



Research for a Cure

“For Yourself and Loved Ones”

A Colorectal Cancer Kit from NFCR



ABOUT THE NFCR COLORECTAL CANCER PREVENTION AND DETECTION KIT

Colorectal cancer, also called colon cancer or large bowel cancer, includes cancerous growths in the colon, rectum and appendix. In the United States, colorectal cancer is the third most common cancer in both males and females and accounts for about 9% of cancer-related deaths each year. In 2011, nearly 141,210 people were diagnosed with colorectal cancer and approximately 49,380 patients died from this disease. As with all other types of cancer, detection of colorectal cancer in its earliest stage greatly increases the potential that it can be successfully treated. Therefore, the National Foundation for Cancer Research has put together this **Colorectal Cancer Prevention and Detection Kit** to educate you about the essentials of prevention, early diagnosis, and treatment options of colorectal cancer. Share this information with your family and friends to reduce their risk of getting colorectal cancer, too. If you need more information about colorectal cancer or other types of cancer, visit us at www.NFCR.org.

WHAT IS COLORECTAL CANCER?

Cancer begins in cells, the building blocks that make up tissues and organs of the body. Normally, cells grow and divide to form new cells as the body needs them. When cells grow old, they die, and new cells take their place. Sometimes, this orderly process goes wrong. New cells form when the body does not need them, and old cells do not die when they should. These extra cells can form a mass of tissue called a growth or tumor that can be either benign or malignant.

Cancer that forms in the tissues of the colon (the longest part of the large intestine) is called colon or colorectal cancer. Most colorectal cancers are adenocarcinomas (cancers that begin in cells that make and release mucus and other fluids). When colorectal cancer spreads outside the colon or rectum, cancer cells are often found in nearby lymph nodes. If cancer cells have reached these nodes, they may also have spread to other lymph nodes or other organs, often to the liver.

SYMPTOMS OF COLORECTAL CANCER

Perhaps the most common symptom of colorectal cancer is a change in bowel habits. Other symptoms include:

- » Having chronic diarrhea or constipation
- » Feeling that your bowel does not empty completely
- » Finding blood (either bright red or very dark) in your stools
- » Finding that your stools are narrower than usual
- » Feeling frequent gas pains or cramps
- » Losing weight for no known reason
- » Feeling very tired all the time
- » Having nausea or vomiting

Most often, these symptoms are not due to cancer. A variety of daily life occurrences as well as other less serious health problems can cause those symptoms, too. But if you are experiencing symptoms that persist more than a few days, you should consider seeing your doctor. It is always better to know what is causing symptoms such as these, and if colorectal cancer is diagnosed, to be treated as early as possible.

RISK FACTORS OF COLORECTAL CANCER

Current scientific research cannot determine the exact causes of colorectal cancer. But it is clear that certain risk factors are more relevant than others in the development of colorectal cancer, including:

- **Age over 50:** Colorectal cancer is more likely to occur as people get older. More than 90% of people with this disease are diagnosed after age 50. The average age at diagnosis is 72.
- **Colorectal polyps:** Polyps are growths on the inner wall of the colon or rectum. They are more common in people over age 50. Most polyps are benign (not cancerous), but some polyps (adenomas) can become cancer. Finding and removing polyps may reduce the risk of colorectal cancer.
- **Family history of colorectal cancer:** Individuals whose close relatives (parents, brothers, sisters, or children) have a history of colorectal cancer are somewhat more likely to develop this disease themselves, especially if the relative developed the cancer at a young age.
- **Genetic alterations:** Changes in certain genes increase the risk of colorectal cancer:
 - **Hereditary nonpolyposis colon cancer (HNPCC)** is the most common type of inherited (genetic) colorectal cancer. It accounts for about 2 percent of all colorectal cancer cases. It is caused by changes in an HNPCC gene. Most people with an altered HNPCC gene do develop colon cancer, so genetic testing may be appropriate.
 - **Familial adenomatous polyposis (FAP)** is a rare, inherited condition in which hundreds of polyps form in the colon and rectum. It is caused by a change in a specific gene called APC. Unless FAP is treated, it usually leads to colorectal cancer by age 40. FAP accounts for less than 1 percent of all colorectal cancer cases.
- **Personal history of cancer:** A person who has already had colorectal cancer may develop colorectal cancer a second time. Also, women with a history of cancer of the ovary, uterus (endometrium), or breast are at a somewhat higher risk of developing colorectal cancer.
- **Ulcerative colitis or Crohn's disease:** A person who has had a condition that causes inflammation of the colon (such as ulcerative colitis or Crohn's disease) for many years is at increased risk of developing colorectal cancer.
- **Unhealthy Diet:** Studies suggest that diets high in fat (especially animal fat) and low in calcium, folate, and fiber may increase the risk of colorectal cancer.
- **Cigarette smoking:** A person who smokes cigarettes may be at increased risk of developing polyps and colorectal cancer.



PREVENTION WHAT YOU CAN DO TO LOWER YOUR RISK OF COLORECTAL CANCER

Certain risk factors associated with colorectal cancer (smoking cigarettes, diet, and an inactive lifestyle) are personal choices and can be avoided, but many of the risks outlined above cannot. If you increase the protective factors and avoid the risk factors in your daily life, you may lower your risk of colorectal cancer. In fact, a recent study found that about 25% of colorectal cancer cases could be avoided by following a healthy lifestyle, including but not limited to:



- Maintaining a healthy weight – Pay attention to abdominal obesity (as measured by waist size) as it may be a more important risk factor than overall obesity
- Exercising or being physically active for at least 30 minutes per day
- Eating a healthy diet – including at least 5 servings of fruits and vegetables each day and limiting your consumption of red and processed meats
- Quitting smoking - there is now sufficient evidence from research to conclude tobacco smoking causes colorectal cancer
- Drinking less or not at all – those who have a lifetime average of 2-4 drinks of wine per day have a 23% higher risk than those who consume less than 1 drink per day

DETECTION

Treatment for colorectal cancer is more likely to be effective when the disease is found early. Doctors have a wide range of screening options available to detect the presence of colorectal cancer, including tests that can help to find polyps or cancer before you experience symptoms. Finding and removing polyps may prevent colorectal cancer.

To find polyps or early colorectal cancer:

- People in their 50s and older should be screened.
- People who are at higher-than-average risk of colorectal cancer should talk with their doctor about whether to have screening tests before age 50, what tests to have, the benefits and risks of each test, and how often to schedule appointments.

The chart below lists several common types of colorectal cancer screenings with the suggested frequency of testing for the risky age groups.

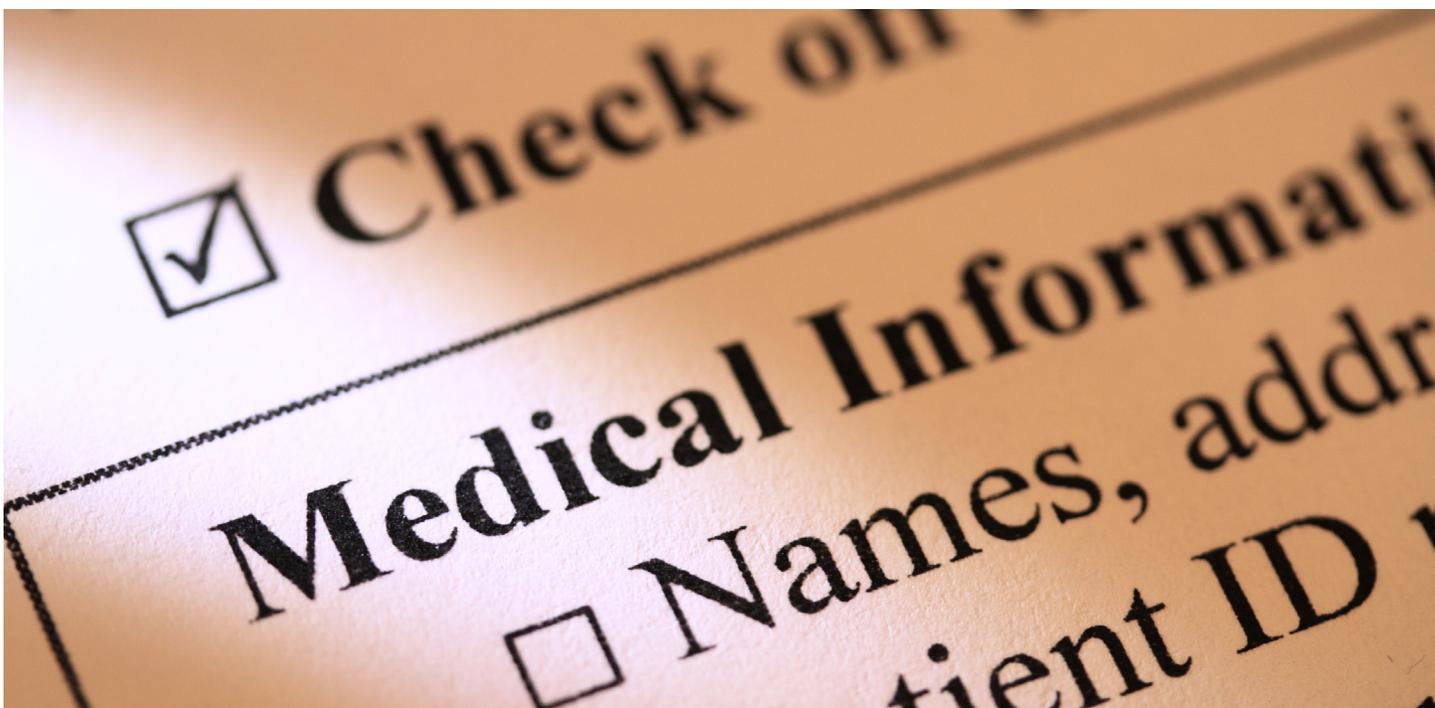
*Colorectal Cancer Detection Chart
(regardless of gender):*

Test	Age	Frequency	Detects
Digital rectal exam	40+	Yearly	Both polyps and cancer
Fecal occult blood test	40+	Yearly	Mainly cancer
Fecal immunochemical test	40+	Yearly	Mainly cancer
Colonoscopy	50+	Every 5-10 years	Both polyps and cancer
Sigmoidoscopy	50+	Every 5-10 years	Both polyps and cancer
Double-contrast barium enema	50+	Every 5-10 years	Both polyps and cancer



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- **Digital rectal exam:** A rectal exam is often part of a routine physical examination. Your doctor inserts a lubricated, gloved finger into your rectum to feel for abnormal areas.
 - **Colonoscopy:** Your doctor examines inside the rectum and entire colon using a long, lighted tube called a *colonoscope*. If polyps are found, they will be removed and examined under a microscope for signs of cancer.
 - **Sigmoidoscopy:** Using a lighted tube called a *sigmoidoscope*, your doctor checks inside your rectum and only the lower part of the colon for polyps and signs of cancer. If polyps or other abnormal tissue is found, the doctor removes them for examination under the microscope.
 - **Double-contrast barium enema (DCBE):** You are given an enema with a barium solution, and air is pumped into your rectum. Several x-ray pictures are taken of your colon and rectum. The barium and air help your colon and rectum show up on the pictures. Polyps or tumors may show up.
 - **Fecal occult blood test (FOBT):** Sometimes cancers or polyps bleed, and this test can detect tiny amounts of blood in the stool. If the FOBT detects blood, a colonoscopy or another test is necessary to determine the source of the blood.
 - **Fecal immunochemical test (FIT):** A newer kind of test that also detects occult (hidden) blood in the stool. However, this test is also less likely to react to bleeding from parts of the upper digestive tract, such as the stomach.

These screening options are available to all patients, regardless of their own risk factors, but may not be appropriate for every colorectal cancer patient. Patients should consult with their physician to determine what their own risk profile is, and adopt a screening strategy that is tailored to their individual needs.



TREATMENT

When colorectal cancer is diagnosed, the doctor must determine the type and the extent of spread, or stage, of the cancer in order to decide on the best course of treatment for each patient. Depending on the stage of the cancer, two or more of the following treatment options could be used at the same time or adopted one after another.

Surgery is the most common treatment for colorectal cancer. As it takes time to heal after surgery, patients may feel uncomfortable and require pain medication. Constipation and diarrhea may also be experienced. The types of surgery for treating colorectal cancer may include:

- **Colonoscopy:** The doctor uses the colonoscope (long, thin lighted tube) which has the capacity to remove any small malignant polyps from your colon or upper rectum. Small tumors in the lower rectum may be removed without a colonoscope.
- **Laparoscopy:** Early stages of colon cancer may be removed with a laparoscope (thin, lighted tube). Usually, three or four tiny cuts are made into your abdomen allowing the surgeon to see inside your abdomen and remove the tumor and part of the healthy colon. The surgeon can also remove nearby lymph nodes.
- **Open surgery:** By making a large cut into your abdomen, the surgeon can remove the tumor and part of the healthy colon or rectum, and inspect the remaining parts of your intestine and liver for signs of spreading cancer. Some nearby lymph nodes are also removed.

Chemotherapy uses anti-cancer drugs to kill cancer cells that are rapidly dividing. The drugs are usually given through a vein, but some may be given by mouth for systemic chemotherapy.

- Side effects occur since these drugs can harm normal cells that divide rapidly too, such as blood cells, cells in hair roots, and cells that line the digestive tract. You may experience weakness, hair loss, and unpleasant gastrointestinal symptoms such as nausea, vomiting, and diarrhea. Your doctor can suggest ways to control many of these effects.
- Chemotherapy can be used as a first line treatment for colorectal cancer or as additional treatment after surgery.

Chemotherapy drugs for colorectal cancer may include the following*:

- 5-Fluorouracil (5-FU) and leucovorin
- Xeloda® (capecitabine)
- Camptosar® (irinotecan)
- Eloxatin® (oxaliplatin)

Depending upon the stage of the colorectal cancer, a chemotherapy treatment can use combinations of these drugs:

1. FOLFOX regimen (5-FU, leucovorin, and oxaliplatin)
2. FOLFIRI regimen (5-FU, leucovorin, and irinotecan)
3. FOLFOXIRI regimen (5-FU, leucovorin, irinotecan, and oxaliplatin)
4. CAPOX regimen (capecitabine and oxaliplatin)

* From American Cancer Society, 2011. Your doctor may suggest other chemotherapy drugs or combinations of drugs.

Radiation therapy – Cancer cells can be killed with the use of a high-powered energy beams, such as X-rays. Two methods can be used by a radiologist. External Beam Radiation uses a machine that is outside of your body to direct the energy beams at your cancerous area. Brachytherapy uses radiation material in needles, seeds or catheters that are placed inside your body near the cancer.

- Side effects can include nausea, vomiting, diarrhea, and uncontrollable urination. The skin in the treated areas may become dry and sensitive. Patients may also become very tired during treatment. Your doctor can usually treat or control these effects and they usually subside after the end of the treatment.
- Radiation therapy can be used alone or with other colorectal cancer treatment options such as chemotherapy. Sometimes it can be administered during surgery.

Targeted Therapy (Biologic Therapy) is a new treatment approach that uses drugs that specifically target molecular changes in cells that cause colorectal cancer. They are administered through a vein for systemic therapy.

- Side effects may include rash, fever, abdominal pain, vomiting, diarrhea, blood pressure changes, bleeding, or breathing problems. Side effects usually become milder after the first treatment.
- Targeted therapy is currently used only for treating metastatic or spreading colorectal cancer.

Presently, there are three types of targeted therapy for colorectal cancer†:

1. Avastin® (generic name bevacizumab) stops a tumor from creating its own new blood vessels that supply oxygen and nutrients, allowing it to grow. Avastin is approved for use in combination with chemotherapy for patients who have metastatic colorectal cancer.

2. Erbitux® (generic name cetuximab) blocks a protein called Epidermal Growth Factor Receptor (EGFR) that is important for cellular growth. EGFR is expressed in some metastatic colorectal cancers. This targeted therapy can be used alone or in combination with chemotherapy. Patients who have a mutation (DNA error) in a gene called K-ras will not benefit from this targeted therapy.

3. Vectibix® (generic name panitumumab) also blocks the growth signals from EGFR. Vectibix is used as a single therapy to treat patients with EGFR-expressing metastatic colorectal cancer that has progressed on or after chemotherapy treatment. Patients who have a mutation (DNA error) in a gene called K-ras are not recommended for treatment with this targeted therapy.

† From the National Cancer Institute, National Institutes of Health. Discuss with your doctor to see if any of these drugs are suitable to your type of colorectal cancer.

When colorectal cancer is diagnosed, you should ask your doctor to assure that the treatment option chosen for you is the best choice tailored to your personal profile. To explore more personalized medicine approaches for colorectal cancer treatment, you could consult NFCR's online Treatment Decision Tools to get a free report outlining treatment options that may fit your specific disease profile best..



NFCR COLORECTAL CANCER RESEARCH

Progress has been made in the treatment of colorectal cancer, resulting in a reduction of the number of patients who succumb to this disease over the past 15 years in the United States. Still, 35% of patients with colorectal cancer will not survive longer than five years after initial diagnosis. New and more effective therapeutic strategies are now being developed by NFCR researchers that aim to produce a major improvement in survival rates among colorectal cancer patients and in the quality of their lives.

Below are a few notable research programs and breakthroughs in colorectal cancer research by NFCR:

- 1. The targeted therapy that shuts down a tumor's blood supply.** A NFCR scientist discovered vascular endothelial cell growth factor (VEGF) – a critical protein that helps form new blood vessels to nourish and support malignant tumors. This breakthrough led the research community to develop Avastin® – the targeted therapy that binds VEGF to stop the formation of the tumor's blood vessels, thereby starving the tumor of the nutrients it needs to grow. Today, Avastin, in combination with chemotherapy, is recommended for first-line treatment of patients with metastatic (spreading) colorectal cancer and several other major types of cancer.
- 2. Development of new biomarkers.** Advancements in early diagnosis of colorectal cancer could greatly improve the outcome for patients by making it possible to interrupt the disease process before the cancer advances and metastasizes to distant sites. NFCR scientists are identifying microRNAs—tiny cellular molecules that are closely associated with cancer development and progression—that may serve as diagnostic markers and clinical-stage markers for colorectal cancer and those that may predict which patients will become resistant to current therapies. These new biomarkers will allow physicians to diagnose colorectal cancer earlier and tailor efficacious treatment for their patients -- giving them the hope they deserve to fight their cancer successfully.
- 3. Nutrition and Cancer Prevention:** NFCR has been a leader in the cancer preventative effects of essential dietary micronutrients. An NFCR scientist previously showed the micronutrient in tomatoes, lycopene, is a powerful antioxidant that prevents oxidative damage in cells caused by free radicals—one of the largest environmental causes of cancer. Dietary micronutrient selenium is incorporated by our body into cell “selenoproteins” that have antioxidative functions. NFCR research is identifying the molecular targets of selenoproteins in colon cancer cells. This crucial information will facilitate future epidemiological studies on prevention of colon cancer by dietary selenium.
- 4. Alleviating unpleasant side effects of chemotherapy.** NFCR scientists have long been studying a Traditional Chinese Medicine formula. Named PHY906 by NFCR scientists, the formula comprises four Chinese herbs. Recently, the research team demonstrated through Phase I and Phase II clinical trials that treatment using PHY906 in combination with chemotherapy alleviates the unpleasant gastrointestinal side effects of chemotherapy given to colon and rectal cancer patients. Standard medicines have not provided patients any consistent relief from these debilitating side effects. With continued success in clinical trials, PHY906 could become one of the first FDA-approved oral herbal medicines for anti-cancer treatment.

HOW YOU CAN HELP

These NFCR-supported research projects hold great promise for improving the treatment and survival of colorectal cancer patients, or possibly preventing colorectal cancer in the first place. With more funding, however, NFCR could enable these dedicated scientists to ramp up their efforts and accelerate their research progress to save more lives sooner.

You can take action to prevent and cure colorectal cancer! Start now by visiting us at www.NFCR.org. From there you can click on the following tabs to learn more about how to get involved:

- Share this **Colorectal Cancer Prevention and Detection Kit** with friends or family members.
- **Donate** through NFCR programs to support our scientists in accomplishing important research to develop better prevention, diagnosis and treatment strategies of colorectal cancer.
- **Volunteer your time** to raise awareness of NFCR's research mission and support cancer research:
 - » **Start your own fundraiser for NFCR**
 - » **Build your own fundraiser webpage**
 - » Sign the **World Cancer Declaration**

We encourage and invite you to join the hundreds of thousands of individuals around the globe who share your passion, and ours, for conquering cancer in our lifetimes. They are helping NFCR save lives through cutting-edge colorectal cancer research. You can help, too.



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NATIONAL FOUNDATION
FOR CANCER RESEARCH

Research for a Cure

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