancer cases has been reviewed to determine the sensitivity. Using this methodology, the sensitivity ranges from 75%-95%. When considering only localized cancer, the sensitivity varies from 58%-94%. In scenarios where double-contrast barium enema has been compared to proximate endoscopy, the sensitivity has been 80%-100%. In the evaluation of a positive fecal occult blood test, most reports indicate a sensitivity of 75%-80%. The sensitivity of double-contrast barium enema for large adenomas has been best studied when all subjects have undergone both radiologic and endoscopic procedures. With this study design, the best estimate of sensitivity is 75%-85%. In the large study in which polypectomy was shown to reduce the incidence of cancer, most of the benefit was derived during the initial adenoma clearance. Almost one third of the entry group was selected because of a positive barium enema. It has been determined that the specificity of double-contrast barium enema for large adenomas is 96% and the negative predictive value is 98%. It is frequently suggested that the double-contrast barium enema does not perform as well in the rectosigmoid. However, well-designed studies have shown that sensitivity figures for the double-contrast barium enema in this anatomic region are comparable to those in other colonic sites. Certainly by supplementing double-contrast barium enema with flexible sigmoidoscopy, the neoplastic yield can be increased. In the work-up of a positive fecal occult blood test, the combination of the two procedures detected 98% of large polyps and cancers. Whether the mortality benefit is sufficient to justify the cost, risk, and inconvenience produced by two tests is unknown. The determination is most likely affected by disease prevalence and risk level. As previously mentioned, screening with a double-contrast barium enema and flexible sigmoidoscopy contributed to a reduction in cancer incidence in hereditary nonpolyposis colorectal cancer kindred, a group with a higher lesion distribution proximal to the reach of flexible sigmoidoscopy. Cost-effectiveness analysis has demonstrated that the double-contrast barium enema performed every five to ten years costs less than \$22,000 per life year saved for a possible range of natural history, far below the standard of \$40,000. Double-contrast

barium enema every five years always cost less than \$14,000 per life year saved. Even in individuals with a family history, double-contrast barium enema performed every five years has been shown to be the most cost-effective screening strategy.

Double-contrast barium enema is a safe procedure with a perforation rate of 1/25,000. This can be compared to the perforation rate associated with other options such as single contrast barium enema (1/10,000), flexible sigmoidoscopy (1/5,000), and diagnostic colonoscopy (1/2,000).

There is very little information on double-contrast barium enema in cancer surveillance for inflammatory bowel disease. In one study, double-contrast barium enema identified 14/22 areas of dysplasia or cancer in ten patients. No information on the correct identification of patients was given. However, double-contrast barium enema did identify four of seven cases occurring in endoscopically normal mucosa, suggesting that double-contrast barium enema could have a complementary role in the surveillance program.

Single-Contrast Barium Enema

A preponderance of the literature portrays a dramatically inferior performance profile for the single-contrast barium enema. However, most of these studies were performed before 1970 and were published in nonradiologic journals, or focused on patients with persistent symptoms after a normal barium enema. Recent studies suggest that single contrast barium enema has the potential to be as sensitive as double-contrast barium enema for cancer and large polyps. Reported sensitivity for cancer ranges from 82%-95% and 95% for large polyps. However, because of the paucity of studies and the limitations of the study designs, questions arise about the reproducibility of the results, particularly for large polyps. In one of the fecal occult blood test trials, single contrast barium enema was used for diagnostic follow-up. The sensitivity for cancer was 80%. Most authorities question the ability of single contrast barium enema to adequately evaluate the rectum and recommend supplementation with sigmoidoscopy.

Computed Tomography Colonography

Helical computed tomography scanning with special software has been shown to be capable of detecting colonic adenomas and carcinomas. These can be displayed in a two-dimensional (2-D) mode, similar to conventional axial computed tomography scans, or as three-dimensional (3D) images, similar to a colonoscopic perspective. Only a few small highly selected studies have been performed. In a blinded prospective study, the sensitivity and specificity combining 2D and 3D techniques for large polyps was 75% and 90% respectively. No statistically significant difference has been found between the sensitivity of 2D and 3D reconstructions although performing both yields slightly better results. Also, 3D colonography improves the specificity of the study. Interpretation time is long with current technology, requiring 20 to 60 minutes in a normal colon. Several issues on patient preparation, scanning technique, and cost of the study remain to be resolved.

Ultrasound

A technique for evaluating colonic neoplasia in which ultrasound was performed following colonic distension with rectally administered water has been described. The sensitivity and specificity for carcinoma was 94% and 100% respectively. Statistics for polyps >7mm were 91% and 100%. No other reports in the literature support the reproducibility of these findings. Another study produced extremely poor results (12.5% >7 mm polyp) with this technique.

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for screening and evaluation of colorectal cancer

POTENTIAL HARMS

Risk of colonic perforation:

- Double-contrast barium enema has a perforation rate of 1/25,000.
- Single contrast barium enema has a perforation rate of 1/10,000.
- Flexible sigmoidoscopy has a perforation rate of 1/5,000
- Diagnostic colonoscopy has a perforation rate of 1/2,000.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate

imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Glick SN, Ralls PW, Balfe DM, Bree RL, DiSantis DJ, Kidd R, Levine MS, Megibow AJ, Mezwa DG, Saini S, Shuman WP, Greene FL, Laine LA, Lillemoe K. Screening for colorectal cancer. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl): 231-7. [22 references] [PubMed](#)

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1998

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria.™

GUIDELINE COMMITTEE

ACR Appropriateness Criteria™ Committee, Expert Panel on Gastrointestinal Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Names of Panel Members: Seth N. Glick, MD; Philip W. Ralls, MD; Dennis M. Balfe, MD; Robert L. Bree, MD; David J. DiSantis, MD; Reiley Kidd, MD; Marc S. Levine, MD; Alec J. Megibow, MD, MPH; Duane G. Mezwa, MD; Sanjay Saini, MD; William P. Shuman, MD; Frederick Leslie Greene, MD; Loren A. Laine, MD; Keith Lillemoe, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

The ACR Appropriateness Criteria™ are reviewed after five years, if not sooner, depending upon introduction of new and highly significant scientific evidence. The next review date for this topic is 2003.

GUIDELINE AVAILABILITY

Electronic copies: Available from the [American College of Radiology \(ACR\) Web site](#).

Print copies: Available from ACR, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on March 19, 2001. The information was verified by the guideline developer on March 29, 2001.

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