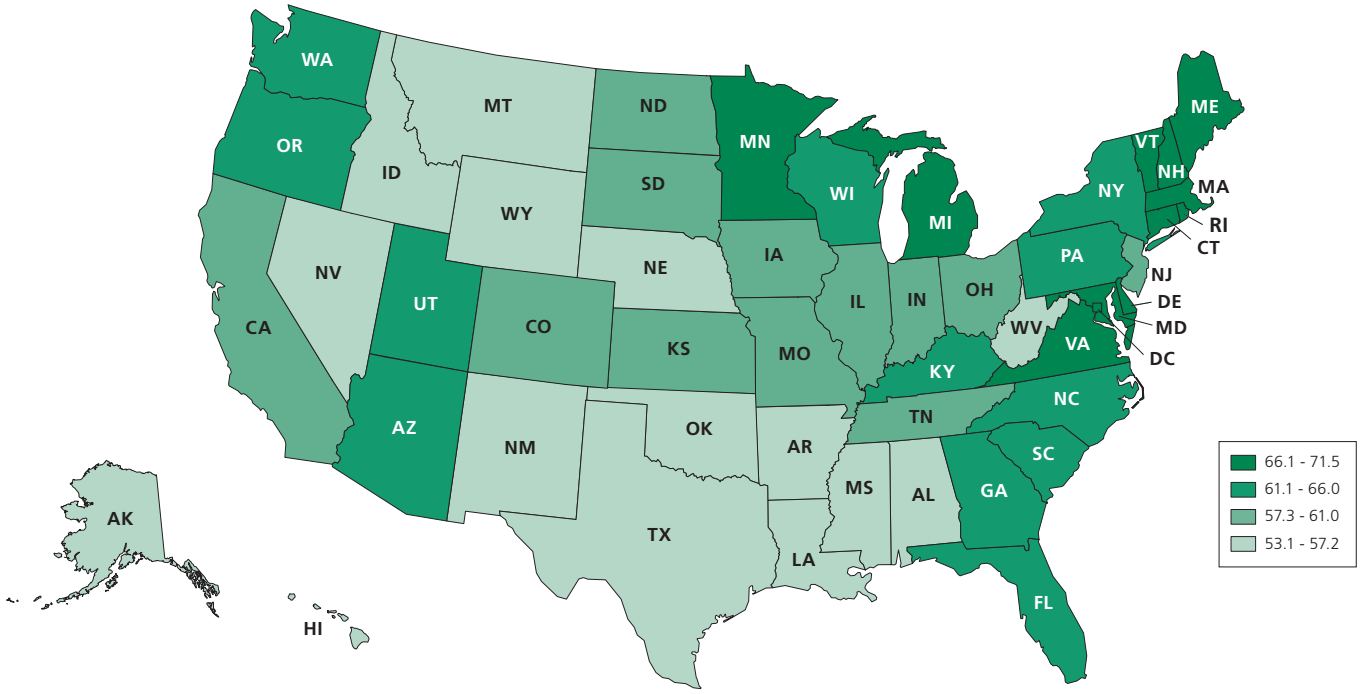
Colorectal Cancer Facts & Figures 2011-2013

Colorectal Cancer Screening* Prevalence (%) among Adults 50 Years and Older by State, 2006-2008



*A fecal occult blood test within the past year or a sigmoidoscopy or colonoscopy within the past 10 years.
These estimates do not distinguish between screening and diagnostic exams.

Source: Behavioral Risk Factor Surveillance System Public Use Data Tapes 2006 and 2008. National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention.

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Preface

The American Cancer Society estimates that in 2011 about 141,210 people will be diagnosed with colorectal cancer and about 49,380 people will die of the disease in the US. In both men and women, colorectal cancer is the third most commonly diagnosed cancer and the third leading cause of cancer death. The majority of these cancers and deaths could be prevented by applying existing knowledge about cancer prevention and by increasing the use of established screening tests. In the past decade, there has been unprecedented progress in reducing colorectal cancer incidence and death rates in most US population groups; this progress has come about largely through the prevention and early detection of colorectal cancer through screening. Even more progress is possible by increasing access to and utilization of colorectal cancer screening tests; currently, only about half of people aged 50 or older, for whom screening is recommended, report having received colorectal cancer testing consistent with current guidelines.

Screening has the potential to prevent colorectal cancer because most colorectal cancers develop from adenomatous polyps. Polyps are noncancerous growths in the colon and rectum. Though most polyps will not become cancerous, detecting and removing them through screening can actually prevent cancer from occurring. Furthermore, being screened at the recommended frequency increases the likelihood that when colorectal cancer is present, it will be detected at an earlier stage, when it is more likely to be cured, treatment is less extensive, and the recovery is much faster.

In addition to following recommended screening guidelines, people can reduce the risk of developing or dying from colorectal cancer by maintaining a healthy body weight, regular physical activity, limiting intake of red and processed meats, and by not smoking.

The American Cancer Society has identified colorectal cancer as a major priority because the application of existing knowledge has such great potential to prevent cancer, diminish suffering, and save lives. This third edition of *Colorectal Cancer Facts & Figures* is part of the Society's effort to motivate the public and medical communities to prevent the tragic and avoidable suffering caused by colorectal cancer. It is intended to provide basic information about colorectal cancer to the general public, the media, and health professionals. More detailed information on many topics related to colorectal cancer is available on the American Cancer Society's Web site at cancer.org.

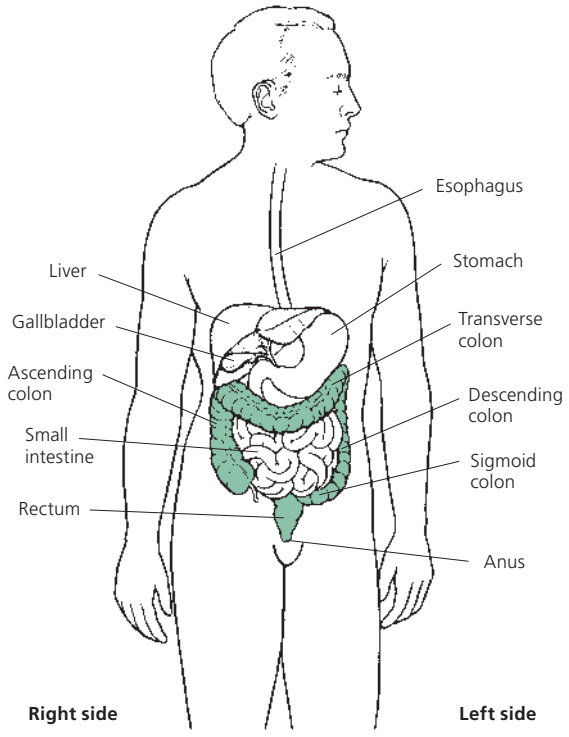
Colorectal Cancer Basic Facts

What is colorectal cancer?

Colorectal cancer develops in the colon or the rectum (Figure 1). The colon and rectum are parts of the digestive system, also called the gastrointestinal, or GI, system. The digestive system processes food for energy and rids the body of solid waste (fecal matter or stool).

After food is chewed and swallowed, it travels through the esophagus to the stomach. There it is partially broken down and sent to the small intestine, where digestion continues and most of the nutrients are absorbed. The word "small" refers to the diameter of the small intestine, which is smaller than that of the large intestine. The small intestine is actually the longest part of the digestive system – about 20 feet in length. Cancer occurs infrequently in the small intestine.

Figure 1. Diagram of Colon and Rectum



The small intestine joins the large intestine in the lower right abdomen. The small and large intestine are sometimes called the small and large bowel. The first and longest part of the large intestine is the colon, a muscular tube about 5 feet long. Water and mineral nutrients are absorbed from the food matter in the colon. Waste (feces) left from this process passes into the rectum, the final 6 inches of the large intestine, and is then expelled from the anus.

The colon has 4 sections:

- The first section is called the ascending colon. It begins where the small intestine attaches to the colon and extends upward on the right side of a person's abdomen.
- The second section is called the transverse colon because it crosses the body from the right to the left side.
- The third section, the descending colon, continues downward on the left side.
- The fourth section is known as the sigmoid colon because of its "S" shape. The sigmoid colon joins the rectum, which in turn joins the anus.

Colorectal cancer usually develops slowly over a period of 10 to 15 years.[1] The tumor typically begins as a noncancerous polyp. A polyp is a growth of tissue that develops on the lining of the colon or rectum that can become cancerous. Certain kinds of polyps, called adenomatous polyps or adenomas, are the most likely to become cancers, though fewer than 10% of adenomas progress to cancer.[2] Adenomas are common; an estimated one-third to one-half of all individuals will eventually develop one or more adenomas.[3-4]

About 96% of colorectal cancers are adenocarcinomas, which evolve from glandular tissue.[5] The great majority of these cancers arise from an adenomatous polyp, which is visible through a scope or on an x-ray-like image. The information on early detection in this document is most relevant to this type of cancer.

Once cancer forms in the large intestine, it can grow through the lining and into the wall of the colon or rectum. Cancers that have invaded the wall can also penetrate blood or lymph vessels, which are thin channels that carry away cellular waste and fluid (Figure 2). Cancer cells typically spread first into nearby lymph nodes, which are bean-shaped structures that help fight infections. Cancerous cells can also be carried in blood vessels to the liver or lungs, or can spread in the abdominal cavity to other areas, such as the ovary. The process through which cancer cells travel to distant parts of the body through blood or lymphatic vessels is called metastasis.

The extent to which a colorectal cancer has spread is described as its stage. Staging is essential in determining the choice of treatment and in assessing prognosis. More than one system is used for the staging of cancer. The two most common staging systems are the TNM system, typically used in clinical settings, and the Surveillance, Epidemiology, and End Results (SEER) summary staging system, used for descriptive and statistical analysis of tumor registry data. In this document, we will describe colorectal cancer stages using the SEER summary staging system:

- **In situ:** Cancers that have not yet begun to invade the wall of the colon or rectum; these preinvasive lesions are not counted in cancer statistics.
- **Local:** Cancers that have grown into the wall of the colon and rectum, but have not extended through the wall to invade nearby tissues
- **Regional:** Cancers that have spread through the wall of the colon or rectum and have invaded nearby tissue, or that have spread to nearby lymph nodes
- **Distant:** Cancers that have spread to other parts of the body, such as the liver or lung

Figure 2. Colorectal Cancer Growth

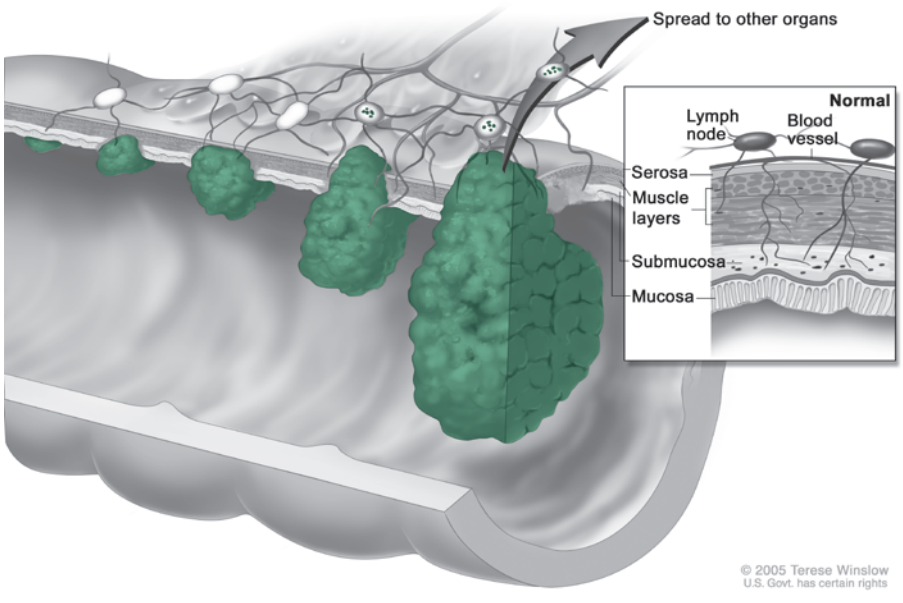


Table 1: Colorectal Cancer Incidence and Mortality Rates* by Race/Ethnicity, 2003-2007

	Incidence		Mortality	
Race/Ethnicity	**Men**	**Women**	**Men**	**Women**
Non-Hispanic White	56.8	41.9	20.9	14.6
Non-Hispanic Black	68.3	51.6	30.5	21.0
Asian American/Pacific Islander	42.8	32.5	13.2	9.9
American Indian/Alaska Native†	43.2	34.4	19.2	12.9
Hispanic/Latino	49.2	34.8	15.6	10.5
All persons	57.2	42.5	21.2	14.9

*Per 100,000, age adjusted to the 2000 US standard population.

† Statistics based on data from Contract Health Service Delivery Area (CHSDA) counties.

Source: Incidence: North American Association of Central Cancer Registries. Mortality: National Center for Health Statistics, Centers for Disease Control and Prevention, as provided by the Surveillance, Epidemiology, and End Results Program, National Cancer Institute.

How many cases and deaths are estimated to occur in 2011?

Colorectal cancer is the third most commonly diagnosed cancer and the third leading cause of cancer death in both men and women in the US, with about 141,210 new cases and 49,380 deaths expected in 2011. About 72% of cases arise in the colon and about 28% in the rectum.

How many people alive today have been diagnosed with colorectal cancer?

The National Cancer Institute estimates that more than 1.1 million Americans with a history of colorectal cancer were alive in January 2007. Some of these individuals were cancer-free, while others still had evidence of cancer and may have been undergoing treatment.

Who gets colorectal cancer?

Anyone can get colorectal cancer. The lifetime risk of being diagnosed with cancer of the colon or rectum is about 5% for both men and women in the US.[6]

Age

Incidence and death rates for colorectal cancer increase with age. Overall, 90% of new cases and 94% of deaths occur in individuals 50 and older. The incidence rate of colorectal cancer is more than 15 times higher in adults 50 years and older than in those 20 to 49 years.[7]

Sex

Overall, colorectal cancer incidence and mortality rates are about 35% to 40% higher in men than in women (Table 1). The reasons for this are not completely understood, but likely reflect complex interactions between gender-related differences in exposure to hormones and risk factors.[8] Gender differences in risk patterns may also help explain why the proportion of colorectal tumors occurring in the rectum is higher in men (31%) than in women (24%).

Race/ethnicity

Colorectal cancer incidence and mortality rates are highest in African American men and women (Table 1); incidence rates are 20% higher and mortality rates are about 45% higher than those in whites. Incidence and mortality rates among other major racial/ethnic groups are lower than those among whites.

It is important to recognize that the burden of colorectal cancer also varies greatly within racial/ethnic groups. For example, incidence rates among American Indians/Alaska Natives (AI/AN) living in Alaska are 102.6 (per 100,000), compared to 21.0 among AI/ANs residing in the Southwest.[9]

What are the symptoms of colorectal cancer?

Early colorectal cancer often has no symptoms, which is why screening is so important. Most colorectal cancers begin as a polyp, a small growth in the wall of the colon. As a polyp grows, it can bleed or obstruct the intestine (Figure 2,). See your doctor if you have any of these warning signs:

- Bleeding from the rectum
- Blood in the stool or in the toilet after having a bowel movement
- Dark- or black-colored stools
- A change in the shape of the stool
- Cramping pain in the lower stomach
- A feeling of discomfort or an urge to have a bowel movement when there is no need to have one
- New onset of constipation or diarrhea that lasts for more than a few days
- Unintentional weight loss

Table 2. Colorectal Cancer Incidence and Mortality Rates* by Race/Ethnicity and State, 2003-2007

	Non-Hispanic White				Non-Hispanic AfricanAmerican			
	Men		Women		Men		Women	
	Incidence	Mortality	Incidence	Mortality	Incidence	Mortality	Incidence	Mortality
Alabama	59.4	21.8	39.6	13.7	72.3	33.5	49.5	21.0
Alaska	49.2	19.9	36.7	12.2	†	†	†	†
Arizona	44.8	19.0	33.4	12.8	46.4	25.2	40.9	16.5
Arkansas	56.9	22.6	40.7	14.8	70.5	34.5	54.2	24.5
California	52.7	19.6	39.7	14.1	65.4	29.1	52.8	22.5
Colorado	48.7	18.4	38.0	13.8	54.8	25.9	43.8	16.8
Connecticut	59.0	18.9	43.3	13.9	63.1	25.6	52.6	19.4
Delaware	60.4	21.9	43.5	15.9	71.7	26.6	45.3	19.5
Dist. of Columbia‡#	45.5	12.6	34.9	10.5	65.2	32.2	53.5	21.2
Florida	52.2	18.6	39.2	13.1	58.0	27.5	46.6	19.4
Georgia	55.2	19.8	38.3	13.1	68.0	29.6	51.5	20.7
Hawaii	58.7	19.2	39.8	13.3	†	†	†	†
Idaho	48.4	17.5	38.4	14.0	†	†	†	†
Illinois	65.2	23.6	46.3	15.8	80.5	36.0	58.6	24.3
Indiana	60.7	23.9	44.1	15.5	69.5	33.0	56.7	22.1
Iowa	62.2	22.2	47.9	15.9	73.9	39.1	58.0	†
Kansas	59.9	21.2	41.5	14.7	76.9	34.5	50.3	22.8
Kentucky	67.3	25.1	48.4	17.2	82.4	31.0	59.2	26.3
Louisiana	64.8	24.4	43.3	14.9	77.8	34.9	55.6	23.8
Maine	61.1	20.7	46.9	16.2	†	†	†	†
Maryland§	54.1	21.6	39.1	14.4	59.1	31.0	47.8	21.3
Massachusetts	60.5	21.5	43.6	14.9	54.8	24.0	42.0	17.7
Michigan	54.8	20.0	41.8	14.8	74.7	31.1	53.5	20.8
Minnesota	54.2	18.8	40.9	13.7	55.4	25.0	37.7	16.4
Mississippi‡	61.2	22.1	41.5	14.1	72.8	34.2	56.1	23.9
Missouri	60.1	22.0	43.1	15.1	77.6	32.1	53.4	22.2
Montana	49.3	17.8	39.0	14.2	†	†	†	†
Nebraska	66.7	23.2	46.9	15.5	74.8	35.7	58.3	27.4
Nevada¶	-	23.3	-	17.3	-	27.3	-	19.6
New Hampshire#	55.4	21.3	42.5	15.0	†	†	†	†
New Jersey	63.2	23.8	46.0	16.9	68.2	30.4	52.7	22.5
New Mexico	49.4	18.1	38.0	12.8	†	†	34.8	†
New York	58.2	20.8	44.1	14.9	61.7	26.6	48.0	18.8
North Carolina	54.9	20.2	38.9	13.4	65.4	29.7	49.8	19.8
North Dakota#	68.7	21.2	43.4	14.6	†	†	†	†
Ohio	58.6	23.0	43.2	16.4	66.6	33.4	50.1	21.7
Oklahoma	56.9	23.0	41.7	14.9	68.2	35.6	52.6	18.0
Oregon	51.5	19.7	39.2	15.0	51.1	†	43.0	†
Pennsylvania	63.2	23.2	46.8	15.9	70.9	31.9	51.0	20.5
Rhode Island	62.1	21.4	45.1	14.6	49.3	†	55.2	†
South Carolina	56.0	19.0	40.6	13.7	69.7	31.8	49.8	20.2
South Dakota	56.9	21.1	42.4	15.2	†	†	†	†
Tennessee‡	56.8	21.9	41.5	14.8	65.8	36.4	53.7	25.0
Texas	55.7	20.7	38.8	13.7	75.1	35.1	54.4	22.7
Utah	44.4	15.1	31.8	11.1	†	†	†	†
Vermont	49.9	20.6	43.0	15.4	†	†	†	†
Virginia	52.7	20.5	39.4	13.7	66.8	31.5	50.8	21.2
Washington	50.6	18.4	38.2	13.5	56.6	27.2	44.2	21.7
West Virginia	68.4	25.3	48.6	17.8	64.3	35.1	61.5	27.7
Wisconsin	53.3	19.7	41.2	13.8	76.4	29.2	59.1	19.9
Wyoming	50.2	20.2	41.5	16.0	†	†	†	†
US	56.8	20.9	41.9	14.6	68.3	30.5	51.6	21.0

*Rates are per 100,000 and age adjusted to the 2000 US standard population. †Statistic not displayed due to fewer than 25 cases or deaths. ‡One year during 2003-2007 this state's registry did not meet NAACCR's combined criteria for data quality. §For all years during 2003-2007, this state's registry did not meet NAACCR's combined criteria for data quality. ¶This state's registry did not submit incidence data to NAACCR for 2003-2007. #Mortality rates for this state are not exclusive of Hispanic origin due to unreliable ethnicity data.

Source: Incidence - North American Association of Central Cancer Registries (NAACCR). **Mortality -** National Center for Health Statistics, Centers for Disease Control and Prevention, as provided by the Surveillance, Epidemiology, and End Results Program, National Cancer Institute.

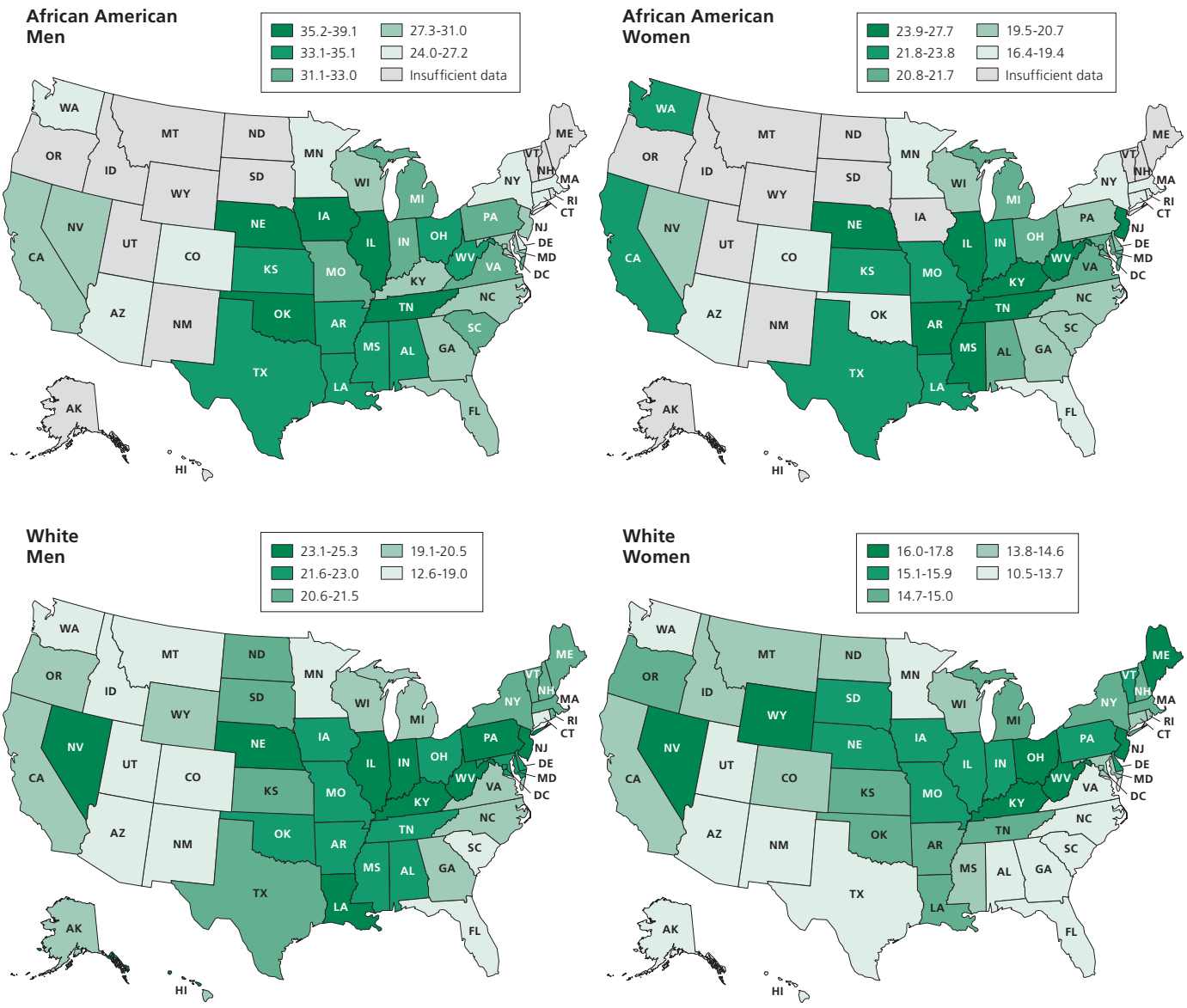
Colorectal Cancer Occurrence

Are there geographic differences in colorectal cancer rates?

Colorectal cancer rates in the US vary widely by geographic area. Contributing factors include regional variations in risk factors and access to screening and treatment, which are influenced by socioeconomic factors, legislative policies, and proximity to medical services.[10]

Table 2 shows colorectal cancer incidence and death rates per 100,000 for white and African American men and women by state. Compared to whites, African Americans have much larger state variations in incidence. Among men, incidence rates range from 46.4 (per 100,000) in Arizona to 82.4 in Kentucky in African Americans and from 44.4 in Utah to 68.7 in North Dakota in whites. Among women, incidence rates range from 34.8 (New Mexico) to 61.5 (West Virginia) in African Americans, and from 31.8 (Utah) to 48.6 (West Virginia) in whites.

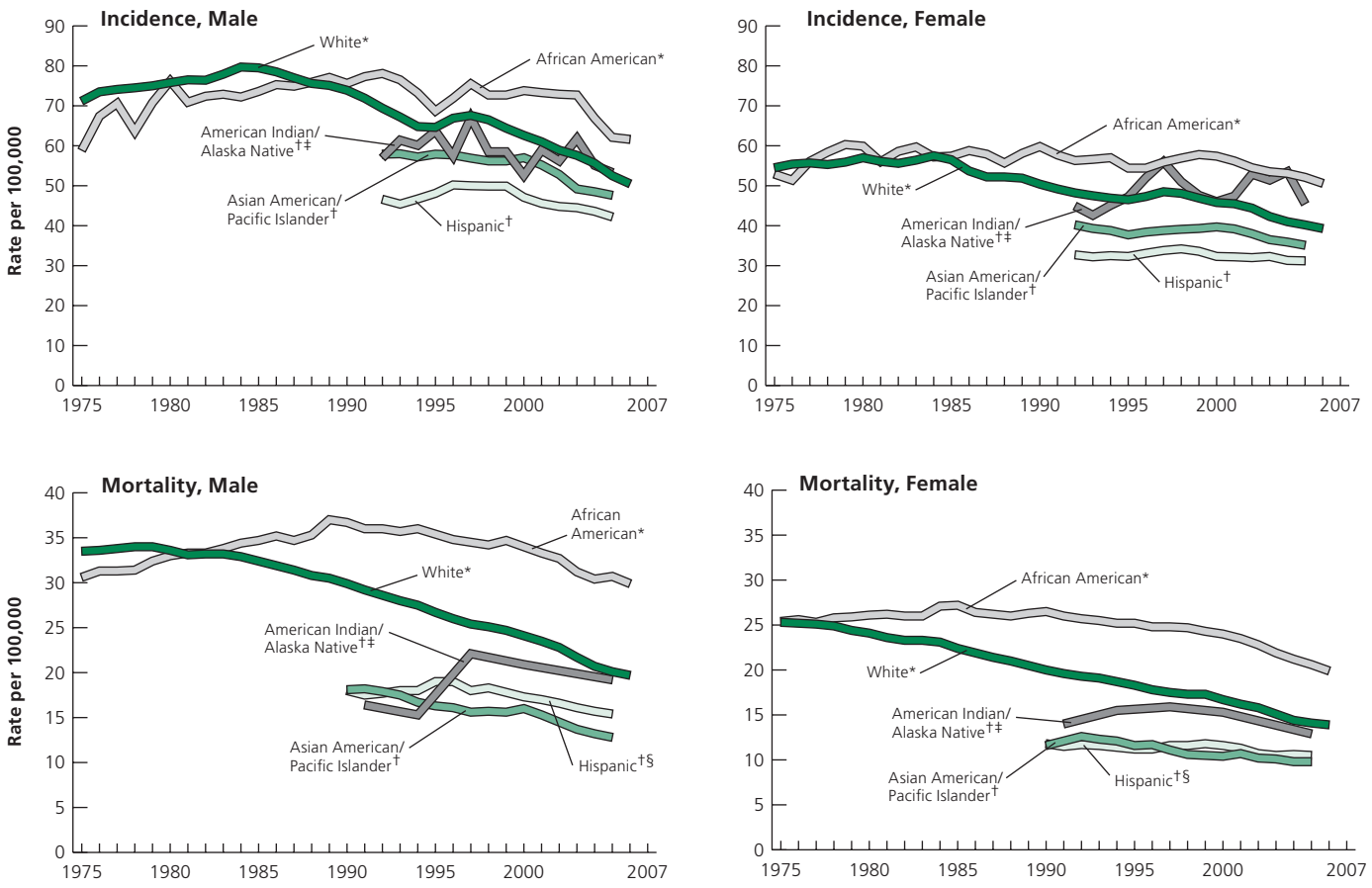
Figure 3. Colorectal Cancer Death Rates* by State, Race, and Sex, US, 2003-2007



*Per 100,000 and age adjusted to the 2000 US standard population. **Note:** Statistic not displayed for states with fewer than 25 deaths.

Source: National Center for Health Statistics, Centers for Disease Control and Prevention, as provided by the Surveillance, Epidemiology, and End Results Program, National Cancer Institute.

Figure 4. Trends in Colorectal Cancer Incidence and Mortality Rates by Race/Ethnicity and Sex, 1975-2007



Rates are per 100,000 and age adjusted to the 2000 US standard population. *Rates are two-year moving averages. †Rates are three-year moving averages. ‡Rates are based on Contract Health Service Delivery Areas; mortality rates are for fixed time intervals: 1990-1992, 1993-1995, 1996-1998, 1999-2002, and 2003-2007. §Due to incomplete data, rates exclude deaths from Connecticut, District of Columbia, Louisiana, Maine, Maryland, Minnesota, Mississippi, New Hampshire, New York, North Dakota, Oklahoma, Vermont, and Virginia.
Sources: Incidence - Surveillance, Epidemiology, and End Results (SEER) Program; Mortality - National Center for Health Statistics, Centers for Disease Control and Prevention, as provided by the SEER Program, National Cancer Institute.

Colorectal cancer mortality rates among whites generally tend to be lower in Western states, with the exception of Nevada, and higher in some Southern and many Midwestern states (Figure 3, page 5). These patterns appear similar for African Americans in states for which there are sufficient data. However, as previously noted, colorectal cancer mortality rates are substantially higher among African Americans compared to whites; the highest age-adjusted state mortality rate among African American men is 39.1 per 100,000 (Iowa), compared to 25.3 (West Virginia) among white men.

How has the occurrence of colorectal cancer changed over time?

Incidence

- Colorectal cancer incidence rates have been declining in the US since the mid-1980s. Since 1998, rates have been declining by 3.0% per year in men and by 2.3% per year in women.[11] The acceleration in the decline in the past decade has largely been attributed to the detection and removal of precancerous polyps as a result of colorectal cancer screening.[12] Since 1998, incidence rates have declined among men and women in every major racial/ethnic group, though the decrease is not statistically significant among American Indian/Alaska Native women.[11]
- Prior to 1989, incidence rates were predominantly higher in white men than in African American men and were similar for women of both races (Figure 4). Since that time, incidence rates have been higher for African Americans than whites in both men and women. This crossover likely reflects a combination of greater access to and utilization of recommended screening tests among whites (resulting in detection and removal of precancerous polyps), as well as racial differences in trends for colorectal cancer risk factors.[13]

- While rates have been declining among adults 50 years and older, incidence of colorectal cancer is increasing among adults younger than 50 years (Figure 5). This increase appears to be confined to cancers arising in the distal colon and rectum.[12, 14] Reasons for this increase are unknown, but may reflect increasing trends in obesity and/or unfavorable dietary patterns in children and young adults.[14]

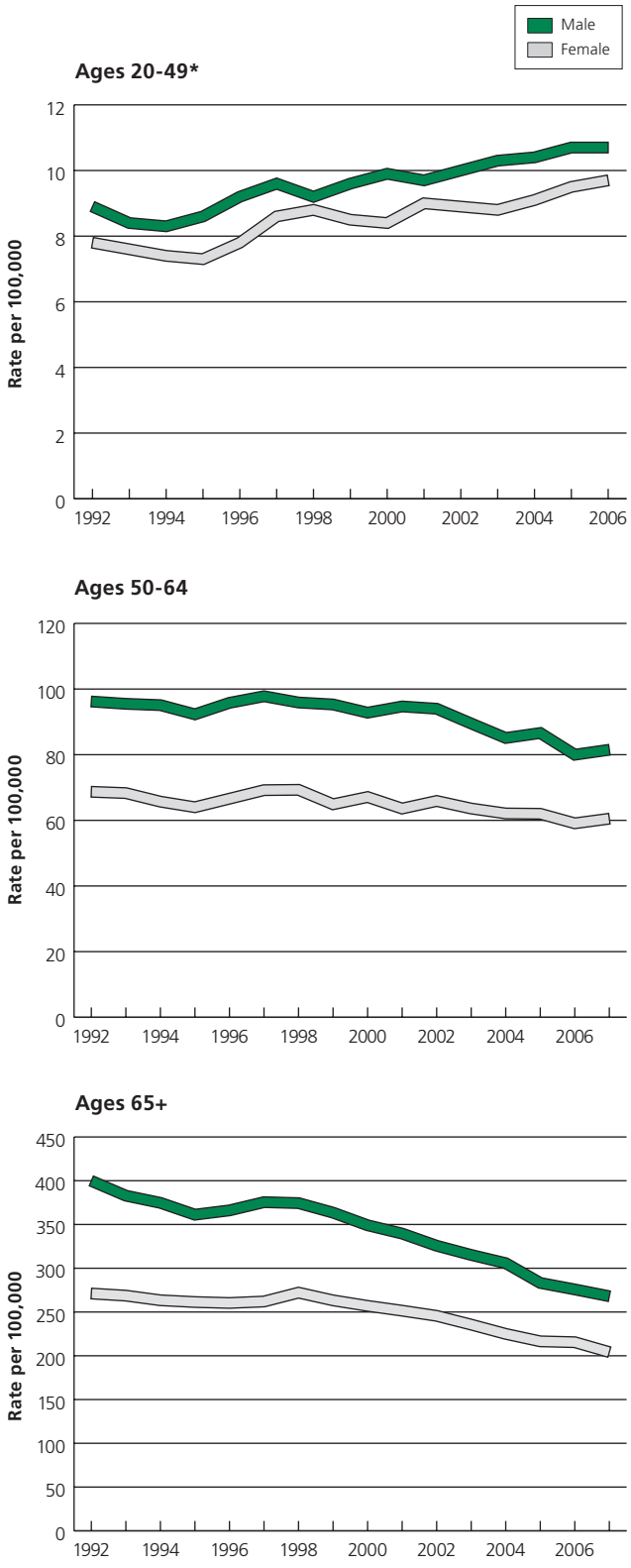
Mortality

- Colorectal cancer death rates have been decreasing since around 1980 in men and 1950 in women.[15] Since 1998, rates overall have decreased by 2.8% per year in men and by 2.6% per year in women, and have been generally decreasing in men and women in every major racial/ethnic group, though not statistically significantly among American Indian/Alaska Native men and women.[11]
- Over the past three decades, there has been increasing divergence in mortality trends between whites and African Americans (Figure 4). Prior to 1980, colorectal cancer mortality rates were lower in African American men than white men and similar among women of both races. However, largely as a result of substantial improvements in the early detection and treatment of colorectal cancer, steep declines began in whites in the early 1980s that did not begin in African Americans until the late 1990s. As a result, rates have been substantially higher in African American men and women. The gap in mortality has widened over time because the pace of the decline in African Americans continues to lag behind that in whites; colorectal cancer mortality rates were 44% higher in African Americans than in whites in 2007.[16]

Stage distribution and cancer survival

- Overall, only 39% of colorectal cancer patients diagnosed between 1999 and 2006 had localized-stage disease, for which the 5-year relative survival rate is 90%; 5-year survival rates for patients diagnosed at the regional and distant stage are 70% and 12%, respectively.
- The 5-year relative survival rate for colorectal cancer has increased from 51% for cases diagnosed in the mid-1970s to 67% for cases diagnosed in 1999-2006.[16] A significant advance in colorectal cancer treatment in the late 1980s was the introduction of 5-fluorouracil-based adjuvant chemotherapy for resectable (operable) stage III colon cancer, which reduced mortality by as much as 30%.[17]
- Compared to whites, all other racial/ethnic groups are less likely to be diagnosed with colorectal cancer at an early stage, when treatment is more successful (Table 3, page 8).
- Among racial/ethnic groups, Asians and Pacific Islanders and whites are generally the most likely to survive 5 years after a colorectal cancer diagnosis (Figure 6, page 8).

Figure 5. Colorectal Cancer Incidence Trends by Age and Sex, 1992-2007



Rates are age adjusted to the 2000 US standard population.
*Rates for ages 20-49 are 2-year moving averages.

Source: Surveillance, Epidemiology, and End Results Program, National Cancer Institute.

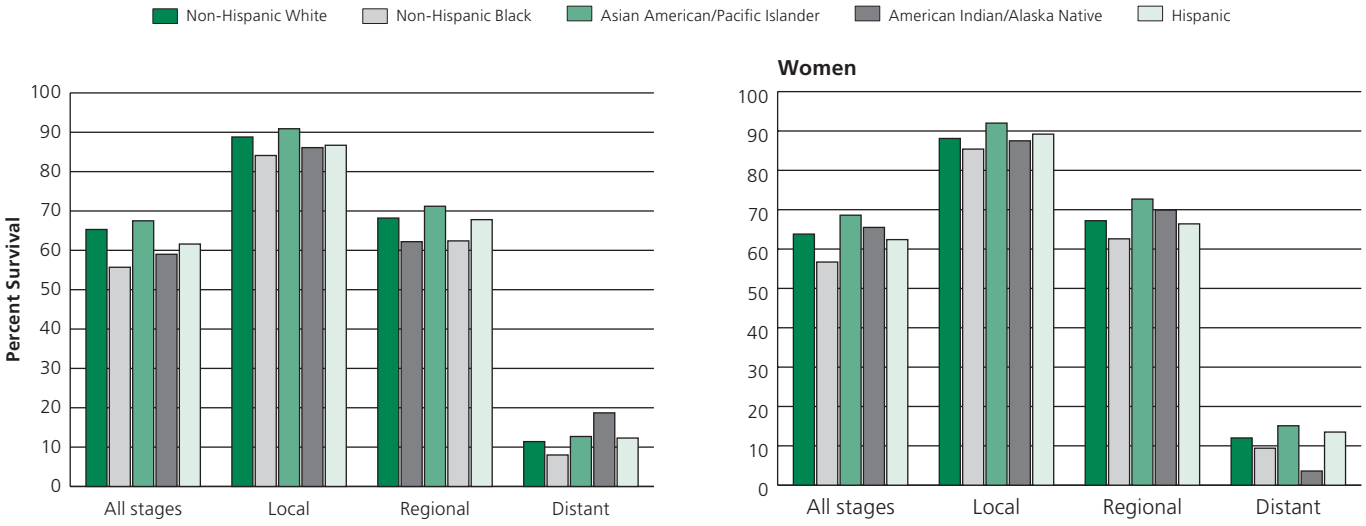
Table 3: Colorectal Cancer Stage Distribution (%) by Race/Ethnicity, 1999-2006

	Men				Women			
Race/Ethnicity	**Local**	**Regional**	**Distant**	**Unstaged**	**Local**	**Regional**	**Distant**	**Unstaged**
Non-Hispanic White	42	35	19	4	40	36	19	5
Non-Hispanic African American	36	34	25	5	36	34	24	6
Asian American/Pacific Islander	40	37	19	4	38	41	18	3
American Indian/Alaska Native	36	37	24	3	40	39	17	3
Hispanic	37	36	22	5	37	36	21	5

Source: Altekruse et al.[16]

- Factors that contribute to disparities in survival by race and ethnicity include differences in access to early detection, timely and high-quality treatment and supportive care, and comorbidities (other illnesses).[18] Studies have found that African Americans are less likely than whites to receive the most appropriate surgery, adjuvant chemotherapy, and radiation treatments after a cancer diagnosis.[19-20]
- In clinical trial settings, where treatment is equal among study groups, racial differences in survival disappear. Moreover, African American patients appear to experience fewer negative side effects from chemotherapy than whites.[21-22]
- Survival disparities exist within, as well as between racial and ethnic groups for the same reasons listed above. For example, among African Americans, the 5-year relative survival rate for colorectal cancer is 30% higher among patients who are privately insured compared to those without health insurance.[23]

Figure 6. Five-year Colorectal Cancer-specific Survival* by Stage and Race/Ethnicity, 1999-2006



*Cause-specific survival rates are the probability of not dying from colorectal cancer within 5 years of diagnosis. Rates for American Indians/Alaska Natives are based on small case numbers, particularly for distant stage disease.
Sources: Altekruse et al.[16]

Colorectal Cancer Risk Factors

There are many known factors that increase or decrease the risk of colorectal cancer; some of these factors are modifiable and others are not (Table 4). Nonmodifiable risk factors include a personal or family history of colorectal cancer or adenomatous polyps, and a personal history of chronic inflammatory bowel disease. The American Cancer Society and other organizations recommend that some people at increased risk for colorectal cancer because of these conditions begin screening at an earlier age.[24] For more information on recommended colorectal cancer screening for individuals with these risk factors, please see page 14. Modifiable risk factors that have been associated with an increased risk of colorectal cancer in epidemiologic studies include physical inactivity, obesity, high consumption of red or processed meats, smoking, and moderate-to-heavy alcohol consumption. A recent study found that about one-quarter of colorectal cancer cases could be avoided by following a healthy lifestyle, i.e., maintaining a healthy abdominal weight, being physically active at least 30 minutes per day, eating a healthy diet, not smoking, and not drinking excessive amounts of alcohol.[25]

Heredity and family history

- People with a first-degree relative (parent, sibling, or offspring) who has had colorectal cancer have 2 to 3 times the risk of developing the disease compared to individuals with no family history; if the relative was diagnosed at a young age or if there is more than one affected relative, risk increases to 3 to 6 times that of the general population.[26-27] About 20% of all colorectal cancer patients have a close relative who was diagnosed with the disease.[28]
- About 5% of patients with colorectal cancer have a well-defined genetic syndrome that causes the disease.[28] The most common of these is Lynch syndrome (also known as hereditary nonpolyposis colorectal cancer), which accounts for 2% to 4% of all colorectal cancer cases.[29] Although individuals with Lynch syndrome are predisposed to numerous types of cancer, risk of colorectal cancer is highest. Previous studies estimated colorectal cancer risk as high as 80% to 90%.[30] However, these analyses may have overestimated risk due to the overrepresentation of Lynch families with more extreme disease patterns due to historically stringent selection criteria.[31-32] A recent study of colorectal cancer in 147 Lynch syndrome families in the US found lifetime risks of 66% in men and 43% in women, with a median age at diagnosis of 42 years and 47 years, respectively.[33] (The median age at colorectal cancer diagnosis overall in the US is 68 years in men and 72 years in women.[16])

Table 4. Summary of Major Risk Factors for Colorectal Cancer

	Relative Risk*
Factors that increase risk:	
Heredity and Medical History	
Family history	
1 first-degree relative[26]	2.2
more than 1 relative[26]	4.0
relative with diagnosis before age 45[27]	3.9
Inflammatory bowel disease[36]	
Crohn disease (colon)	2.6
Ulcerative colitis	
colon	2.8
rectum	1.9
Diabetes[46]	1.2
Other factors	
Obesity[46]	1.2
Red meat consumption[46]	1.2
Processed meat consumption[46]	1.2
Smoking[46]	1.2
Alcohol consumption[64]	1.1
Factors that decrease risk:	
Physical activity (colon)[43]	
Men	0.8
Women	0.7
Calcium[56]	0.8
Milk consumption[56]	0.9

*Relative risk compares the risk of disease among people with a particular "exposure" to the risk among people without that exposure. Dietary risk factors are usually evaluated by comparing highest with lowest consumption. If the relative risk is greater than 1.0, then risk is higher among exposed than unexposed persons. Relative risks less than 1.0 indicate a protective effect.

- Familial adenomatous polyposis (FAP) is the second most common predisposing genetic syndrome; for these individuals, lifetime risk of colorectal cancer approaches 100% without intervention.[29]
- Although accurate identification of families with a history of colorectal cancer and/or a predisposing genetic abnormality is extremely important so testing can begin at an early age, studies have shown that documentation of family cancer history in medical records is lacking in half of primary care patients.[34-35]

Personal medical history

- People who have had colorectal cancer are more likely to develop new cancers in other areas of the colon and rectum, even if the first cancer was completely removed. The risk of a second cancer is much greater if the first cancer was diagnosed at age 60 or younger.
- People who have had one or more adenomatous polyps have an increased risk of colorectal cancer. This is especially true if the polyps were large or if there was more than one.[4]

- People who have a chronic inflammatory bowel disease have an increased risk of developing colorectal cancer which increases with extent and duration of the disease.[36] This includes conditions such as ulcerative colitis and Crohn disease, in which the colon is inflamed over a long period of time. It is estimated that 18% of patients with a 30-year history of ulcerative colitis will develop colorectal cancer.[37]
- Many studies have found an association between diabetes and increased risk of colorectal cancer.[38-39] Though adult onset (Type 2) diabetes (the most common type) and colorectal cancer share similar risk factors, including physical inactivity and obesity, a positive association between diabetes and colorectal cancer has been found after accounting for physical activity, body mass index, and waist circumference.[40] A recent study suggests that the association may be stronger in men than in women.[39]

Other risk factors

Physical inactivity

One of the most consistently reported relationships between colon cancer risk and behavior is the protective effect of physical activity.[41] Based on these findings, as well as the numerous other health benefits of regular physical activity, the American Cancer Society recommends engaging in at least moderate activity for 30 minutes or more on 5 or more days per week. Forty-five to 60 minutes of intentional physical activity is preferable. Epidemiologic studies find that:

- High levels of physical activity decrease the risk of colon cancer among men and women by possibly as much as 50%.[42]
- According to most studies, the more physical activity in which people engage, the lower their risk of colon cancer. In men and women, both recreational and occupational physical activity decrease risk.[43]
- Sedentary people who become active later in life may also reduce their risk.[44]
- Even moderate physical activities, such as brisk walking or stair climbing, are associated with lower risk of colon cancer.[45]

Overweight and obesity

Being overweight or obese is associated with a higher risk of colorectal cancer, with stronger associations more consistently observed in men than in women.[46] Overweight and obesity increase risk of colorectal cancer independent of physical activity.[47] Abdominal obesity (measured by waist size) may be a more important risk factor for colon cancer than overall obesity in both men and women.[48]

Diet

Geographic differences in colorectal cancer rates and changing risks among immigrant populations over time suggest that diet and lifestyle strongly influence colorectal cancer risk; however, research on the role of specific dietary elements on colorectal cancer risk is still accumulating. Studies suggest that following the Society's dietary recommendations (consume a healthy diet with an emphasis on plant sources; namely: limit consumption of red and processed meats, eat a variety of vegetables and fruits, and choose whole grains in preference to processed grains) and consuming the recommended levels of calcium will help reduce the risk of developing colorectal cancer.[46, 49-51]

- Several studies, including one by the American Cancer Society, have found that high consumption of red and/or processed meat increases the risk of both colon and rectal cancer.[46, 52-53] Further analyses indicate that the association with red meat may be related to the cooking process because a higher risk of colorectal cancer is observed particularly among those individuals who consume meat that has been cooked at a high temperature for a long period of time.[42]
- In contrast to findings from earlier research, more recent large, prospective studies do not indicate a major relationship between colorectal cancer and vegetable, fruit, or fiber consumption.[42, 49] However, some studies suggest that people with very low fruit and vegetable intake are at higher risk.[54-55]
- Consumption of milk and calcium probably decreases the risk of developing colorectal cancer.[42, 49, 56]
- Studies indicate that individuals with low blood levels of vitamin D have an increased risk of developing colorectal cancer; however, the relationship between vitamin D and cancer is still not fully understood and remains an area of active investigation.[57-58]

Smoking

In November 2009, the International Agency for Research on Cancer reported that there is now sufficient evidence to conclude that tobacco smoking causes colorectal cancer.[59] The association appears to be stronger for rectal than for colon cancer.[60-61] It is thought that earlier studies may have failed to detect this association because of a particularly long latency period – at least three to four decades – between tobacco exposure and colorectal cancer diagnosis and/or because smoking may only be associated with a subset of colorectal cancers.[62-63]

Alcohol

Colorectal cancer has been linked to even moderate alcohol use. Individuals who have a lifetime average of 2 to 4 alcoholic drinks per day have a 23% higher risk of colorectal cancer than those who consume less than one drink per day.[64]

Medications and dietary supplements

Accumulating research suggests that aspirin-like drugs, postmenopausal hormones, and calcium supplements may help prevent colorectal cancer.

Extensive evidence suggests that long-term, regular use of aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDS) is associated with lower risk of colorectal cancer.[65-66] The American Cancer Society does not currently recommend use of these drugs for cancer prevention because of the potential side effects of gastrointestinal bleeding from aspirin and other traditional NSAIDs or of heart attacks from selective COX-2 inhibitors (a type of NSAID commonly used to treat arthritis). However, people who are already taking NSAIDs for chronic arthritis or aspirin for heart disease prevention may have a lower risk of colorectal cancer as a side benefit.

There is substantial evidence that women who use postmenopausal hormones have lower rates of colorectal cancer than those who do not.[42] Decreased risk is especially evident in women with long-term hormone use, though risk returns to that of nonusers within three years of cessation.[67-68] However, use of postmenopausal hormones increases risk for breast and other cancers, as well as cardiovascular disease, so it is not recommended for the prevention of colorectal cancer.[69]

At present, the American Cancer Society does not recommend any medications or supplements to prevent colorectal cancer because of uncertainties about their effectiveness, appropriate dose, and potential toxicity.

Current Recommendations for the Prevention of Colorectal Cancer

1. Get screened regularly.
2. Maintain a healthy weight throughout life.
3. Adopt a physically active lifestyle.
4. Consume a healthy diet with an emphasis on plant sources; specifically:
   - Choose foods and beverages in amounts that help achieve and maintain a healthy weight.
   - Eat 5 or more servings of a variety of vegetables and fruits each day.
   - Choose whole grains in preference to processed (refined) grains.
   - Limit your consumption of processed and red meats.
5. If you drink alcoholic beverages, limit consumption.

Colorectal Cancer Screening

The goals of screening for colorectal cancer are the prevention of cancer through the detection and removal of precancerous growths and the diagnosis of cancers at an early stage. Screening reduces mortality both by decreasing incidence and by detecting cancers at earlier, more treatable stages.[24]

Recommended options for colorectal cancer screening

In 2008, the American Cancer Society collaborated with the American College of Radiology and the US Multi-Society Task Force on Colorectal Cancer (a consortium representing the American College of Gastroenterology, the American Society of Gastrointestinal Endoscopy, the American Gastroenterological Association, and representation from the American College of Physicians) to publish consensus guidelines for colorectal cancer screening.[24] The leadership of these organizations believed that a single set of jointly developed and promoted recommendations would highlight their importance and promote evidence-based practice. The guidelines draw a distinction between screening tests that primarily detect cancer (stool tests) and those that are more likely to detect both cancer and precancerous growths, (structural exams – flexible sigmoidoscopy, colonoscopy, CT colonography, and double-contrast barium enema). The recommendations emphasize that cancer prevention should be the primary goal of colorectal cancer screening. To achieve this goal, exams that are designed to detect both early cancer and precancerous polyps should be encouraged if resources are available and patients are willing to undergo an invasive test. The higher likelihood of polyp detection with the use of these tests substantially increases opportunities for polyp removal and colorectal cancer prevention.

The following options are recommended for colorectal cancer screening in men and women aged 50 and older at average risk (summarized in Table 5, page 12):

Tests that are more likely to detect both adenomatous polyps and cancer

- **Flexible sigmoidoscopy:** A slender, flexible, hollow, lighted tube is inserted through the rectum into the colon by a trained examiner. The sigmoidoscope is about 2 feet long (60 cm) and provides a visual examination of the rectum and lower one-third of the colon (sigmoid colon).[24] Simple bowel cleansing, usually with enemas, is necessary to prepare the colon, and the procedure is typically performed without sedation. If there is a polyp or tumor present, the patient is referred for a colonoscopy so that the colon can be examined further.

Table 5. Considerations When Deciding with Your Doctor Which Test Is Right for You:

Test	Benefits	Performance & Complexity*	Limitations	Test Time Interval
Flexible Sigmoidoscopy	• Fairly quick • Few complications • Minimal bowel preparation • Minimal discomfort • Does not require sedation or a specialist	**Performance:** High for rectum & lower one-third of the colon **Complexity:** Intermediate	• Views only one-third of colon • Bowel preparation needed • Cannot remove large polyps • Small risk of infection or bowel tear • Slightly more effective when combined with annual fecal occult blood testing • Colonoscopy necessary if abnormalities are detected	5 years
Colonoscopy	• Examines entire colon • Can biopsy and remove polyps • Can diagnose other diseases • Required for abnormal results from all other tests	**Performance:** Highest **Complexity:** Highest	• Can miss some polyps and cancers • Full bowel preparation needed • Can be expensive • Sedation of some kind usually needed, necessitating a chaperone • Patient may miss a day of work. • Highest risk of bowel tears or infections compared to other tests	10 years
Double-contrast Barium Enema	• Can usually view entire colon • Few complications • No sedation needed	**Performance:** High **Complexity:** High	• Can miss some small polyps and cancers • Full bowel preparation needed • Cannot remove polyps • Exposure to low-dose radiation • Colonoscopy necessary if abnormalities are detected	5 years
Computed Tomographic Colonography	• Examines entire colon • Fairly quick • Few complications • No sedation needed • Noninvasive	**Performance:** High **Complexity:** Intermediate	• Can miss some polyps and cancers • Full bowel preparation needed • Cannot remove polyps • Exposure to low-dose radiation • Colonoscopy necessary if abnormalities are detected	5 years
Fecal Occult Blood Test	• No bowel preparation • Sampling is done at home • Low cost • Noninvasive	**Performance:** Intermediate for cancer **Complexity:** Lowest	• May require multiple stool samples • Will miss most polyps and some cancers • Higher rate of false-positives than other tests • Pre-test dietary limitations • Slightly more effective when combined with a flexible sigmoidoscopy every five years • Colonoscopy necessary if abnormalities are detected	Annual
Stool DNA Test	• No bowel preparation • Sampling is done at home • Requires only a single stool sample • Noninvasive	**Performance:** Intermediate for cancer **Complexity:** Low	• Will miss most polyps and some cancers • High cost compared to other stool tests • New technology with uncertain interval between testing • Colonoscopy necessary if abnormalities are detected	Uncertain

*Complexity involves patient preparation, inconvenience, facilities and equipment needed, and patient discomfort.

Sigmoidoscopy, followed by colonoscopy if a polyp or tumor is found, can identify 70% to 80% of individuals with advanced lesions and is associated with a 60% to 80% reduction in colorectal cancer mortality for the area of the colon within its reach.[70-72] Results of a recent clinical trial indicate that a single sigmoidoscopy screening between the ages of 55 and 64 years reduces colorectal cancer incidence by 33% and mortality by 43%.[73]

- **Colonoscopy:** Like sigmoidoscopy, this procedure allows for direct visual examination of the colon and rectum. A colonoscope is similar to a sigmoidoscope, but is a much longer, more complex instrument, allowing visualization of the entire colon and removal of polyps if present. Before undergoing a colonoscopy, patients are instructed to take special laxative agents to completely cleanse the colon. Sedation is usually provided during the examination to minimize discomfort.[24] If a polyp is found, it may be removed by passing a wire loop through the colonoscope to cut the polyp from the wall of the colon using an electric current. Studies show that colonoscopy is the most sensitive method for the detection of colorectal cancer or adenomatous polyps.[74] Colorectal cancer screening by colonoscopy has a number of advantages: it is highly sensitive; examines the entire colon; and allows for screening, diagnosis, and removal of polyps in a single visit. It has been estimated that colonoscopy screening has the potential to prevent about 65% of colorectal cancer cases.[75-76] Colonoscopy also has the longest rescreening interval of all forms of testing; if normal, the exam does not need to be repeated for 10 years. However, colonoscopy has a higher risk of complications than other forms of testing, including bowel tears or bleeding, especially when a polyp is removed.[24]
- **Barium enema with air contrast:** This procedure, which allows complete radiological examination of the colon, is also called a double-contrast barium enema (DCBE).[24] Barium sulfate is introduced into the colon through the rectum and is allowed to spread throughout to partially fill and open the colon. Air is then introduced to expand the colon and increase the quality of x-rays that are taken. This method is less sensitive than colonoscopy for visualizing small polyps or cancers. If a polyp or other abnormality is seen, the patient should be referred for a colonoscopy so that the colon can be examined further. Use of DCBE for colorectal cancer screening is very uncommon today due to the increased availability of colonoscopy, changing patient and physician preferences, and smaller numbers of radiologists adequately trained to perform the procedure.[24]
- **Computed tomographic colonography (CTC):** Also referred to as virtual colonoscopy, this imaging procedure was introduced in the 1990s and results in detailed, cross-sectional, 2- or 3- dimensional views of the entire colon and rectum with the use of a special x-ray machine linked to a computer.[24] Although a full bowel cleansing is necessary for a successful examination, CTC does not require sedation. A small, flexible tube is inserted into the rectum in order to allow air or carbon dioxide to open the colon; then the patient passes through the CT scanner, which creates multiple images of the interior colon. CTC is less invasive than other screening techniques, requires no recovery time, and typically takes approximately 10 to 15 minutes to complete. Patients with polyps of significant size (larger than 5 mm) or other abnormal results are referred for colonoscopy, sometimes on the same day in order to alleviate the necessity of a second bowel preparation. Studies have shown that the performance of CTC is similar to optical colonoscopy for the detection of invasive cancer and polyps approximately 1 cm or larger in size.[77-78]

Tests that are primarily effective at detecting cancer

Although some precancerous polyps may be detected by stool tests, the potential for prevention is both limited and incidental and cannot be the primary goal of screening with these tests.

- **Fecal occult blood test (FOBT):** Cancerous tumors and some large polyps bleed intermittently into the intestine. The FOBT can detect very small quantities of blood in stool. The FOBT kit is obtained from a health care provider for use at home. Bleeding from colorectal cancer may be intermittent or undetectable, so accurate test results require annual testing that consists of collecting 2 to 3 samples (depending on the product) from consecutive bowel movements. There are two types of FOBT available – guaiac-based tests, which detect blood from any source, and immunochemical-based tests, which detect only human blood. While there are numerous guaiac-based tests available, the American Cancer Society recommends only high-sensitivity tests (e.g. Hemmocult Sensa, etc.) for colorectal cancer screening.[79] For guaiac-based FOBT (gFOBT), individuals are instructed to avoid nonsteroidal anti-inflammatory drugs, vitamin C, citrus juices, and red meat for 3 days prior to the test. Typically, 6 samples from 3 consecutive bowel movements are collected by smearing the stool sample thinly on a special card.[24] The fecal immunochemical test (FIT) may be more convenient for some individuals because it does not require special dietary restrictions and may require collection of fewer stool samples. Upon completing either of these tests, patients return the kit to their doctor or to a laboratory for evaluation. Patients who have a positive gFOBT or FIT are referred for a colonoscopy to rule out the presence of polyps or cancer. Studies have shown that the regular use of these screening methods reduces the risk of death from colorectal cancer by 15% to 33%.[24] In addition, FOBT has also been shown to decrease by 20% the incidence of colorectal cancer by detecting large polyps, resulting in their subsequent removal by colonoscopy.[80] It is important to note that the effectiveness of FOBT is dependent on repeated screenings over time; a recent study indicated that a majority of patients who choose this testing option fail to adhere to a regular testing schedule.[81]

Table 6. Colorectal Cancer Screening (%) among Adults Aged 50 and Older in the US, 2008

	FOBT*	Endoscopy†	Either FOBT or Endoscopy‡
Gender			
Men	10.3	52.2	54.9
Women	9.7	48.6	52.0
Age (years)			
50-64	9.1	45.7	49.1
65+	11.1	55.5	58.1
Race/Ethnicity			
White (non-Hispanic)	10.3	52.7	56.0
African American (non-Hispanic)	8.9	47.3	48.9
Asian§	12.1	42.6	47.8
American Indian/ Alaskan Native¶	4.5	31.7	33.1
Hispanic/Latino	7.8	34.6	37.2
Education (years)			
11 or fewer	8.1	34.0	37.3
12	8.1	48.1	50.8
13 to 15	12.9	52.2	56.3
16 or more	10.8	61.9	64.5
Health Insurance			
Yes	10.3	52.6	55.7
No	8.8	12.7	19.5
Immigration			
Born in US	10.1	51.9	55.0
Born in US Territory	5.8	42.3	45.9
In US less than 10 years	8.0	22.5	28.0
In US 10 years or more	9.7	38.7	41.9
Total	**10.0**	**50.2**	**53.2**

Percentages are age adjusted to the 2000 US standard population.

*A home fecal occult blood test within the past year. †A sigmoidoscopy within the past five years or a colonoscopy within the past 10 years. ‡Either a fecal occult blood test within the past year, sigmoidoscopy within the past five years, or a colonoscopy within the past 10 years. §Does not include Native Hawaiians or other Pacific Islanders.¶Estimates should be interpreted with caution because of small samples sizes.

Source: National Health Interview Survey Public Use Data File 2008, National Center for Health Statistics, Centers for Disease Control and Prevention, 2009.

- **Stool DNA (sDNA) test:** This method of screening is the result of increasing knowledge about the molecular properties of cancer. Cancerous tumors and large polyps shed cells that contain altered DNA into the large bowel, and the sDNA test detects these gene mutations in stool samples. Like FOBT, a test kit is obtained from a health care provider for specimen collection at home. Although only a one-time collection is necessary, adequate evaluation requires the entire stool specimen (30 g minimum). Collection kits are designed to facilitate ease of collection and mailing, and include a specially designed cooling pack necessary for temperature control during shipping. Patients with a positive test result are referred for a colonoscopy. Based on current evidence, the appropriate time interval for repeat testing is uncertain.[24] New variants of sDNA tests are in development and undergoing evaluation.

Any of the above recommended options is useful in screening for colorectal cancer in average-risk adults. Each of these tests has strengths and limitations related to accuracy, potential for prevention, cost, and risks (Table 5, page 12). Positive results from any other option should be followed with a colonoscopy for more complete diagnostic evaluation. When choosing a screening test, patients should be given information about each test and should engage in a shared decision-making process with a health care professional based on the patient's health, medical history, and personal preference.

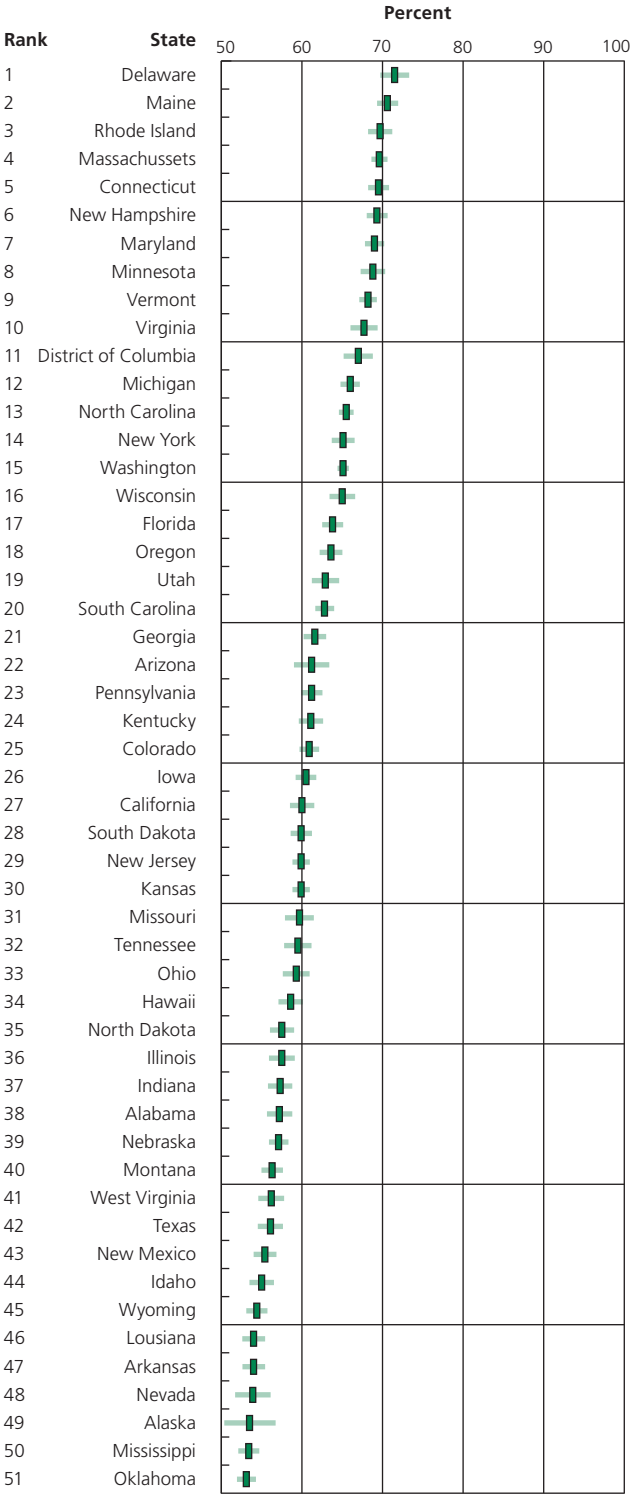
Often during the course of an exam in a physician's office, a single stool sample is collected and placed on an FOBT card for examination. The office-based, single-sample FOBT is not a recommended screening test for colorectal cancer because this test performs poorly in its ability to detect the disease. In one large study, this form of testing detected only 5% of precancerous polyps and cancers that were revealed by subsequent colonoscopy.[82]

"Toilet bowl tests" are guaiac-based tests that are often promoted as a type of FOBT. They consist of strips of paper to be dropped into the toilet water with your stool and are sold in drugstores and other retail outlets. These tests have not been evaluated in the types of rigorous clinical studies done on the guaiac-based FOBT and the FIT and are not recommended for colorectal cancer screening by the American Cancer Society or any other major medical organization.

Screening for individuals at increased risk for colorectal cancer

Some people who are at increased risk of colorectal cancer because of family history or certain medical conditions (see page 9) should begin colorectal cancer screening before age 50. Colonoscopy is the recommended screening method for most individuals in these increased and high-risk groups. Recommendations regarding age to initiate screening and rescreening intervals may differ based on individual circumstances, so individuals with these risk factors should discuss screening with their health care provider. For additional information on colorectal cancer screening in high-risk individuals, see Levin et al.[24]

Figure 7. Colorectal Cancer Screening* Prevalence among Adults Aged 50 Years and Older by State, 2006-2008



Rank	State
1	Delaware
2	Maine
3	Rhode Island
4	Massachussets
5	Connecticut
6	New Hampshire
7	Maryland
8	Minnesota
9	Vermont
10	Virginia
11	District of Columbia
12	Michigan
13	North Carolina
14	New York
15	Washington
16	Wisconsin
17	Florida
18	Oregon
19	Utah
20	South Carolina
21	Georgia
22	Arizona
23	Pennsylvania
24	Kentucky
25	Colorado
26	Iowa
27	California
28	South Dakota
29	New Jersey
30	Kansas
31	Missouri
32	Tennessee
33	Ohio
34	Hawaii
35	North Dakota
36	Illinois
37	Indiana
38	Alabama
39	Nebraska
40	Montana
41	West Virginia
42	Texas
43	New Mexico
44	Idaho
45	Wyoming
46	Lousiana
47	Arkansas
48	Nevada
49	Alaska
50	Mississippi
51	Oklahoma

*Either a fecal occult blood test in the past year or a sigmoidoscopy or colonoscopy in the preceding 10 years. See Table 7 for values.

Source: Behavioral Risk Factor Surveillance System Public Use Data Tapes 2006 and 2008, National Center for Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2007 and 2009.

Use of colorectal cancer screening

Despite the evidence supporting the effectiveness of colorectal cancer screening and the availability of various screening tests, only about half of the US population aged 50 and older (53%) is current for recommended testing. According to the National Health Interview Survey, screening prevalence has been increasing modestly since 2000 exclusively due to an increase in endoscopy (sigmoidoscopy or colonoscopy).[83] Among adults 50 and older in 2008, 10% reported an FOBT and 50% reported an endoscopy within the recommended time intervals (Table 6). Screening prevalence is lower among people aged 50 to 64 compared to those 65 years and older, and is especially low among those who are non-white, who have fewer years of education, who lack health insurance coverage, and who are recent immigrants.

The proportion of adults 50 and older who follow screening recommendations varies by state.

- Among adults 50 and older, the percentage of the population that has had a recent screening test (either endoscopy or FOBT) ranges from 53% in Oklahoma to 72% in Delaware (Figure 7).
- Among the 39 states with adequate data on colorectal cancer screening in African Americans, rates range from a low of 46% in Arkansas to a high of 70% in Maryland (Table 7, page 16).
- Among the 45 states with sufficient data on Hispanics, screening prevalence ranges from 32% in Idaho to 81% in Vermont (Table 7, page 16).
- No state meets the American Cancer Society's 2015 goal of 75% of all adults older than 50 having a recent test.

Barriers to colorectal cancer screening

Barriers to colorectal cancer screening must be identified in order to be eliminated. A number of studies have been conducted to try to understand why rates of screening for colorectal cancer are low. Several common factors have emerged in these studies:

- Factors most strongly and consistently associated with inadequate colorectal cancer screening relate to cost and a general lack of access to health care, often as a result of no health insurance (Figure 8, page 17). Populations most commonly affected include Hispanics, new immigrants, individuals born outside the US, and those with limited proficiency with the English language. These are also the groups that are least likely to be aware of the need for colorectal screening.[84-85]
- Inadequate communication by health care providers about the importance of screening is another major factor in screening underutilization. Studies have shown that the absence of a physician's recommendation for screening reduces the likelihood of screening among both insured and uninsured individuals.[84, 86-87]

Table 7. Colorectal Cancer Screening* Prevalence among Adults Aged 50 Years and Older by Race/Ethnicity and State, 2006-2008

	All races combined			White			African American			Hispanic		
State	rank	%	± 95% CI	rank	%	± 95% CI	rank	%	± 95% CI	rank	%	± 95% CI
Delaware	1	71.5	1.8	2	72.1	1.9	2	69.3	6.5	–	†	–
Maine	2	70.6	1.3	5	70.7	1.4	–	†	–	–	†	–
Rhode Island	3	69.7	1.5	3	70.9	1.5	8	64.7	10.9	24	49.4	8.4
Massachusetts	4	69.6	1.0	6	70.6	1.1	10	63.3	5.7	9	57.5	5.3
Connecticut	5	69.5	1.3	4	70.8	1.4	14	62.3	7.4	3	64.2	6.8
New Hampshire	6	69.3	1.3	8	69.4	1.3	–	†	–	–	†	–
Maryland	7	69.0	1.2	7	70.1	1.3	1	69.7	3.1	5	62.2	10.1
Minnesota	8	68.8	1.5	9	69.3	1.5	26	57.6	13.9	–	†	–
Vermont	9	68.2	1.1	11	68.1	1.1	–	†	–	1	81.0	9.6
Virginia	10	67.7	1.7	10	68.3	1.8	4	68.5	4.9	4	62.5	13.9
Dist. of Columbia	11	67.0	1.8	1	75.3	2.1	9	63.7	2.5	12	55.0	10.5
Michigan	12	66.0	1.2	16	66.8	1.3	5	66.3	4.4	13	54.4	12.0
North Carolina	13	65.5	0.9	14	67.2	1.0	13	62.5	2.6	29	46.2	7.3
New York	14	65.1	1.4	12	67.9	1.3	17	61.3	4.9	11	56.2	6.2
Washington	15	65.1	0.7	17	65.9	0.8	19	61.0	9.5	23	50.1	5.4
Wisconsin	16	65.0	1.6	18	65.7	1.6	6	65.5	7.6	31	45.1	21.4
Florida	17	63.8	1.3	13	67.6	1.3	21	59.5	5.4	26	48.5	4.8
Oregon	18	63.6	1.4	20	64.2	1.4	–	†	–	30	45.7	11.7
Utah	19	62.9	1.7	22	63.7	1.7	–	†	–	17	51.4	9.5
South Carolina	20	62.8	1.2	19	65.6	1.4	28	56.6	3.1	8	58.0	10.5
Georgia	21	61.6	1.4	23	62.8	1.6	22	59.2	3.5	2	65.8	10.9
Arizona	22	61.2	2.2	21	63.7	2.4	20	59.7	16.6	27	47.3	7.7
Pennsylvania	23	61.2	1.3	29	61.4	1.3	7	65.4	6.1	14	53.5	11.2
Kentucky	24	61.1	1.5	28	61.5	1.5	15	61.9	8.4	20	50.8	13.5
Colorado	25	60.9	1.2	24	62.4	1.2	3	68.8	8.2	16	52.4	4.3
Iowa	26	60.5	1.3	32	60.7	1.4	29	55.8	16.7	25	49.2	12.0
California	27	60.0	1.5	15	67.1	1.5	18	61.1	6.8	37	43.5	3.8
South Dakota	28	59.9	1.3	33	60.7	1.3	–	†	–	35	43.6	15.3
New Jersey	29	59.9	1.1	25	62.1	1.2	24	58.9	3.6	18	51.2	4.6
Kansas	30	59.9	1.1	35	60.5	1.1	25	58.3	6.5	36	43.5	6.7
Missouri	31	59.7	1.8	31	60.8	1.9	27	57.4	6.8	7	60.2	16.0
Tennessee	32	59.5	1.7	34	60.5	1.7	33	53.5	6.3	39	40.2	14.4
Ohio	33	59.3	1.7	37	59.4	1.8	12	62.8	5.8	15	52.6	16.7
Hawaii	34	58.6	1.5	26	62.1	2.3	–	†	–	22	50.4	7.7
North Dakota	35	57.5	1.5	39	57.9	1.5	–	†	–	21	50.6	14.4
Illinois	36	57.5	1.6	36	59.7	1.5	30	55.5	5.3	42	37.1	8.5
Indiana	37	57.3	1.5	40	57.8	1.6	31	55.4	6.1	19	50.8	12.8
Alabama	38	57.2	1.6	38	58.4	1.8	34	52.8	3.8	6	62.0	14.7
Nebraska	39	57.1	1.2	41	57.4	1.2	16	61.4	11.7	40	38.1	8.8
Montana	40	56.3	1.3	42	56.7	1.4	–	†	–	10	57.2	11.9
West Virginia	41	56.2	1.6	45	56.4	1.6	23	59.1	12.2	–	†	–
Texas	42	56.1	1.6	27	61.8	1.9	35	52.5	5.7	38	40.6	3.7
New Mexico	43	55.4	1.4	30	61.3	1.7	36	51.0	14.3	28	46.6	2.8
Idaho	44	55.0	1.5	47	55.7	1.6	–	†	–	45	32.2	8.8
Wyoming	45	54.4	1.3	50	54.8	1.3	–	†	–	34	44.4	7.3
Louisiana	46	54.0	1.4	43	56.7	1.5	37	47.8	3.2	32	45.1	9.0
Arkansas	47	54.0	1.4	48	55.6	1.5	39	46.2	5.1	43	37.1	10.0
Nevada	48	53.9	2.2	46	56.1	2.4	11	63.2	11.3	44	34.4	7.7
Alaska	49	53.5	3.1	49	55.1	3.6	–	†	–	–	†	–
Mississippi	50	53.4	1.3	44	56.7	1.5	38	46.7	2.7	33	44.4	11.4
Oklahoma	51	53.1	1.2	51	53.9	1.3	32	55.2	5.7	41	37.5	8.5

Note: CI = confidence interval, which is similar to a margin of error. Statistics for whites and African Americans are for non-Hispanics.

*Either a fecal occult blood test in the past year or a sigmoidoscopy or colonoscopy in the preceding 10 years. †Sample size insufficient to provide a stable estimate.

Source: Behavioral Risk Factor Surveillance System Public Use Data Tapes 2006 and 2008, National Center for Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, 2007 and 2009.

- Studies indicate that differences in patient and provider testing preferences may impact screening rates. Physicians who do discuss screening typically recommend colonoscopy, whereas patient preference is often for FOBT.[88-89]
- Individuals with the lowest educational attainment and income levels, who have the highest colorectal cancer burden and would thus benefit most from cancer screening, have among the lowest colorectal cancer screening rates, even among insured populations (Table 6, page 14).[84]
- Personal barriers to screening include fear and embarrassment.[84, 90]

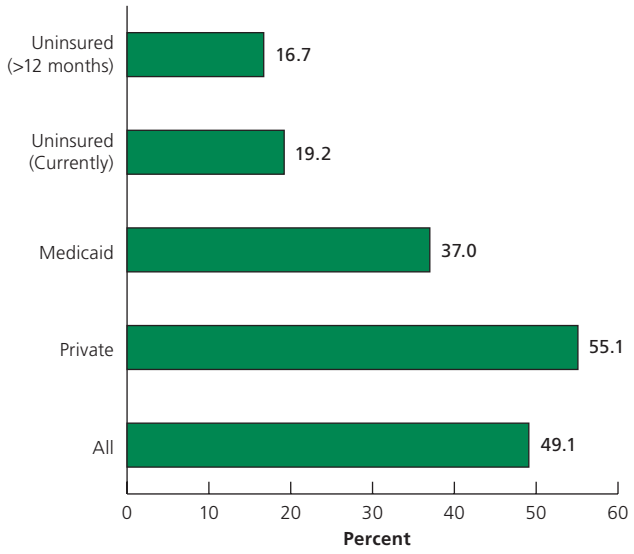
Strategies to increase colorectal cancer screening

Clinicians and health care systems can play a major role in increasing the utilization and quality of screening for colorectal cancer through both patient- and provider-level initiatives. Implementing a diverse set of strategies can maximize the positive impact on screening. Studies have shown that the following interventions increase colorectal cancer screening utilization. [85]

Patient-level interventions

- Eliminating structural barriers by providing FOBT cards and instructions for patients to use at home
- One-on-one comprehensive discussions with a health care provider or health educator about the importance of colorectal cancer screening, including a detailed explanation of the benefits and limitations of various testing options
- Mailed reminders to patients who are due for screening

Figure 8. Colorectal Cancer Screening* Prevalence by Health Insurance Status in Adults Aged 50-64 years



Note: Private and Medicaid categories are not mutually exclusive. *Either a fecal occult blood test in the past year or an endoscopy in the past 10 years.

Source: National Health Interview Survey 2008, National Center for Health Statistics, Centers for Disease Control and Prevention, 2009.

Health care system-level interventions

- Implementation of centralized or office-based reminder systems to assist clinicians in counseling eligible patients about screening
- The use of patient navigators to help manage referrals, help patients navigate the health care system, and facilitate follow up screening

Recent progress in policies and legislation related to colorectal cancer screening

On March 23, 2010, Congress passed and the president signed health care reform legislation, which included approximately 160 provisions that will meaningfully improve the health care system for cancer patients. Many of those provisions will give greater access to colorectal cancer screening. For example:

- All new private health plans are required to cover colorectal cancer screening tests with a US Preventive Services Task Force (USPSTF) rating of "A" or "B" without any out-of-pocket costs to patients. Currently, the USPSTF recommends screening for colorectal cancer using fecal occult blood testing, sigmoidoscopy, or colonoscopy in adults beginning at age 50 and continuing until age 75. *(Effective in new plan years beginning after September 23, 2010)*
- In the Medicare program, preventive services, such as colonoscopies, will have no out-of-pocket costs and are exempt from deductibles. The deductible will be waived for colorectal cancer screening tests even when polyps are detected and removed. *(Effective beginning 2011)*
- States will be given a 1 percent increase in the Federal Medical Assistance Percentages for preventive services if they offer Medicaid beneficiaries all preventive services recommended by the USPSTF, offer immunizations recommended by the Advisory Committee on Immunization Practices, and remove cost sharing for all these services. *(Effective beginning 2013)*
- A public health investment fund is created to expand and sustain national investment in prevention and public health programs, including health screenings. *(Effective beginning 2010)*

One resource that is available to aid primary care providers in improving patient screening rates is the online manual *How to Increase Colorectal Cancer Screening Rates in Practice: A Primary Care Clinician's Evidence-Based Toolbox and Guide*, produced by the American Cancer Society, Thomas Jefferson University, and the National Colorectal Cancer Roundtable, which is available at cancer.org/colonmd.

In addition, as mentioned earlier, health insurance coverage is an important determinant of access to preventive clinical services, including cancer screening. Currently, 26 states and the District of Columbia have enacted laws requiring private insurers to cover the full range of colorectal cancer screening tests for all individuals (Figure 9).

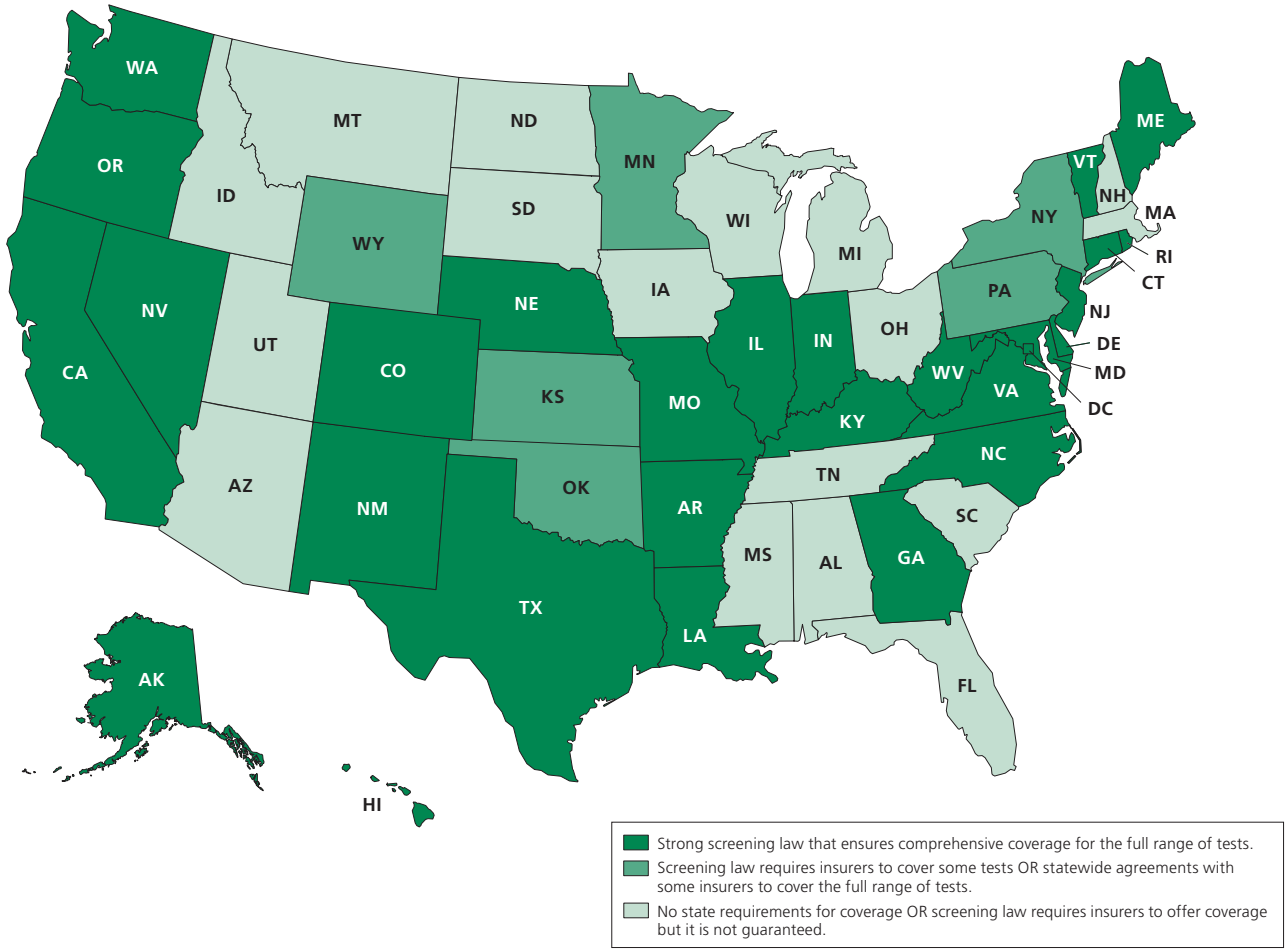
Colorectal Cancer Treatment

Treatment decisions are made by patients with their physicians after considering the best options available for the stage and location of the cancer, as well as the risks and benefits associated with each.

Colon cancer

Most people with colon cancer, particularly in earlier stages, will have some type of surgery to remove the tumor. Adjuvant therapy (additional treatments after surgery) may also be used. Adjuvant chemotherapy (anticancer drugs) or radiation for colon cancer

Figure 9. Colorectal Cancer Screening Coverage Legislation by State, May 2010



*Pennsylvania passed its law in 2008 but restricted the mandate to employers with more than 50 employees. The New York Health Plan Association, which serves 6 million New Yorkers, covers the full range of colorectal cancer screening tests as a part of a voluntary collaboration with the American Cancer Society.

Source: Health Policy Tracking Service & Individual state bill tracking services.

is as effective in patients aged 70 and older who are otherwise healthy as in younger patients; toxicity in older patients can be limited if certain drugs (i.e., oxaliplatin) are avoided.

Carcinoma in situ

Surgery to remove the growth of abnormal cells may be accomplished by polypectomy or local excision through the colonoscope. Resection of a segment of the colon may be necessary if the tumor is too big to be removed by local excision.

Localized stage

Surgical resection to remove the cancer, together with a length of colon on either side of the tumor and nearby lymph nodes, is the standard treatment.

Regional stage

If the cancer has not spread to nearby lymph nodes, surgical resection of the segment of colon containing the tumor may be the only treatment needed. If the doctor thinks the cancer is likely to come back (recur) because of its appearance under the microscope or because it is growing into other tissues, radiation therapy and/or chemotherapy may be recommended as well. If the cancer has spread to nearby lymph nodes, surgical resection of the segment of colon containing the tumor is the first treatment, usually followed by chemotherapy. Chemotherapy treatments based on the drug fluorouracil (5-FU) have been shown to improve survival in patients with stage II or stage III disease, primarily by reducing disease recurrence.[91] Radiation therapy may also be recommended if the cancer has grown into adjacent tissues.

Distant stage

At this stage, the cancer has spread to distant organs and tissues, such as the liver, lungs, peritoneum (lining of the abdomen), or ovaries. The goal of surgery (segmental resection or diverting colostomy) in this stage is usually to relieve or prevent blockage of the colon and to prevent other local complications. If there are only a few metastases to the liver or lungs, surgery to remove these, as well as the colon tumor, may be an option. Surgery is not recommended for all patients.

Chemotherapy, radiation, and biologically targeted therapies may be given alone or in combination to relieve symptoms and prolong survival. Three targeted monoclonal antibody therapies have been approved by the US Food and Drug Administration (FDA) to treat metastatic colorectal cancer. Bevacizumab (Avastin) blocks the growth of blood vessels to the tumor and both cetuximab (Erbitux) and panitumumab (Vectibix) block the effects of hormone-like factors that promote cancer cell growth; however, tumors with certain genetic mutations do not benefit from treatment with cetuximab or panitumumab.[92]

Rectal cancer

Except for some patients with distant stage cancer, surgery to remove the rectal cancer is usually the main treatment. Additional treatments, such as chemotherapy and radiation, are often used before surgery (neoadjuvant therapy) and/or after surgery (adjuvant therapy) to reduce the risk of recurrence and metastasis. The chemotherapy drugs used in the treatment of rectal cancer are the same as those used for colon cancer.

Carcinoma in situ

Removing or destroying the growth of abnormal cells is all that is needed. Treatment options include polypectomy (polyp removal), local excision, or full-thickness rectal resection. This resection may be carried out through the anus. No further treatment is needed.

Localized stage

At this stage, the cancer has grown through the first layer of the rectum into deeper layers but has not spread outside the rectal wall. Depending on where the cancer is located, surgery may involve removal of the cancer and a part of the uninvolved rectum through an abdominal incision. Some small localized rectal cancers may be treated by removing them through the anus without an abdominal incision. In most cases, no further treatment is needed unless the tumor turns out to have high-risk features. For cancers located close to the anus, surgery typically involves an abdominal incision as well as an incision around the anus. This operation removes the anus and the sphincter muscle, so a permanent colostomy is required. Patients who are not candidates for surgery may be treated with radiation therapy. This may mean endocavitary radiation therapy (aiming radiation through the anus) or brachytherapy (placing radioactive pellets directly into the cancer). Radiation therapy alone has not been proven to be as effective as surgery in treating rectal cancer.

Regional stage

If the cancer has grown through the wall of the rectum into nearby tissue but has not yet spread to the lymph nodes, it is usually treated with surgery, chemotherapy, and radiation therapy. Radiation and chemotherapy are often given together before surgery, with additional chemotherapy after surgery.

If the cancer has spread to nearby lymph nodes but not to other parts of the body, it is usually surgically removed. Radiation therapy and chemotherapy are usually given before surgery to help shrink the tumor and lower the risk of recurrence. Chemotherapy will usually be given after surgery as well.

Distant stage

In this stage, the cancer has spread to distant organs and tissues, such as the liver or lung. In rare cases, the cancer can be successfully treated by removing all of the tumors with surgery, along with other treatments. Otherwise, surgery, chemotherapy, and/or radiation therapy are used to relieve, delay, or prevent symptoms and to prolong life.

Colostomy

When a section of the colon or rectum is removed, the surgeon can usually connect the healthy parts, allowing the patient to eliminate waste normally. However, sometimes reconnection is not possible immediately. In this case, the surgeon makes an opening (a stoma) in the skin of the abdomen for waste to leave the body. The operation to create the stoma is called a colostomy. A flat bag fits over the stoma to collect waste, and a special adhesive holds it in place.[93]

Most patients with colorectal cancer who require a colostomy need it only temporarily, until the colon or rectum heals from surgery. After healing takes place, usually in 6 to 8 weeks, the surgeon reconnects the parts of the intestine and closes the stoma. Approximately 1 in 8 people with rectal cancer require a permanent colostomy.[93]

A person with a stoma learns to care for it with help from doctors, nurses, and enterostomal therapists (health professionals trained to care for persons with stomas). Often, an enterostomal therapist will visit the patient before surgery to explain what to expect and how to care for the stoma after surgery. They will also talk about lifestyle issues, including emotional, physical, and sexual concerns, and can provide information about resources and support groups.[93]

Side effects of colorectal cancer treatment

Surgery

The time needed to heal after surgery is different for each person. Patients are often uncomfortable for the first few days; however, medication can usually control the pain. Patients are monitored for signs of bleeding, infection, or other problems requiring immediate treatment. Side effects from surgery for colorectal cancer may include:

- Fatigue, possibly for an extended period
- Constipation or diarrhea
- A temporary or permanent colostomy
- Sexual side effects, such as erectile dysfunction in men, after more extensive operations for rectal cancer

Radiation therapy

Side effects of radiation therapy for colorectal cancer include mild skin irritation, nausea, diarrhea, rectal irritation, the urge to defecate, bladder irritation, fatigue, or sexual problems. These often go away after treatments are completed. Some degree of rectal and/or bladder irritation may be a permanent side effect, and can lead to diarrhea and frequent urination. If a patient has these or other side effects, they should be discussed with his or her doctor because there may be treatment options.

Chemotherapy

Chemotherapy drugs kill cancer cells but also damage some normal cells. Side effects depend on the type of drugs, the amount taken, and the length of treatment. General side effects from chemotherapy include fatigue, nausea and vomiting, diarrhea, loss of appetite, hair loss, swelling and rashes, mouth sores, and numbness, tingling, or blistering of the hands and feet. Some patients may experience low blood cell counts because chemotherapy can damage the blood-producing cells of the bone marrow. This can increase the chances of infection (due to a shortage of white blood cells) and bleeding or bruising after minor cuts or injuries (due to a shortage of blood platelets).

There are remedies for many of the temporary side effects of chemotherapy. For example, antiemetic drugs can prevent or reduce nausea and vomiting, and hematopoietic drugs can improve the levels of white and red blood cells. People receiving chemotherapy should talk with their doctor if they have any unrelieved side effects. Most side effects go away or lessen once treatment is stopped. For example, hair grows back after treatment ends, though it may look different.

Listed below are three drugs most often used in the treatment of colorectal cancer and their common side effects.

5-Fluorouracil: Used before or after surgery or as part of the treatment for metastatic disease; commonly used with radiation

- Diarrhea
- Sores in the mouth and throat
- Difficulty swallowing
- Poor appetite
- Decreased blood cell production
- Pain, redness, and blistering in the palms of the hands and soles of the feet

Oxaliplatin: Used after surgery or for the treatment of metastatic disease

- Pain in hands/feet that worsens with exposure to cold
- Throat pain that worsens with cold foods or liquids
- Decreased sensation in the hands and feet
- Decreased proprioception (the body's sense of movement and position)
- Nausea, vomiting
- Diarrhea
- Decreased blood cell production

Irinotecan: Most often used for metastatic disease

- Diarrhea (may be severe, requiring hospitalization if not managed appropriately)
- Nausea, vomiting
- Decreased blood cell production
- Mild hair loss

Pain

Pain is an important concern among people with cancer and their caregivers. Pain may occur during or after treatment but should not be a constant feature after healing occurs. Individuals who are free from pain can sleep and eat better, enjoy the company of family and friends, and continue with work and hobbies.

There are many different medicines and methods available to control cancer pain. The method of pain control used will depend on the source of the discomfort. Doctors routinely seek information and resources necessary to make individuals who have been diagnosed with cancer as comfortable as possible. If a patient experiences persistent pain and the primary doctor is not able to treat it effectively, a pain specialist should be consulted. Pain specialists may be oncologists, anesthesiologists, neurologists, neurosurgeons, other doctors, nurses, or pharmacists. A pain control team may also include psychologists and social workers.

For more information about cancer pain and how it can be relieved, visit the American Cancer Society's Web site at cancer.org/Treatment/TreatmentsandSideEffects/PhysicalSideEffects/Pain/PainDiary/index.

Additional information can also be found in the special section of *Cancer Facts & Figures 2007*, available at cancer.org/acs/groups/content/@nho/documents/document/caff2007pwsecuredpdf.pdf.

Clinical trials

A clinical trial is a controlled experiment that is used to assess the safety and usefulness of prevention, screening, and treatment methods for human disease and health problems. Generally, patients receive either the state-of-the-art standard treatment or a new therapy that may offer improved survival and/or cause fewer side effects. Participation in clinical trials provides essential information on the effectiveness and risks of a new treatment. For more information about clinical trials, including how to enroll, call the American Cancer Society National Cancer Information Center at 1-800-227-2345. Information can also be obtained by visiting the National Cancer Institute's Web site at cancer.gov/clinicaltrials or by calling 1-800-4-CANCER. Patients should consult their personal doctors and cancer specialists for detailed information about appropriate treatment options.

What is the American Cancer Society doing about colorectal cancer?

Research

Colorectal cancer is an active area of scientific research; studies span the cancer continuum from prevention and early detection to treatment. The American Cancer Society is currently funding more than $80 million in colorectal cancer research, with more than $19 million awarded in fiscal year 2009.

Prevention and early detection

- Interventions to increase colorectal cancer screening prevalence overall and among hard-to-reach, low-income populations
- Interventions aimed at lowering risk of colorectal cancer through improvement in diet and physical activity in minority populations
- Research on new screening tests that may be more accurate and/or more comfortable for patients than current options
- Research into the mechanisms underlying the association between obesity, physical activity, and colorectal cancer

Cancer development

A large proportion of research is focused on understanding the cellular and molecular mechanisms underlying colorectal tumor development, which are currently poorly understood.

- Genetic research studying errors during cell division, which lead to abnormal cell growth and carcinogenesis (cancer development)
- Identification and study of certain natural substances in the body that appear to block cancer cell growth

Treatment

- Gene studies to determine optimal, individualized treatment for advanced colorectal cancer based on patient gene profile
- Evaluation of drugs that boost the immune system's reaction to colorectal cancer, as well as new combinations of chemotherapy drugs and the best ways to combine chemotherapy with radiation or immunotherapy
- Research on several new targeted therapies to increase the number of treatment options with fewer side effects

Behavior and survivorshiop

- Identification of factors responsible for survival differences following a colorectal cancer diagnosis
- Interventions that reduce stress and improve levels of physical activity during chemotherapy treatment

Advocacy

Improvements in the prevention, early detection, and treatment of colorectal cancer provide major, unrealized opportunities to save lives. Ultimately, prevention through changes in tobacco use, diet, physical activity, and body weight can have the largest impact on health in general, including reduced risk of colorectal cancer. In the near term, improvements in screening are more easily achieved. Of the 49,380 people expected to die of colorectal cancer in 2011, more than half could have been saved with recommended screening.[94] Despite the potential to prevent colorectal cancer and reduce the risk of dying from the disease, too few Americans are getting tested according to the recommended guidelines.

To increase the number of people who get screened, the American Cancer Society has reached out to the public, health care professionals, and legislators. During National Colon Cancer Awareness Month every March, and throughout the year, the Society encourages colorectal cancer screening for people age 50 and older; encourages physicians to proactively recommend regular screening to all age-appropriate patients; and advocates for laws that improve access to screening and treatment, as well as addressing the needs of the medically underserved. The key message to men and women age 50 and older is that screening is the most important step you can take to help protect yourself from colon cancer. Talk to your doctor about when to start testing and which test is right for you.

To reach consumers with these messages, the Society:

- Uses national, regional, and local media to encourage consumers to talk with their doctors about colorectal cancer testing
- Uses online and social media communication channels to communicate with constituents and the public about the importance of colon cancer screening, while also establishing a dialogue with them and engaging their feedback and action. The Society's Facebook pages and groups, Twitter feeds, YouTube channel, and other social media avenues are utilized daily to connect with our constituents and send mission-related messages.
- Encourages consumers to visit cancer.org/colon to learn more about colorectal cancer screening
- Builds collaborations within communities nationwide to reach specific populations

Health care professionals play a vital role in a patient's decision to get tested for colon cancer. Research shows patients are more likely to get screened if their doctor recommends it. To reach health care professionals with messages and information about the importance of talking to their patients about colon cancer screening, the Society:

- Encourages health professionals to visit cancer.org/colonmd for tools and resources on how to talk to their patients about colorectal cancer testing and improve testing rates in their practice
- Builds collaborative relationships to facilitate regular communication between health care professionals and the patients they serve
- Collaborates with the Centers for Medicare & Medicaid Services (CMS) to develop messages targeted at health care professionals about the importance of colorectal screening and the availability of resources to help improve testing rates in their practice
- Collaborates with 53 Quality Improvement Organizations to increase the number of colorectal cancer screenings and their documentation in EMR systems at the primary care practice per the CMS 9th Statement of Work
- Collaborated with CIGNA and United HealthGroup to disseminate reminder messages to more than 500,000 members to prompt participation in colorectal cancer screening

The American Cancer Society Cancer Action Network℠ (ACS CAN), the nonprofit, nonpartisan advocacy affiliate of the American Cancer Society, is involved in advocacy efforts at both the federal and state level that will increase access to quality colorectal cancer screening, treatment, and care for all adults. Listed below are some of the efforts the Society and ACS CAN are involved in:

- Implementing the provisions in the Affordable Care Act. The reforms in the Patient Protection Affordable Care Act, which was signed into law in March 2010, represent a profound structural change in how insurance will operate and how consumers and patients will utilize the health insurance system. ACS CAN and the Society have a significant impact at the federal and state levels through our advocacy work, which will urge policy makers to implement the law to ensure that all Americans have access to evidence-based prevention, early detection and treatment services critical to colorectal cancer patients.
- Supporting the work of the CDC's Colorectal Cancer Control Program (CRCCP), which currently provides funding to 25 states and 4 tribes across the US. The CRCCP's goal is to increase colorectal cancer screening rates among men and women aged 50 years and older to 80% by 2014. The program provides grants for both population-based education campaigns and to improve access to vital colorectal cancer screening tests and follow-up services for low-income, uninsured, and underinsured individuals between the ages of 50 and 64, as well as those under 50 who are at high risk of developing colorectal cancer.

- Advocating for passage of the Colorectal Cancer Prevention, Early Detection, and Treatment Act, which will authorize the CRCCP program so more states will have access to federal funding to help improve colorectal cancer screening rates. The legislation will also give states the option to provide full Medicaid benefits to uninsured, low-income men and women under age 65 who are identified by the CRCPP and are in need of treatment for colorectal cancer.
- Advocating for federal funding to strengthen and further expand the scope of the CDC's Colorectal Cancer Screening, Education, & Outreach Program to promote colorectal cancer screening nationwide, to identify and eliminate certain clinical and consumer barriers to screening, and to further reduce colorectal cancer incidence and mortality rates.

The National Colorectal Roundtable

The National Colorectal Cancer Roundtable, cofounded by the American Cancer Society and the Centers for Disease Control and Prevention, is a national coalition of public, private, and voluntary organizations, and invited individual experts dedicated to reducing colorectal cancer incidence and mortality of in the US, through coordinated leadership, strategic planning, and advocacy. The Roundtable works as a catalyst to stimulate key member organizations to act earlier, act more effectively, and act collaboratively in the area of colorectal cancer. The Roundtable taps into the expertise of its members to create tools, conduct studies, develop consensus on outreach, and support projects that can advance the community's work in this area. Many of these projects, such as the development of a colorectal cancer screening *Primary Care Clinician's Evidence-Based Toolbox and Guide*, the creation of a colorectal cancer screening education and outreach evaluation toolkit, and the launch of key initiatives on the quality of colorectal cancer screening, fill a key need among collaborating partners. Such initiatives enhance the efforts of each of the member organizations and create a multiplier effect in the community's work against this disease.

Sources of Statistics

New cancer cases. The estimated number of colorectal cancer cases in 2011 was projected using a spatio-temporal model based on incidence data from 44 states and the District of Columbia for the years 1995-2007 that met the North American Association of Central Cancer Registries' (NAACCR) high-quality data standard for incidence, which covers about 85% of the US population.

Incidence rates. Incidence rates are defined as the number of people per 100,000 who are diagnosed with cancer during a given time period. Colorectal cancer incidence rates for the US were calculated using data on cancer cases collected by the North American Association of Central Cancer Registries (NAACCR) and population data collected by the US Census Bureau. Incidence rates are age adjusted to the 2000 US standard population. Long-term colorectal cancer incidence trends presented herein were calculated using data from the Surveillance, Epidemiology, and End Results Program at the National Cancer Institute.

Estimated cancer deaths. The estimated number of colorectal cancer deaths in 2011 in the US was calculated by fitting the actual numbers of colorectal cancer deaths from 1969 through 2007 to a statistical model that forecasts the number of deaths in 2011. The actual numbers of deaths are obtained from the National Center for Health Statistics (NCHS) at the Centers for Disease Control and Prevention.

Mortality rates. Mortality rates, or death rates, are defined as the number of people per 100,000 dying of a disease during a given year. Mortality rates are based on counts of cancer deaths compiled by NCHS and population data from the US Census Bureau. Death rates are age adjusted to the 2000 US standard population.

Survival. Five-year relative survival rates are presented for cancer patients diagnosed in the 17 Surveillance, Epidemiology, and End Results (SEER) cancer registries between 1999 and 2006 and followed through 2007. Relative survival rates account for normal life expectancy (including events such as death from heart disease, accidents, and diseases of old age). Relative survival rates are not calculated for Hispanics/Latinos, Asian Americans/Pacific Islanders, and American Indians/Alaska Natives because reliable estimates of normal life expectancy are not available for these groups. Therefore, cause-specific survival rates are presented. Cause-specific survival rates are the probability of not dying of colorectal cancer within 5 years of diagnosis and do not account for normal life expectancy.

Screening. Prevalence of colorectal cancer screening among subgroups of US adults aged 50 and older was obtained from the National Health Interview Survey 2008, National Center for Health Statistics, Centers for Disease Control and Prevention, released in 2009 (cdc.gov/nchs/nhis.htm). Prevalence data for colorectal cancer screening by state are from the Behavioral Risk Factor Surveillance System (BRFSS) public use data tapes 2006 and 2008, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, available in 2007 and 2009 (cdc.gov/nccdphp/brfss/). Because the BRFSS is a telephone survey, prevalence estimates are limited to those adults living in a household with a residential telephone line. Prevalence rates are age adjusted to the 2000 US standard population.

Important note about estimated cases and deaths. The projected numbers of new cancer cases and deaths for the current year are model based and may produce numbers that vary considerably from year to year. For this reason, we discourage the use of our estimates to track cancer trends. Incidence and mortality rates reported by SEER and NCHS are the conventional statistics used to tracking cancer incidence and mortality trends for the US. Rates from state cancer registries are useful for tracking local trends.

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