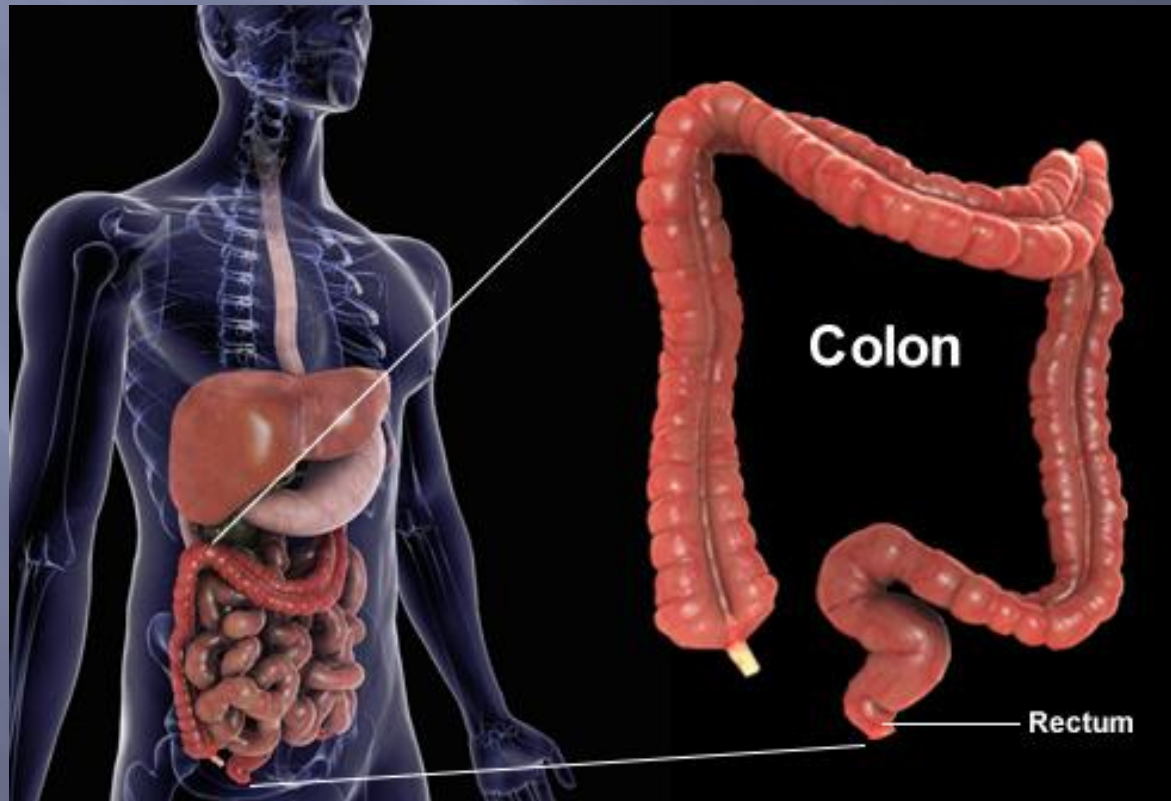


# Screening Program for Detection of Early Colorectal Cancer

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# About Colorectal Cancer

- Colorectal cancer is a malignant tumor arising from the inner wall of the large intestine (colon) or rectum.



# Etiology

- Colorectal cancer is a multifactorial disease process. Genetic factors, environmental exposures (including diet), and inflammatory conditions of digestive tract are all involved in the development of colorectal cancer.
- Current research indicates that genetic factors have the greatest correlation to colorectal cancer.
- Hereditary mutation of the APC gene is the cause of familial adenomatous polyposis (FAP), in which affected individuals carry an almost 100% risk of developing colon cancer by age 40 years.
- Hereditary nonpolyposis colon cancer syndrome (HNPCC, Lynch syndrome) poses about a 40% lifetime risk for developing colorectal cancer. Lynch syndrome is characterized by deficient mismatch repair (dMMR) due to inherited mutation in one of the mismatch repair genes, such as hMLH1, hMSH2, hMSH6, hPMS1, hPMS2, and possibly other undiscovered genes. HNPCC is a cause of about 6% of all colon cancers.

# Risk Factors

- Older age: The great majority of people diagnosed with colon cancer are older than 50.
- African-American race.
- A personal history of colorectal cancer or polyps.
- Inflammatory intestinal conditions. Chronic inflammatory diseases of the colon, such as ulcerative colitis and Crohn's disease, can increase your risk of colon cancer.
- Inherited syndromes that increase colon cancer risk: These syndromes include familial adenomatous polyposis and hereditary nonpolyposis colorectal cancer, which is also known as Lynch syndrome.
- Family history of colon cancer.
- Low-fiber, high-fat diet. Colon cancer and rectal cancer may be associated with a diet low in fiber and high in fat and calories..
- A sedentary lifestyle.
- Diabetes. People with diabetes and insulin resistance may have an increased risk of colon cancer.
- Obesity.
- Smoking.
- Alcohol.
- Radiation therapy for cancer.

# Clinical Presentation

## ▣ Symptoms:

- A change in your bowel habits, including diarrhea or constipation or a change in the consistency of your stool, that lasts longer than four weeks
- Rectal bleeding or blood in your stool
- Persistent abdominal discomfort, such as cramps, gas or pain
- A feeling that your bowel doesn't empty completely
- Weakness or fatigue
- Unexplained weight loss

## ▣ Signs

- Abdominal tenderness
- Macroscopic rectal bleeding
- Palpable abdominal mass
- Hepatomegaly
- Ascites

# Colorectal Cancer Screening Guidelines

- ▣ **American Cancer Society (ACS), US Multi-Society Task Force on Colorectal Cancer, and American College of Radiology.**
- ▣ **U.S. Preventive Services Task Force (USPSTF).**
- ▣ **American College of Physicians (ACP).**
- ▣ **American College of Gastroenterology (ACG).**

# American Cancer Society (ACS), US Multi-Society Task Force on Colorectal Cancer, and American College of Radiology

- A joint guideline developed by the American Cancer Society, US Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology recommends that **screening for colorectal cancer and adenomatous polyps start at age 50 years in asymptomatic men and women.**
- In addition, individuals with any of the following **colorectal cancer risk factors** should undergo colonoscopy at an earlier age and more frequently than average risk individuals:
  - ✓ Family history of colorectal cancer or polyps
  - ✓ Family history of a hereditary colorectal cancer syndrome such as familial adenomatous polyposis (FAP) or hereditary non-polyposis colon cancer (HNPCC)
  - ✓ Personal history of colorectal cancer
  - ✓ Personal history of chronic inflammatory bowel disease (ulcerative colitis or Crohn disease)

# Screening options

- Screening options for average-risk adults consist of tests that detect adenomatous polyps and cancer, and tests that primarily detect cancer. Any one of these tests can be used for screening.
- Tests that detect adenomatous polyps and cancer, and their recommended frequency, include the following:
  - ✓ Flexible sigmoidoscopy every 5 years
  - ✓ Colonoscopy every 10 years
  - ✓ Double-contrast barium enema every 5 years
  - ✓ Computed tomographic (CT) colonography every 5 years
- Tests that primarily detect cancer, and their recommended frequency, include the following:
  - ✓ Annual guaiac-based fecal occult blood test (FOBT) with high test sensitivity for cancer. It is done once a year.
  - ✓ Annual fecal immunochemical test (FIT) with high test sensitivity for cancer. It is also done once a year.
  - ✓ Stool DNA test with high sensitivity for cancer, interval uncertain.



# U.S. Preventive Services Task Force (USPSTF)

- The USPSTF recommends that screening for colorectal cancer start at age 50 years and continue until age 75 years.
- For adults aged 76 to 85 years, the decision to screen should be individualized, taking into account the patient's overall health and prior screening history.
- The USPSTF does not recommend colorectal cancer screening for adults older than 85 years.

# Screening options

- **Stool-based screening tests and intervals** are as follows:
  - ✓ Guaiac-based fecal occult blood test (FOBT), every year
  - ✓ Fecal immunochemical test (FIT), every year
  - ✓ FIT-DNA, every 1 or 3 years
- **Direct visualization screening tests and intervals** are as follows:
  - ✓ Colonoscopy, every 10 years
  - ✓ Computed tomographic (CT) colonography, every 5 years
  - ✓ Flexible sigmoidoscopy, every 5 years
  - ✓ Flexible sigmoidoscopy with FIT; sigmoidoscopy every 10 years, with FIT every year

# American College of Physicians (ACP)

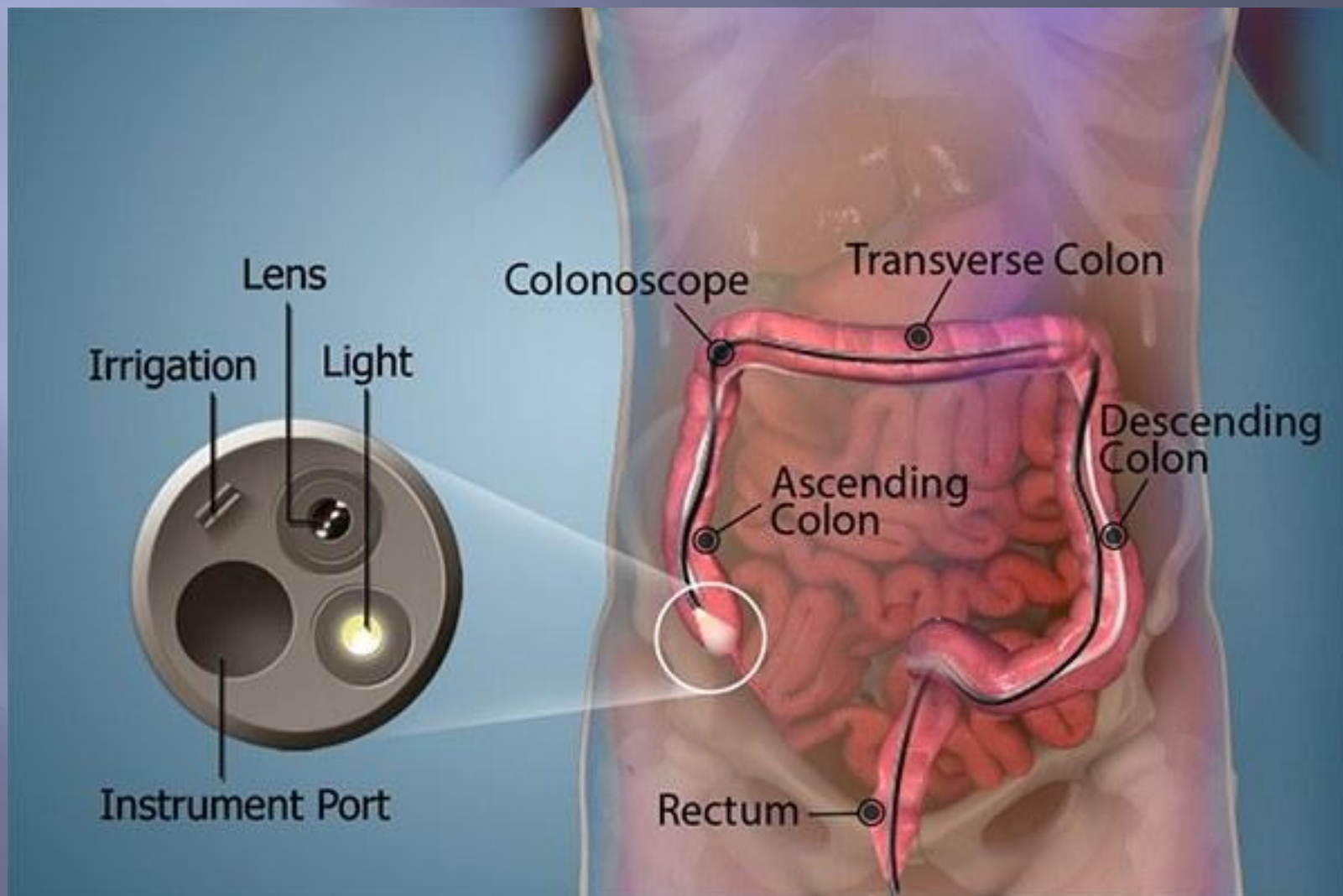
- The American College of Physicians recommended that average-risk adults aged 50 to 75 years should be screened for colorectal cancer by one of the following strategies:
  - ✓ Annual high-sensitivity FOBT or FIT
  - ✓ Flexible sigmoidoscopy every 5 years
  - ✓ High-sensitivity FOBT or FIT every 3 years plus flexible sigmoidoscopy every 5 years
  - ✓ Colonoscopy every 10 years
- Interval screening with fecal testing or flexible sigmoidoscopy in adults having 10-year screening colonoscopy is not recommended.
- Average-risk adults younger than 50 years, older than 75 years, or with an estimated life expectancy of less than 10 years should not be screened.

# American College of Gastroenterology (ACG)

- The guidelines of the American College of Gastroenterology make a distinction between screening tests for cancer prevention and those for cancer detection. The specific guidelines for colorectal cancer screening are as follows:
  - ✓ Tests that prevent cancer are preferred over those that only detect cancer
  - ✓ The preferred colorectal cancer prevention test is colonoscopy every 10 years, beginning at age 50 years, but at age 45 years in African Americans
  - ✓ For patients who decline colonoscopy or another cancer prevention test, the preferred cancer detection test is FIT, conducted annually
- Alternative cancer detection tests recommended in the ACG guidelines are as follows:
  - ✓ Flexible sigmoidoscopy every 5-10 years
  - ✓ CT colonography every 5 years, which replaces double contrast barium enema as the radiographic screening alternative for patients who decline colonoscopy

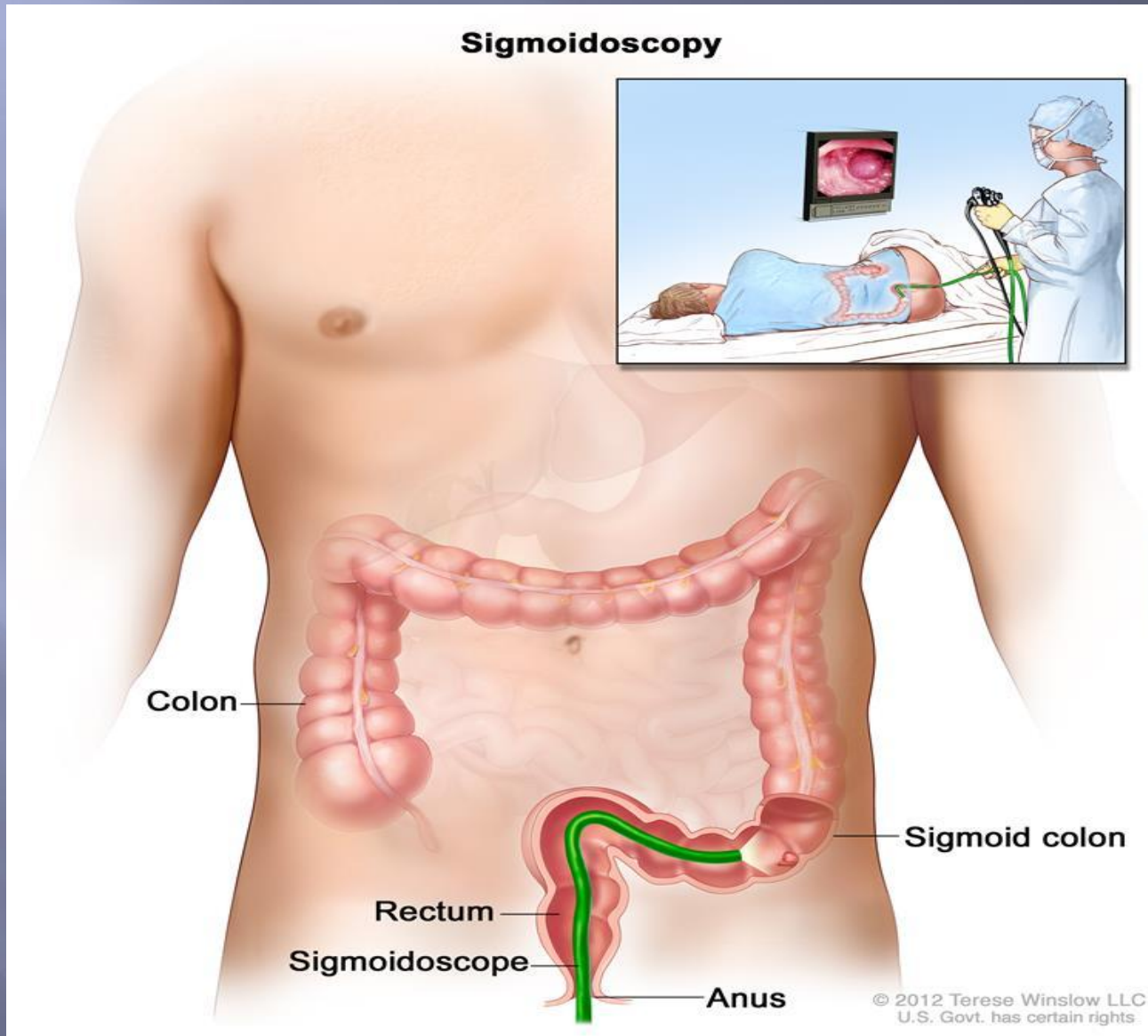
- Alternative cancer detection tests in the ACG guidelines are as follows:
  - ✓ Annual Hemoccult Sensa
  - ✓ Fecal DNA testing every 3 years
- For screening purposes, patients with one first-degree relative diagnosed with colorectal cancer or advanced adenoma at age 60 years or older are considered at average risk.
- For patients with a single first-degree relative diagnosed with colorectal cancer or advanced adenoma before age 60 years, or those with two first-degree relatives with colorectal cancer or advanced adenomas, the guideline recommends colonoscopy every 5 years, beginning at age 40 years or at 10 years younger than the age at diagnosis of the youngest affected relative.

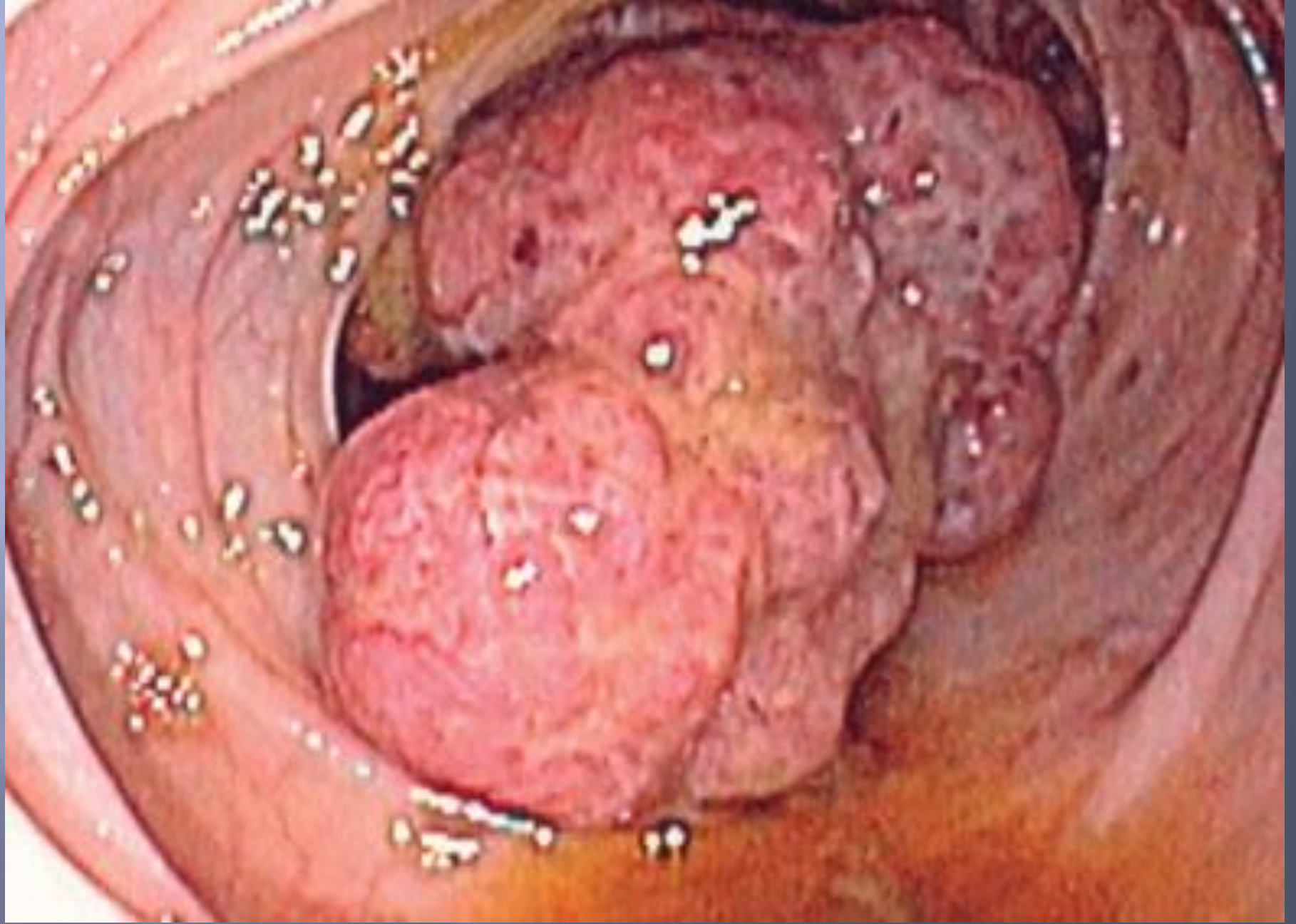
# Overview on Different Screening Options



# Flexible Sigmoidoscopy

## Sigmoidoscopy





flexible sigmoidoscopy showing cancer colon



# EVIDENCE

- Two randomized controlled trials, one from the United Kingdom and one from the United States, documented a decrease in mortality for distal colorectal cancer of about 50 percent after 11 years of follow-up when an initial screening flexible sigmoidoscopy is performed.
- Flexible sigmoidoscopy detects 70–80 percent of all CRC and large adenomas.<sup>60</sup>
- Approximately two percent of patients with normal findings on flexible sigmoidoscopy have a significant lesion in the proximal colon.<sup>60–61</sup>
- The risk of perforation is less than 1 in 1,000.<sup>62–63</sup>

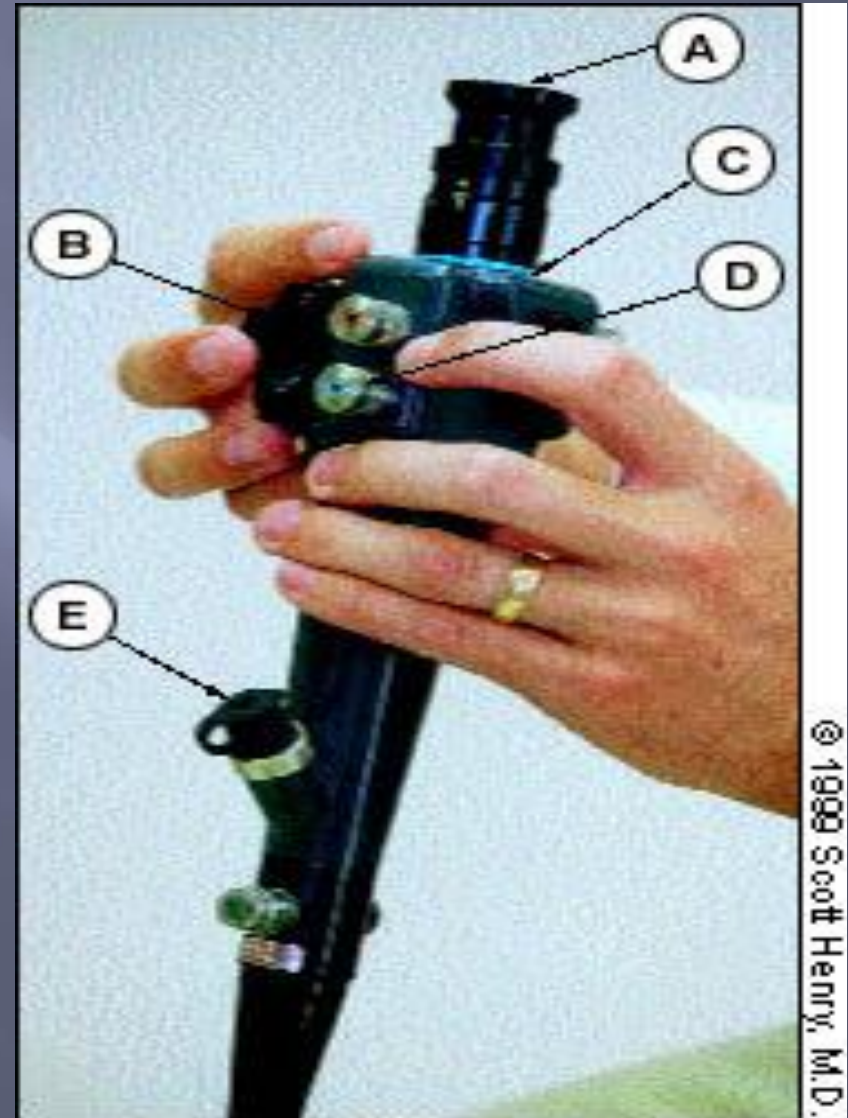
# Patient Preparation

- Before sigmoidoscopy is performed, the physician should provide educational materials and discuss the details of the examination with the patient. The physician must also review the risks of the procedure and obtain informed consent.
- A complete medical history should be obtained. The physician should be aware of any drugs the patient is taking.
- A clear liquid diet on the day before the examination, along with overnight fasting, is usually sufficient.
- For patients with chronic or severe constipation, administration of a pegylated balanced electrolyte solution on the night before the procedure may be considered
- Bowel preparation: one or two tap-water enemas may also be given on the morning of the examination.
- Antibiotic prophylaxis for bacterial endocarditis associated with flexible sigmoidoscopy is optional, even when biopsy is performed.
- Generally, antispasmodics and sedatives are not indicated or needed.

# Equipment

- A flexible video sigmoidoscope is used for the procedure.
- The scope contains a shaft, a control head, and an umbilical (which is connected to the video processor).
- The control head contains the up/down and left/right dials, the suction valve, the air/water valve, and a working channel through which a biopsy forceps or other accessories can be inserted.
- This channel can also be used to hook a large syringe for pushing water inside the colon.

- ▣ Control head of a flexible sigmoidoscope
  - A = eyepiece
  - B = reflexion knobs
  - C = suction valve
  - D = air-water valve
  - E = biopsy channel



# Procedure

- The patient is placed on the examination table in the left lateral position with knees drawn to the chest.
- The anus is carefully inspected for abnormalities such as external hemorrhoids, fissures or fistulas. A digital rectal examination is performed to palpate the rectum and, in male patients, the prostate gland.
- Lubricant jelly is smeared on the scope to reduce patient discomfort.
- With the index finger positioned along the well-lubricated scope tip, the endoscopist guides the tip of the instrument through the anus and into the rectum, where it is then advanced about 6 to 8 cm.
- During the learning stage, the endoscopist should advance and withdraw the scope tip to perfect the technique.
- The rectum follows the curvature of the sacrum and extends about 12 cm to the rectosigmoid junction.

# Complications

- Abdominal cramping and bloating are the complications most frequently associated with sigmoidoscopy.
- Postprocedure bleeding: usually minor and self-limited.
- Bowel perforation is the most serious complication of sigmoidoscopy. But it's very rare. Perforation may require surgical intervention.

# Contraindications

- Acute peritonitis.
- Acute diverticulitis.
- Toxic megacolon.
- Recent bowel surgery.
- Patients who are uncooperative, or medically or emotionally unstable.

# ADVANTAGES

- Safer and more convenient than colonoscopy
- Takes about 10 minutes to perform and is usually well-tolerated without sedation
- Most patients can drive home alone or return to work following the procedure.

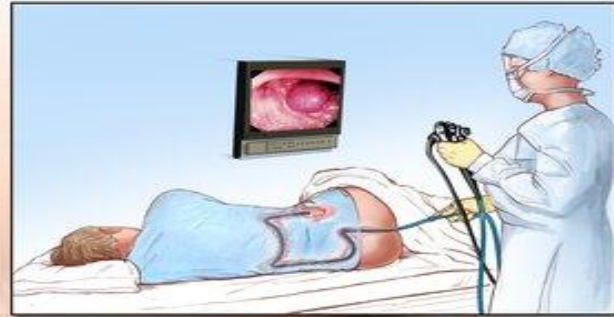


# DISADVANTAGES

- Requires bowel preparation with enemas
- If adenomas found, further testing with colonoscopy is required to visualize the complete colon and remove polyps
- Does not visualize most of the colon; some lesions will be missed

# Colonoscopy

## Colonoscopy



Colon

Rectum

Colonoscope

Anus



Normal  
colon



Colon  
cancer

# Evidence

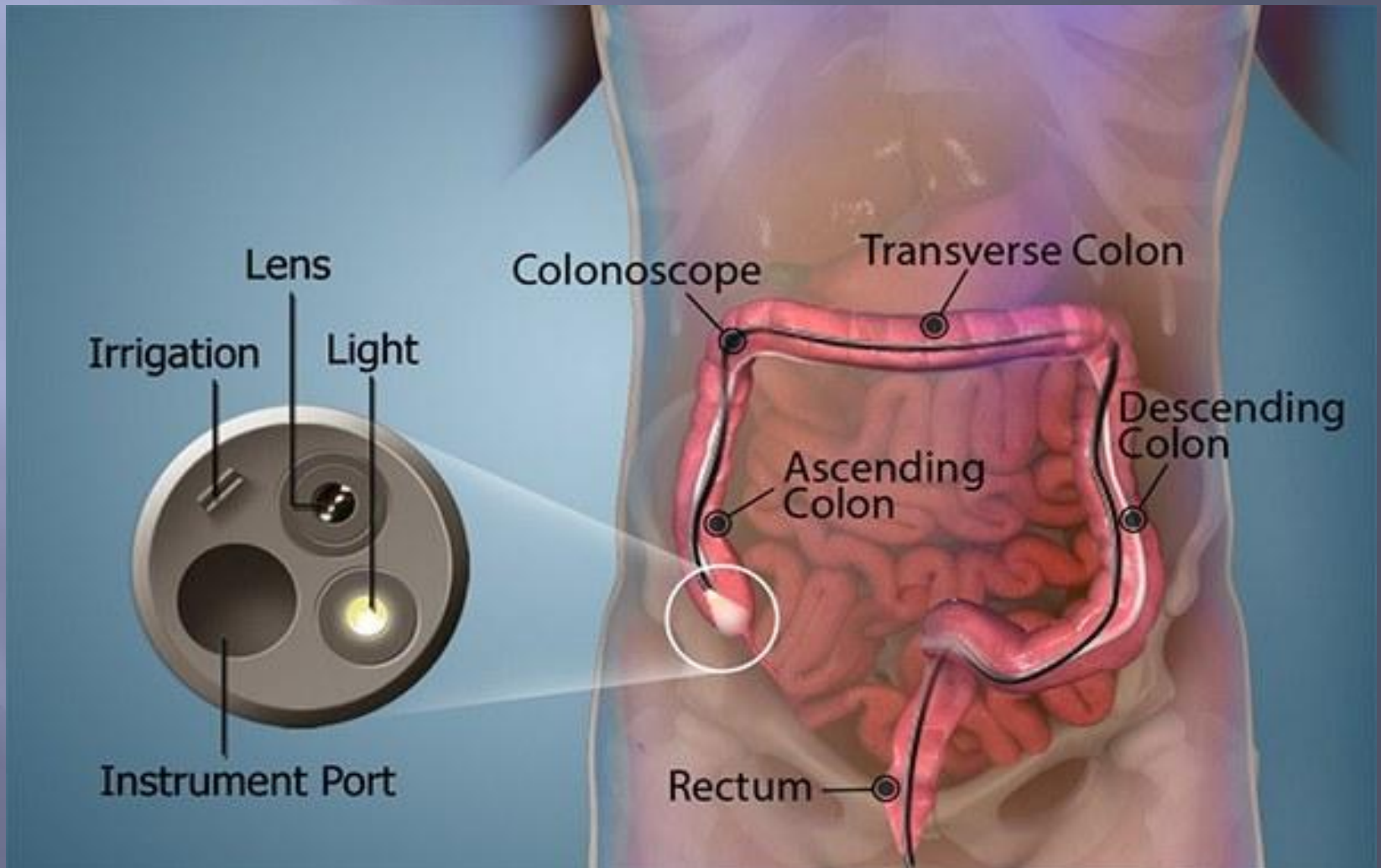
- In cross-sectional screening studies, colonoscopy is more sensitive than FOBT, or flexible sigmoidoscopy combined with FOBT, for detecting large adenomas and CRC.
- Evidence from the National Polyp Study shows that patients who had adenomas removed during participation in the study had a 53 percent reduction in mortality from colon cancer over a median of 15.8 years. This supports the hypothesis that colonoscopic removal of adenomatous polyps prevents death from colorectal cancer and this prevention is long term.
- The benefit of colonoscopy is significant for decreasing mortality from left-sided colorectal cancer but not as strong for right-sided cancers.

# Patient Preparation

- Bowel preparation
  - ✓ 1.5 oz of Fleet Phospho-Soda liquid mixed into half a glass of water, followed by a full glass of water at 3:00 PM and again at 7:00 PM on the day prior to examination
  - ✓ 4 L of polyethylene glycol (PEG) solution administered orally over a 1- to 3-hour period on the evening prior to colonoscopy
- Drugs: Discontinue warfarin, aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), and iron supplements on the days prior to examination. Insulin should not be taken during precolonoscopy fasting.
- Food: Foods to avoid on the day prior to the test include those that may be misinterpreted during examination (eg, red or purple foods, Jell-O, or drinks). Patients should drink only clear liquids (no solid foods) on the day before colonoscopy and during the night before.
- Antibiotic prophylaxis: The most commonly used preprocedure and postprocedure prophylaxis regimens are as follows:
  - ✓ Ampicillin or amoxicillin, 2 g IV/IM or 1.5 g orally
  - ✓ Gentamicin, 1.5 mg/kg
  - ✓ Vancomycin, 1 g IV

- Anesthesia
  - ✓ Colonoscopies are routinely performed with the use of sedative medications.
  - ✓ Administration of sedative drugs at colonoscopy has drawbacks, including an increased rate of complications, higher cost, and longer recovery periods for patients.
  - ✓ IV benzodiazepines have been the usual premedications used for colonoscopy, either alone or with a narcotic.
  - ✓ Midazolam (2-5 mg) and diazepam (5-10 mg) are most commonly used. Meperidine (25-100 mg) may be added as needed.
  - ✓ Propofol, a short-acting IV sedative, has become more commonly used during colonoscopies. It provides no analgesia but leads to a deeper level of sedation with rapid onset and shorter recovery time in comparison with conventional narcotic-benzodiazepine combinations.
  
- Positioning: The procedure is performed with the patient in the left lateral decubitus position.

# Equipment



# Procedure

- The procedure is performed with the patient in the left lateral decubitus position.
- Colonoscope is inserted through the rectum into the colon.
- The scope is advanced and maneuvered while the lumen and walls of the colon are visualized by means of projections onto a television screen.
- The colonoscope has channels through which instruments can be passed in order to perform biopsies, remove polyps.
- Of patients with colorectal cancer, 2-9% have a second synchronous tumor, and 27-53% have concomitant multiple adenomatous polyps. For this reason, a complete examination should be performed during colonoscopy.
- The goal for a complete examination is to reach the cecum and, in some cases, the terminal ileum.
- Landmarks that may help in determining whether this has been achieved include visualization of the appendiceal orifice and the ileocecal valve.



# Complications

- Colonic perforation
- Bleeding
- Infection
- Abdominal distention
- Postpolypectomy coagulation syndrome
- Splenic rupture
- Small-bowel obstruction
- Medication effects: Sedatives used during colonoscopy may cause complications from allergic reactions or, more important, from doses that may be excessive for certain individuals and lead to respiratory depression.

# Contraindications

- Patient refusal
- Uncooperative patients
- Inadequate sedation
- Known or suspected colonic perforation
- Severe toxic megacolon and fulminant colitis
- Clinically unstable patients
- Recent myocardial infarction
- Inadequate bowel preparation
- Peritonism
- Pregnancy except for severe life-threatening conditions during pregnancy when the only alternative is colonic surgery or when colon cancer is suspected.

# ADVANTAGES

- Colonoscopy has the ability to detect and remove polyps at the time of the initial examination. Polypectomy has been shown to decrease colon cancer mortality.
- Enables direct visualization of the entire colon when evidence—via landmarks—indicates the cecum was reached