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CNE SERIES

# Colorectal Cancer: An Overview of the Epidemiology, Risk Factors, Symptoms, and Screening Guidelines

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Some common misconceptions exist concerning which individuals develop colorectal cancer (see Table 1). The purpose of this column is to provide an overview of the epidemiology, risk factors, symptoms, screening guidelines, and health care implications for this type of cancer.

Colorectal cancer is the second leading cause of cancer death for both men and women in the United States. An estimated 148,610 new cases of colon and rectal cancers will occur annually, and 55,170 will result in death. Fortunately, the mortality rate is decreasing for colorectal cancer in both men and women. In the United States, the cumulative lifetime risk of developing colorectal cancer is about 6%. Regardless of advances in treating the disease, the 5-year survival rate in the United States is 65% (Jemal et al., 2006). Early detection and removal of adenomatous polyps through regular screening could reduce the colorectal cancer mortality rate by 50% (Smith, Cokkinides, & Eyre, 2004).

Colorectal cancer affects men and women of all races equally, although there is a slightly higher risk of developing colorectal cancer in African Americans for reasons that are still unclear. A personal or family history of colorectal polyps, colorectal cancer, or inflammatory bowel disease leads to an increased risk above that of the general population. Screening of individuals with this type of medical history should begin at age 40, or 10 years earlier than the youngest family member at the time of his or her cancer diagnosis (Hawk & Levin, 2005). The rate of colorectal cancer increases significantly in the 6th decade of life in average-risk individuals. For this reason, screening should begin by age 50 (Lieberman, 2005).

## Risk Factors

Several risk factors are associated with colorectal cancer. Those that an individual cannot control include age, race, and family history. However, modifiable factors can be managed to help decrease the risk of colorectal cancer. These risk factors include tobacco use, poor diet, low physical activity, and even moderate alcohol consumption (American Cancer Society [ACS], 2006c).

The damage of cigarette

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**Note:** This column is made possible through an educational grant from C-Change, a Washington, DC-based, 501(3)c (not for profit), organization comprising the nation's key cancer leaders from government, business, and nonprofit sectors. These cancer leaders share the vision of a future where cancer is prevented, detected early, and cured or is managed successfully as a chronic illness. The mission of C-Change is to leverage the combined expertise and resources of its members to eliminate cancer as a (major) public health problem at the earliest possible time. C-Change is both a forum and a catalyst for identifying issues and major challenges facing the cancer community and for initiating collaborative actions to complement the efforts of individual C-Change members. Medical-Surgical nurses are invited to learn more about this important organization by visiting www.ndoc.org

The authors reported no actual or potential conflict of interest in relation to this continuing nursing education article.

**Table 1.**
**Myths and Facts of Colorectal Cancer**

| Myth | Fact |
|---|---|
| Colorectal cancer is a disease of older white males. | Colorectal cancer affects all races and genders equally, with a slightly higher incidence and mortality rate among African-American males. Women age 60 and older have an equal risk of being diagnosed with breast cancer or colorectal cancer. |
| There is nothing I can do to prevent colorectal cancer. | Routine screening, exercising, eating a low-fat and high-fiber diet, not smoking, and drinking in moderation will help decrease the risk of colorectal cancer. Removal of polyps will assist in prevention. |
| Colorectal cancer is fatal. | If the patient is diagnosed and treated early, the 5-year survival rate for colorectal cancer is 65%. |
| If there are no symptoms present, screening is not necessary. | Routine screening for individuals at average risk should begin at age 50, regardless of signs or symptoms. If abdominal pain, narrow stools, constipation, diarrhea, or bleeding occurs, cancer may be present at a more advanced stage. |

**Sources:** Agrawal et al., 2005; Hendon & DiPalma, 2005.

smoking often is associated with lung cancer, but it also is extremely harmful to the colon and rectum. Evidence shows that 12% of colorectal cancer deaths are attributed to smoking (Zisman, Nickolov, Brand, Gorchow, & Hemant, 2006). The carcinogens found in tobacco increase cancer growth in the colon and rectum, and increase the risk of being diagnosed with this cancer. Wu and colleagues (2005) reported several profound findings, including:

- A correlation between cigarette smoking and adenomatous polyps.
- Larger polyps found in the colon and rectum were associated with long-term smoking.
- An elevated number of adenomatous polyps in former smokers even after 10 years of smoking cessation.

Evidence also demonstrates an earlier incidence of colorectal cancer in men and women who smoke cigarettes (Zisman et al., 2006).

Maintaining a healthy diet and being physically active are important components of colorectal cancer prevention. The amount of fat and fiber in the diet has been examined extensively as risk factors associated with colorectal cancer. Experts found that a diet high in fiber and low in fat, which for adults is 20-35 grams of fiber per day (National Library of Medicine, 2005) and about 30% or less of their total daily calories from fat (National Heart Lung and Blood Institute, 2007), along with limited consumption of red meat, helps reduce the risk of colorectal cancer. It also is recommended that men and women regularly eat fruits and cruciferous vegetables, and consume calcium to decrease the risk of colorectal cancer (Hendon & DiPalma, 2005). Additionally, recent evidence supported by the International Agency for Research on Cancer indicates that inactivity can be associated with colorectal cancer (Meyerhardt et al., 2006). The lack of physical activity in daily routines also can be attributed to the increased incidence of obesity in men and women, another factor associated with colorectal cancer (ACS, 2006a; Centers for Disease Control [CDC], 2006). Therefore, regular physical activity and a healthy diet can help decrease the risk of colorectal cancer.

According to the American Heart Association (2006), one benefit of drinking alcohol is that there is a small increase in the HDL cholesterol, but the effects of alcohol on the colon and rectum are not as positive. The consumption of alcohol is a factor in the diagnosis of colorectal cancer at a younger age, as well as an increase of colorectal cancer in the distal colon. As with smoking, the regular consumption of alcohol causes a two-fold increase risk of developing colorectal cancer (Zisman et al., 2006).

## Symptoms

The symptom that often is first recognized by the patient is blood in or on the stool. It is important to remember that blood in or on the stool does not absolutely mean colorectal cancer is present; bleeding could be related to hemorrhoids, ulcers, a tear, or inflammatory bowel disease. Any change in bowel habits that occurs for an extended period of time can be a sign of colorectal cancer (ACS, 2006b). For example, chronic constipation or unremitting diarrhea represents a change in bowel habits that should prompt a visit to the doctor. A narrowing of the stool, or an incomplete bowel movement, also are important signs to recognize, as they could indicate a blockage in the colon and/or rectum. Other symptoms of colorectal cancer include constant abdominal or back pain, unusual gas or bloating, unexplained weight loss, fatigue, or anemia, and vomiting. These are the major symptoms that may be observed if polyps or colorectal cancer is present (National Cancer Institute [NCI], 2004).

Symptoms may occur before sizeable colorectal polyps or cancer are present. However, in most

instances, symptoms do not occur before colorectal cancer has already emerged. This fact supports why screening is so important for the asymptomatic patient (ACS, 2006b; Zisman et al., 2006). The principal message to remember is that screening should begin before these symptoms arise, if possible. Waiting for symptoms to occur may be too late to prevent colorectal cancer.

## Screening Options

Colorectal cancer is one of the most preventable cancers. Detection and removal of adenomatous polyps, from which more than 95% of colorectal cancers arise, reduce the risk of being diagnosed with or dying from this disease (Walsh & Terdiman, 2003). Hawk and Levin (2005) emphasized that studies repeatedly show improved survival with diagnosis at an earlier stage, thus providing a rationale for screening. Four different screening methods can help detect polyps or cancer in the colon and rectum: fecal occult blood testing (FOBT), flexible sigmoidoscopy, colonoscopy, and the "virtual colonoscopy" (computed tomography [CT] colonograph) (Hawk & Levin, 2005).

Regular screening for the average-risk person should begin by age 50 with FOBT and either a sigmoidoscopy or colonoscopy (Smith, Cokkinides, & Eyre, 2006). The goal of FOBT is to examine the stool for hidden blood that occasionally sheds from adenomatous polyps and cancer. One disadvantage of this screening method is that often polyps do not bleed. This test should be done every year by obtaining a three-sample card from a primary care physician; the patient takes the card home to obtain the stool samples for testing. Dietary guidelines must be followed both before and during this test; if not done properly, the test can result in a false outcome. Additionally, negative FOBT results do not necessarily mean there are no polyps or cancer present, just that no blood was detected in the stool. Conversely, positive FOBT does not indicate cancer, only that further screening should be administered to locate the bleeding. Any FOBT that was administered by a doctor using a small stool sample on a single card is inadequate and not recommended as a colorectal cancer screening method (Smith et al., 2006).

As a screening option, FOBT is noninvasive, has proven effective in randomized trials, and is cost effective (Hendon & DiPalma, 2005). In a study to test the effectiveness of FOBT as a screening tool, 46,551 participants were assigned randomly to three groups: (a) annual screening, (b) biennial screening, and (c) no screening (the control group). Over a 13-year period, findings showed that mortality from colorectal cancer per 1,000 was 5.88 in participants using annual screening, 8.33 in participants within the biennial screening group, and 8.83 in the control group. Study results also showed a 33% decrease in mortality between the annually screened group and the control group (Hendon & DiPalma, 2005).

Interestingly, in 2002, the U.S. Preventive Services Task Force (USPSTF) examined the evidence regarding screening for colorectal cancer and found there is fair-to-good evidence that several screening methods are effective in reducing mortality from colorectal cancer. The USPSTF stated that the benefits from screening substantially outweigh potential harm, but the quality of evidence, magnitude of benefit, and potential harm vary with each method. The USPSTF found good evidence that periodic FOBT reduces mortality from colorectal cancer and fair evidence that sigmoidoscopy alone or in combination with FOBT reduces mortality; however, they did not find direct evidence that screening colonoscopy is effective in reducing colorectal cancer mortality. Also, the USPSTF found insufficient evidence that newer screening technologies (computed tomographic colography) are effective in improving health outcomes. Complete discussion of the USPSTF findings, as well as cost analyses can be found online (www.ahrq.gov/clinic/uspstf/uspscolo.htm).

Although the USPSTF findings appear to not completely support the ACS, CDC, and NCI screening guidelines for colorectal cancer (see Figure 1), it is important to consider that screening methods do contribute to detection. In light of the current evidence, health care personnel must consider factors, such as availability and efficacy of screening methods, patient preferences, as well as payer support. Patients always should be encouraged to check with their health insurance provider to determine which screening methods are covered under various circumstances.

The two most commonly used screening exams to detect colorectal cancer are the flexible sigmoidoscopy (FS) and the colonoscopy, which examine the colon and rectum to find any polyps or suspicious lesions (Hawk & Levin, 2005). The FS is an inexpensive procedure that can be done in a physician's office and requires no sedation. The day before the procedure, the patient is placed on a clear liquid diet and given a prescription for a bowel prep. The FS is recommended every 5 years along with the FOBT (Smith et al., 2006). The addition of the FOBT allows for the detection of proximal cancers that are not visible through the FS. Hendon and DiPalma (2005) demonstrated the importance of FOBT in addition to the FS. Their findings showed that detection of advanced neoplasia by FS alone was 70%, whereas with the addition of FOBT the

**Figure 1.**

Professional and Patient Resources

## Colon and Rectal Cancer Screening Guidelines[1]

**Beginning at age 50**
both men and women should follow 1 of these 5 testing schedules:

- Yearly fecal occult blood test (FOBT)* or fecal immunochemical test (FIT)
- Flexible sigmoidoscopy every 5 years
- Yearly FOBT* or FIT, plus flexible sigmoidoscopy every 5 years**
- Double-contrast barium enema every 5 years
- Colonoscopy every 10 years

*For FOBT, the take-home multiple sample method should be used.
**The combination of yearly FOBT or FIT flexible sigmoidoscopy every 5 years is preferred over either of these options alone.

**All positive tests should be followed up with colonoscopy.**

People should talk to their doctor about starting colorectal cancer screening earlier and/or undergoing screening more often if they have any of the following colorectal cancer risk factors:

- A personal history of colorectal cancer or adenomatous polyps
- A strong family history of colorectal cancer or polyps (cancer or polyps in a first-degree relative [parent, sibling, or child] younger than 60 or in 2 first-degree relatives of any age)
- A personal history of chronic inflammatory bowel disease
- A family history of an hereditary colorectal cancer syndrome (familial adenomatous polyposis or hereditary non-polyposis colon cancer)

[1] Source: American Cancer Society

## Authoritative Sources for Patient and Professional Education

**American Cancer Society**
http://www.cancer.org

**Cancer Research and Prevention Foundation**
**Colorectal Cancer Awareness Month Information**
http://www.preventcancer.org/colorectal/

**Centers for Disease Control and Prevention**
http://www.cdc.gov/cancer/colorectal/

**Colon Cancer Alliance**
http://www.ccalliance.org

**National Cancer Institute's Cancer Information Service**
http://cis.nci.nih.gov/

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**Table 2.**
**Screening Guidelines, Advantages, and Disadvantages**

| Screening | Guidelines | Advantages | Disadvantages |
|---|---|---|---|
| Fecal Occult Blood Test (FOBT) | Annually starting at age 50 | • Cost effective<br>• Noninvasive<br>• Can be done at home | • False-positive/ false-negative results<br>• Dietary restrictions<br>• Duration of testing period |
| Flexible Sigmoidoscopy (FS)+FOBT | Every 5 years starting at age 50 | • Cost effective<br>• Can be done without sedation<br>• Performed at doctor's office<br>• Any polyps found can be biopsied | • Examines only a portion of the colon (additional screening may be needed)<br>• Discomfort for patient<br>• Bowel cleansing |
| Colonoscopy | Every 10 years starting at age 50 | • Patient is sedated<br>• Outpatient screening<br>• Most thorough screening (views entire colon and rectum)<br>• Polyps can be removed and biopsied | • Bowel cleansing<br>• Sedation may be a problem for some<br>• Cost if uninsured<br>• Risk of perforation |
| Virtual Colonoscopy (a.k.a. computed tomography colonography-CT) | Every 10 years starting at age 50 | • Relatively noninvasive<br>• No sedation is needed<br>• Can show dual or tri-dimensional imagery | • Small polyps may go undetected<br>• Bowel cleansing<br>• Cost<br>• If polyps are found, a colonoscopy will be required<br>• Exposure to radiation<br>• Patient discomfort |

**Note:** The listed guidelines for screenings are based on individuals who are at an average risk for colorectal cancer. Anyone experiencing symptoms or are at an increased risk should start screening earlier than 50 years of age.

**Source:** Virtual Colonoscopy, 2005.

detection rate was 76%. The main disadvantage of FS is that only a portion of the distal colon can be examined. Using a 60 cm flexible sigmoidoscope, approximately 65%-75% of adenomatous polyps and 40%-65% of colorectal cancers are within its reach, whereas the colonoscope has the ability to view the entire length of the colon (Hawk & Levin, 2005). This use of FS has been associated with a 60%-70% reduction in colorectal cancer; however, FS detects only half of adenomas (Hendon & DiPalma, 2005).

The colonoscopy is a more thorough exam, given that FS only examines the lower portion of the bowel (the sigmoid colon). The dietary and bowel prep process is similar to what patients experience for FS; clear fluids and laxatives are ordered to cleanse the intestinal tract for a thorough screening. During a colonoscopy, a thin, lighted tube, which has a small camera attached, is inserted into the rectum. The colonoscope is guided through the colon and rectum and if any polyps are found, they can be removed and biopsied. Colonoscopy is emerging as the preferred screening method due to its level of comfort through sedation and the accuracy that FS does not provide (Hendon & DiPalma, 2005).

Virtual colonoscopy (CT colonography) is a relatively new screening option to detect colorectal cancer (Virtual Colonoscopy, 2005). Virtual colonoscopy produces a dual or tri-dimensional colorectal image that is generated using data from a spiral CT scan. This screening method is appealing to many people because it is noninvasive and requires no sedation, and a view of the entire colon and rectum is visible. The preparation for this procedure does require the same dietary restrictions and bowel cleansing as the colonoscopy (clear fluids and laxatives), and air insufflation also is needed for a clear view of the colon (Virtual Colonoscopy, 2005). Many people may prefer this screening method

to FS or colonoscopy, but it is important to remember that if any polyps are visible on the scan, the patient will then have to undergo a colonoscopy for further evaluation. Table 2 presents a summary of the advantages and disadvantages of the four common screening methods for detecting colorectal cancer.

## Implications for Educating the Public

As essential as screening is, education about colorectal cancer is equally important. Primary prevention and early detection are vital to health education. Educating the public about the epidemiology, risk factors, symptoms, and screening options associated with colorectal cancer helps people become advocates for their own health. Health educators in the community visit work sites, religious institutions, community centers, shelters, soup kitchens, and health care facilities. They provide public education to ensure that men and women recognize the importance of regular screening as a lifesaver. Health educators can be nurses or other trained individuals.

Typically, individuals in the community setting have many misconceptions about colorectal cancer. For instance, many people do not know the difference between a sigmoidoscopy and a colonoscopy, or that FOBT should be done every year to increase the efficiency of sigmoidoscopy and help decrease the risk of colorectal cancer (Hendon & DiPalma, 2005; Smith et al., 2006). Health educators work to alter these perceptions and arm individuals with the correct information. The goal of the health educator and the nurse is to promote healthy living and to encourage individuals to engage in practices and behaviors that are beneficial to long-term health. In the event that a physician fails to discuss all health options, it is imperative that patients learn to ask for health screenings that allow early detection of problems, which may potentially prolong their lives.

Nurses in inpatient and other health care settings also should conduct health histories that assess patients for appropriate cancer screening. Additionally, conducting appropriate education with the patient and family concerning cancer screening is an important nursing role. Family, friends, and colleagues also often rely on information from nurses to assist them in understanding screening options and early cancer detection guidelines. These are vital roles for nurses. ■

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### Objectives

This continuing nursing educational (CNE) activity is designed for nurses and other health care professionals who care for and educate patients and their families regarding colorectal cancer. For those wishing to obtain CNE credit, an evaluation follows. After studying the information presented in this article, the nurse will be able to:

1. Discuss the epidemiology, risk factors, and symptoms of colon cancer.
2. List the screening options for colon cancer.
3. Describe the implications for educating the public regarding colon cancer.

### Answer Form:

1. If you applied what you have learned from this activity into your practice, what would be different?

_____

_____

_____

_____

| Evaluation | Strongly disagree | | | | Strongly agree |
|---|---|---|---|---|---|
| The offering met the stated objectives. | | | | | |
| 2. By completing this activity, I was able to meet the following objectives: | | | | | |
| a. Discuss the epidemiology, risk factors, and symptoms of colon cancer. | 1 | 2 | 3 | 4 | 5 |
| b. List the screening options for colon cancer. | 1 | 2 | 3 | 4 | 5 |
| c. Describe the implications for educating the public regarding colon cancer. | 1 | 2 | 3 | 4 | 5 |
| 3. The content was current and relevant. | 1 | 2 | 3 | 4 | 5 |
| 4. The objectives could be achieved using the content provided. | 1 | 2 | 3 | 4 | 5 |
| 5. This was an effective method to learn this content. | 1 | 2 | 3 | 4 | 5 |
| 6. I am more confident in my abilities since completing this material. | 1 | 2 | 3 | 4 | 5 |

7. The material was (check one) ___new ___review for me

8. Time required to complete the reading assignment: _____minutes

I verify that I have completed this activity: _____

Comments

_____

_____

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1. To receive continuing nursing education credit for individual study after reading the article, complete the answer/evaluation form to the left.

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