Anal Cancer

What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide, and die in an orderly fashion. During the early years of a person's life, normal cells divide faster to allow the person to grow. After the person becomes an adult, most cells divide only to replace worn-out or dying cells or to repair injuries.

Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of out-of-control growth of abnormal cells.

Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells continue to grow and form new, abnormal cells. Cancer cells can also invade (grow into) other tissues, something that normal cells cannot do. Growing out of control and invading other tissues are what makes a cell a cancer cell.

Cells become cancer cells because of damage to DNA. DNA is in every cell and directs all its actions. In a normal cell, when DNA gets damaged the cell either repairs the damage or the cell dies. In cancer cells, the damaged DNA is not repaired, but the cell doesn't die like it should. Instead, this cell goes on making new cells that the body does not need. These new cells will all have the same damaged DNA as the first cell does.

People can inherit damaged DNA, but most DNA damage is caused by mistakes that happen while the normal cell is reproducing or by something in our environment. Sometimes the cause of the DNA damage is something obvious, like cigarette smoking. But often no clear cause is found.

In most cases the cancer cells form a tumor. Some cancers, like leukemia, rarely form tumors. Instead, these cancer cells involve the blood and blood-forming organs and circulate through other tissues where they grow.

Cancer cells often travel to other parts of the body, where they begin to grow and form new tumors that replace normal tissue. This process is called *metastasis*. It happens when the cancer cells get into the bloodstream or lymph vessels of our body.

No matter where a cancer may spread, it is always named for the place where it started. For example, breast cancer that has spread to the liver is still called breast cancer, not liver cancer. Likewise, prostate cancer that has spread to the bone is metastatic prostate cancer, not bone cancer.

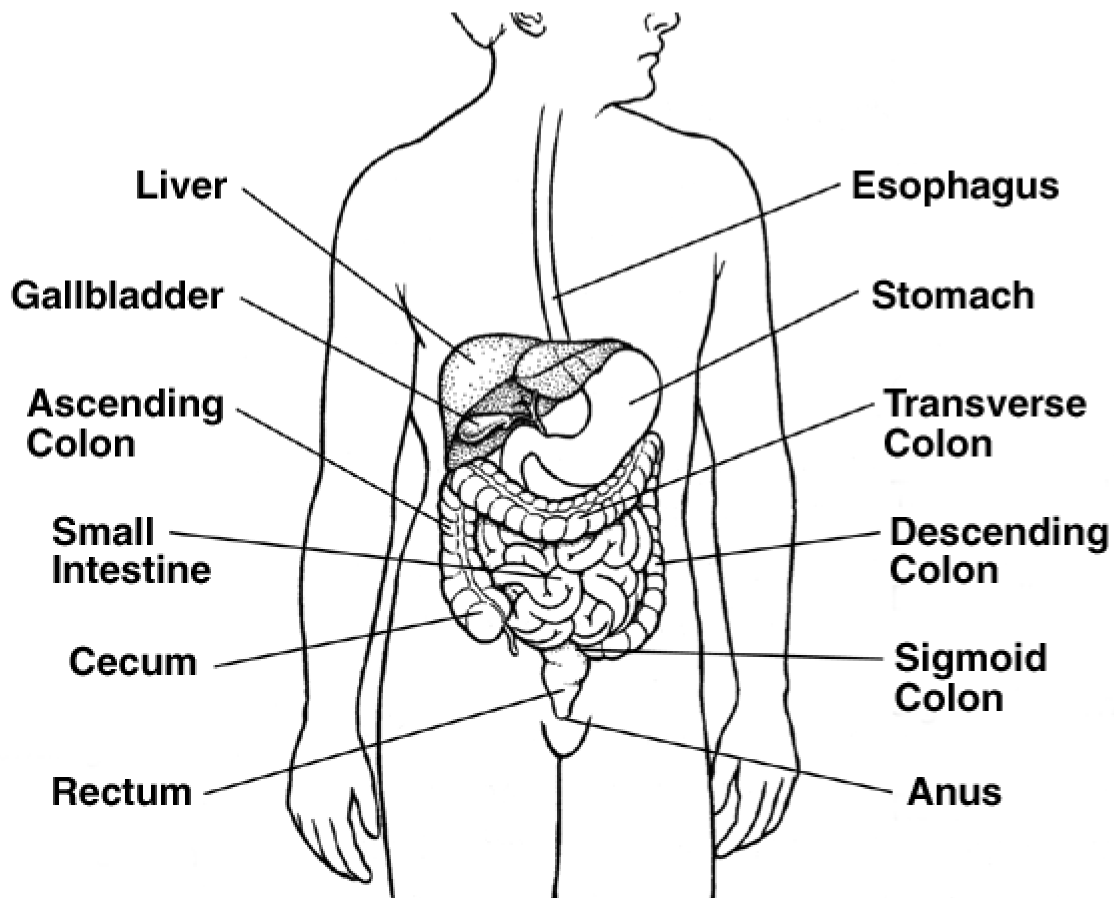
Different types of cancer can behave very differently. For example, lung cancer and breast cancer are very different diseases. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their particular kind of cancer.

Not all tumors are cancerous. Tumors that aren't cancer are called *benign*. Benign tumors can cause problems – they can grow very large and press on healthy organs and tissues. But they cannot grow into (invade) other tissues. Because they can't invade, they also can't spread to other parts of the body (metastasize). These tumors are almost never life threatening.

What is anal cancer?

The anus

The anus is the body's opening at the lower end of the intestines. The anal canal is the tube that connects the lower part of the large intestine (rectum) to the anus and the outside of the body. As food is digested, it passes from the stomach to the small intestine. It then travels from the small intestine into the large intestine (colon). The colon absorbs water and liquid from the digested food. The waste matter that is left after going through the colon is known as *feces* or *stool*. Feces are stored in the rectum, the final 6 inches of the digestive system. From there, they pass out of the body through the anus as a bowel movement.



The anal canal is about an inch and a half long. Its inner lining (called the *mucosa*) is made up of several different kinds of cells. Learning a little about these cells is helpful in understanding the kinds of cancer that develop in various parts of the anal canal. Glands and ducts (tubes leading from the glands) are found under the mucosa. These glands make mucus, which acts as a lubricating fluid.

The anal canal goes from the rectum to the *anal verge* (where the canal meets the outside skin at the anus). About midway down the anal canal is the *dentate line*, which is where most of these *anal glands* empty into the anus.

Cells above the anal canal (in the rectum) and in the part of the anal canal close to the rectum are shaped like tiny columns. Most cells near the middle of the anal canal and around the dentate line are shaped like cubes and are called transitional cells. This area is called the *transitional zone*. Below the dentate line are flat (squamous) cells. At the anal verge, the squamous cells of the lower anal canal merge with the skin just outside the anus. This skin around the anal verge (called the perianal skin or the anal margin) is also made up of squamous cells, but it also contains sweat glands and hair follicles; the lining of the lower anal canal does not. Cancers of the anal canal (above the anal verge) and cancers of the anal margin (below the anal verge) are treated very differently.

The anal canal is surrounded by a sphincter, which is a circular muscle that keeps feces from coming out until it is relaxed during a bowel movement.

Anal tumors

Many types of tumors can develop in the anus. Not all of these tumors are cancers -- some are benign (non-cancerous). There are also some growths that start off as benign but over time can develop into cancer. These are called pre-cancerous conditions. This section discusses all of these types of abnormal growths.

Benign (non-cancerous) anal tumors

Polyps: Polyps are small, bumpy, or mushroom-like growths that develop in the mucosa or just under it. There are several kinds, depending on their cause and location.

- Inflammatory polyps arise because of inflammation from injury or infection.
- Lymphoid polyps are caused by an overgrowth of lymph tissue (which is part of the immune system). Small nodules of lymph tissue are normally present under the anal inner lining.
- Hypertrophied anal papillae are benign growths of connective tissue that are covered by squamous cells. They are simply an enlargement of the normal papillae, which are small folds of mucosa found at the dentate line. Hypertrophied anal papillae are also called fibroepithelial polyps.

Skin tags: Skin tags are benign growths of connective tissue that are covered by squamous cells. Skin tags are often mistaken for hemorrhoids but they are not truly hemorrhoids.

Condylomas: Condylomas (also called *warts*) are growths that occur just outside the anus and in the lower anal canal below the dentate line. Occasionally condylomas can be found just above the dentate line. They are caused by infection with the *human papilloma virus* (HPV). People who have had condylomas are more likely to develop anal cancer (see "Potentially pre-cancerous anal conditions" below and the section “What are the risk factors for anal cancer?”).

Other benign tumors: In rare cases, benign tumors can grow in other tissues of the anus. These include:

- Adnexal tumors -- usually benign growths that start in hair follicles or sweat glands of the skin just outside of the anus. These tumors stay in the perianal skin area and do not grow into the anal region.
- Leiomyomas -- develop from smooth muscle cells
- Granular cell tumors -- develop from nerve cells and are composed of cells that contain lots of tiny spots (granules)
- Hemangiomas -- start in the lining cells of blood vessels

- Lipomas -- start from fat cells
- Schwannomas -- develop from cells that cover nerves

Potentially pre-cancerous anal conditions

Some changes in the anal mucosa are harmless in their early stages but may later develop into a cancer. A common term for these potentially pre-cancerous conditions is *dysplasia*. Some warts, for example, contain areas of dysplasia that can develop into cancer.

Dysplasia occurring in the anus is also known as *anal intraepithelial neoplasia* (AIN) and as *anal squamous intraepithelial lesions (SILs)*. Depending on how the cells look under the microscope, AIN (or anal SIL) can be divided into 2 groups: low-grade and high-grade. The cells in low-grade AIN resemble normal cells while the cells in high-grade AIN look much more abnormal. Low-grade AIN often goes away without treatment. It has a low chance of turning into cancer. High-grade AIN is less likely to go away without treatment. Left untreated, high-grade AIN may eventually become cancer, and so it needs to be watched closely. Some cases of high-grade AIN need to be treated.

Carcinoma in situ

Sometimes abnormal cells on the surface layer of the anus look like cancer cells but have not grown into any of the deeper layers. This condition is known as *carcinoma in situ*, (pronounced "in SY-too"), or *CIS*. Another name for this condition is *Bowen's disease*. Some doctors view this as the earliest form of anal cancer and others consider it the most advanced type of AIN, which is considered a pre-cancer but not a true cancer.

Invasive anal cancers

Squamous cell carcinomas: Most anal cancers in the United States are squamous cell carcinomas. These tumors come from the squamous cells that line the anal margin and most of the anal canal.

Cells of *invasive* squamous cell carcinomas have already spread beyond the surface to the deeper layers of the lining. Squamous cell carcinomas of the anal canal are discussed in detail in this document. Squamous cell carcinomas of the anal margin (perianal skin) are treated similarly to squamous cell carcinomas of the skin elsewhere in the body. For more information, see our document, *Skin Cancer: Basal and Squamous Cell.*

Cloacogenic carcinomas (also called basaloid or transitional cell carcinomas) are sometimes listed as a subclass of squamous cell cancers. They develop in the transitional zone, also called the *cloaca*. These cancers look slightly different under the microscope but they behave and are treated like other squamous cell carcinomas of the anal canal.

Adenocarcinomas: A small number of anal cancers are known as *adenocarcinomas*. These can develop in cells that line the upper part of the anus near the rectum, or in glands located under the anal mucosa that release their secretions into the anal canal.

These anal adenocarcinomas, are treated the same way as rectal carcinomas. For more information, see our document, *Colorectal Cancer*.

Adenocarcinomas can also start in apocrine glands (a type of sweat gland of the perianal skin). *Paget's disease* is a type of apocrine gland carcinoma that spreads through the surface layer of the skin. Paget's disease can affect skin anywhere in the body but most often affects skin of the perianal area, vulva, or breast. This condition should not be confused with Paget's disease of the bone, which is a different disease.

Basal cell carcinomas: Basal cell carcinomas are a type of skin cancer that can develop in the perianal skin. These tumors are much more common in areas of skin that are exposed to sun, such as the face and hands, and account for only a small number of anal cancers. They are often treated with surgery to remove the cancer. For more information, see our document, *Skin Cancer: Basal and Squamous Cell.*

Malignant melanoma: This cancer develops from cells in the skin or anal lining that make the brown pigment called melanin. Only about 1% to 2% of anal cancers are melanomas. Melanomas are far more common on parts of the body that are exposed to sun. If melanomas are found at an early stage (before they have grown deeply into the skin or spread to lymph nodes) they can be removed with surgery and the outlook (prognosis) for long-term survival is very good. But because they are hard to see, most anal melanomas are found at a later stage. If possible, the entire tumor is removed with surgery. If all of the tumor can be removed, a cure is possible. If the melanoma has spread too far to be removed completely, other treatments may be given. For more information, see our document, *Melanoma Skin Cancer.*

Gastrointestinal stromal tumors: These are rare anal cancers that are much more commonly found in the stomach or small intestine. When these are found at an early stage, they are removed with surgery. If they have spread beyond the anus, they can be treated with drug therapy. For more information, see our document, *Gastrointestinal Stromal Tumor (GIST).*

What are the key statistics about anal cancer?

Anal cancer is fairly rare -- much less common than cancer of the colon or rectum. The most recent American Cancer Society estimates for anal cancer in the United States are for 2012:

- About 6,230 new cases (3,980 in women and 2,250 in men)
- About 780 deaths (480 in women and 300 in men)

The number of new anal cancer cases has been on the rise for many years. Anal cancer is found mainly in adults, with the average age being in the early 60s. The disease affects women somewhat more often than men.

Treatment for anal cancer is often very effective, and most patients with this cancer can be cured. But anal cancer can be a serious condition.

What are the risk factors for anal cancer?

A risk factor is anything that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. For example, exposure to strong sunlight is a risk factor for skin cancer. Smoking is a risk factor for cancer of the lung and many other cancers. But risk factors don't tell us everything. Having a risk factor, or even several risk factors, does not mean that you will get cancer. Also, people without risk factors can still get cancer.

Human papilloma virus infection

Most squamous cell anal cancers seem to be linked to infection by the human papilloma virus (HPV), the same virus that causes cervical cancer. In fact, women with a history of cervical cancer (or pre-cancer) have an increased risk of anal cancer.

HPV is a group of more than 100 related viruses. They are called papilloma viruses because some of them cause papillomas, which are more commonly known as warts. There are several subtypes of the virus, but the one most likely to cause anal cancer is called HPV-16. HPV-16, as well as HPV 18, HPV 31, HPV 33, and HPV 45 are considered high-risk types of HPV because they are strongly linked to cancer. They can also cause cancers of the cervix, vagina, and vulva in women, as well as cancer of the penis in men.

Other subtypes of HPV can cause warts in the genital and anal areas. The medical term for these warts is *condyloma acuminatum*. The 2 types of HPV that cause most cases of anal and genital warts are HPV 6 and HPV 11. They are called low-risk types of HPV because they tend to cause warts but not cancer. HPV infection can cause anal and genital warts, but most people infected with HPV do not have genital warts or any other signs of infection.

HPV is passed from one person to another during skin-to-skin contact with an infected area of the body. HPV can be spread during sex -- including vaginal intercourse, anal intercourse, and oral sex - but sex doesn't have to occur for the infection to spread. All that is needed is for there to be skin-to-skin contact with an area of the body infected with HPV. Infection with HPV seems to be able to be spread from one part of the body to another - for example, infection may start in the genitals and then spread to the anus. The only way to completely prevent anal and genital HPV infection is to never allow another person to have contact with those areas of the body.

Infection with HPV is common, and in most cases the body is able to clear the infection on its own. But in some cases the infection does not go away and becomes chronic. Chronic infection, especially when it is with high-risk HPV types, can eventually cause certain cancers, including anal cancer.

For men, the 2 main factors influencing the risk of genital HPV infection are circumcision and the number of sexual partners. Men who are circumcised (have had the foreskin of the penis removed) have a lower chance of becoming and staying infected with HPV. The risk of being infected with HPV is also strongly linked to having many sexual partners (over a man's lifetime).

For women, certain factors have been linked to an increased risk of genital HPV infection, such as:

- Starting to have sex at an early age
- Having many sexual partners
- Having sex with a partner who has had many other partners
- Having sex with uncircumcised males

In a study that looked at risk factors for anal HPV infection in women, risk was increased in younger women and in those who had more than 5 sexual partners in their lifetime. Ever having anal sex also increased risk.

Circumcision and HPV: Men who have not been circumcised are more likely to be infected with HPV and pass it on to their partners. The reasons for this are unclear. It may be that the skin on the glans of the penis goes through changes that make it more resistant to HPV infection. Another theory is that the surface of the foreskin (which is removed by circumcision) is more easily infected by HPV. Still, circumcision does not completely protect against HPV infection -- men who are circumcised can still get HPV and pass it on to their partners.

Condoms and HPV: Condoms can provide some protection against HPV, but they do not completely prevent infection. One study found that when condoms are used correctly they can lower the genital HPV infection rate in women by about 70% - but they need to be used every time sex occurs. This study did not look at the effect of condom use on anal HPV infection. In another study, men who used condoms less than half of the time had a higher risk of HPV infection. Condoms cannot protect completely because they don't cover every possible HPV-infected area of the body, such as skin of the genital or anal area. Still, condoms provide some protection against HPV, and they also protect against HIV and some other sexually transmitted diseases. Condoms (when used by the male partner) also seem to help genital HPV infections clear (go away) faster in both women and men.

Other cancers

Ever having cancer of the cervix, vagina, or vulva is linked to an increased risk of anal cancer. This is likely because these cancers are also caused by infection with HPV. Although it is likely that having penile cancer, which is also linked to HPV infection, would increase the risk of anal cancer, this link has not been shown in studies.

HIV infection

People infected with the human immunodeficiency virus (HIV), the virus that causes AIDS, are much more likely to get anal cancer than those not infected with this virus. Effective drug treatment for HIV has lowered the risk for many AIDS related diseases, but it hasn't lowered the anal cancer rate.

Sexual activity

Having multiple sex partners increases the risk of infection with HIV and HPV. It also increases the risk of anal cancer.

Receptive anal intercourse also increases the risk of anal cancer in both men and women, particularly in those younger than the age of 30. Because of this, men who have sex with men have a high risk of this cancer.

Smoking

Smoking also increases the risk of anal cancer. Current smokers are several times more likely to have cancer of the anus compared with people who do not smoke. Quitting smoking will reduce the risk. People who used to smoke but have quit are only slightly more likely to develop this cancer compared with people who never smoked.

Lowered immunity

Higher rates of anal cancer occur among people with reduced immunity, such as people who have had an organ transplant and must take medicines that suppress their immune system.

Race and gender

Anal cancer is more common in African-Americans than in whites. Overall, it is more common in women than men, but in African Americans it is more common in men than in women.

Do we know what causes anal cancer?

The exact cause of anal cancer is not known, but most anal cancers seem to be linked to infection with the human papilloma virus (HPV). While HPV infection seems to be important in the development of anal cancer, the vast majority of people with HPV infections *do not* get anal cancer.

A great deal of research is now under way to learn how HPV might cause anal cancer. There is good evidence that HPV causes many anal squamous cell carcinomas. But the role of this virus in causing anal adenocarcinomas is less certain. More than 100 subtypes of HPV have been found. The subtype known as HPV-16 is often found in squamous cell

carcinoma and is also found in some anal warts. Another type, HPV-18, is found less often. Most anal warts are caused by HPV-6 and HPV-11. Warts containing HPV-6 or HPV-11 are much less likely to become cancerous than those containing HPV-16.

HPV makes proteins called E6 and E7 that can shut down two important tumor suppressor proteins in normal cells. These proteins -- p53 and Rb -- normally work to keep cells from growing out of control. When they are not active, cells can become cancerous.

When the body is less able to fight off infections, viruses like HPV may become more active and trigger the development of anal cancer. HIV, the virus that causes AIDS, weakens the body's immune system, as can medicines used to prevent rejection in patients with kidney, heart, liver, or other organ transplants.

Most people know that smoking is the main cause of lung cancer. But few realize that the cancer-causing chemicals in tobacco smoke can travel from the lungs to the rest of the body. Many studies have noted an increased rate of anal cancer in smokers, and the effect of smoking is especially important in people with other risk factors for anal cancer.

It is important to remember that some patients with anal cancers do not have any known risk factors and the causes of their cancers are not known.

Can anal cancer be prevented?

Since the cause of many cases of anal cancer is unknown it is not possible to prevent this disease completely.

The best way to reduce the risk of developing anal cancer is to avoid infection with HPV or HIV. The risk of these infections is higher for those who have sex with multiple partners and those who have unprotected anal sex.

Infection with HPV increases the risk of developing anal cancer. Infection with HPV can be present for years without any symptoms; so the absence of visible warts cannot be used to tell if someone has HPV. Even when someone doesn't have warts (or any other symptom), he (or she) can still be infected with HPV and pass the virus to somebody else.

Condoms ("rubbers") do provide some protection against HPV, but they cannot completely protect against infection. This is because HPV can still be passed from one person to another by skin-to-skin contact with an HPV-infected area of the body that is not covered by a condom - like the skin in the genital or anal area. Still, it is important to use condoms to protect against AIDS and other sexually transmitted illnesses that are passed on through some body fluids.

A vaccine called Gardasil® can help protect against infection with HPV subtypes 16 and 18 (as well as 6 and 11). In studies, this vaccine was found to prevent anal and genital warts caused by HPV types 6 and 11 and to prevent anal, vulvar, vaginal, and cervical cancers and pre-cancers caused by types 16 and 18.

This vaccine can only be used to prevent HPV infection -- it does not help treat an existing infection. To be most effective, the vaccine should be given before a person becomes sexually active.

Gardasil was originally only approved for use in women to prevent cervical cancer, but it is now also approved to prevent vulvar and vaginal cancers and pre-cancers (in women) and to prevent anal cancers and pre-cancers in both men and women. It is also approved to prevent anal and genital warts in both men and women.

Cervarix®, another HPV vaccine available in the US, can also be used to prevent infection with HPV types 16 and 18. Although it is only approved by the FDA to help prevent cervical cancers and pre-cancers, a recent study has shown that it is also helpful in preventing anal cancers and pre-cancers.

Smoking is a known risk factor for anal cancer. Stopping smoking significantly reduces the risk of developing anal cancer and many other cancers.

Can anal cancer be found early?

Many cases of anal cancer can be found early in the course of the disease. Anal cancers develop in a part of the digestive tract that your doctor can easily see and reach. Many early anal cancers have symptoms that should make you see your doctor. Unfortunately, some anal cancers may not cause symptoms until they reach an advanced stage. Other anal cancers may cause symptoms like those caused by diseases other than cancer. This may cause a delay in their diagnosis.

A digital rectal exam (DRE) will find some cases of anal carcinoma early. This test is sometimes used to look for prostate cancer in men (because the prostate gland can be felt through the rectum). The rectal exam is also done routinely as part of a pelvic exam on women. In this exam, the doctor inserts a gloved, lubricated finger into the anus to feel for unusual lumps or growths. If you are at increased risk for anal cancer, ask your doctor whether more frequent exams are needed.

The odds that anal cancer can be found early depend on the location and type of the cancer. Cancers that begin higher up in the anal canal are less likely to be found early. Melanomas tend to spread earlier than other cancers making it more difficult to diagnose in an early stage.

For people at high risk for anal intraepithelial neoplasia (AIN) some experts recommend screening with anal cytology testing. This test is also called an *anal Pap test* or anal Pap smear because it is much like a Pap test for cervical cancer. The anal lining is swabbed, and cells that come off on the swab are looked at under the microscope. People at increased risk for AIN include men who have sex with men (regardless of HIV status), women who have had cervical cancer or vulvar cancer, anyone who is HIV-positive, and all transplant recipients.

The anal Pap test has not been studied enough to know how often it should be done, or if it actually reduces the risk of anal cancer. Some experts recommend that the test be

repeated yearly in HIV-positive men who have sex with men, and every 2 to 3 years if the men are HIV-negative. Patients with positive results should be referred for a biopsy. If AIN is detected, this condition should be treated.

How is anal cancer diagnosed?

Anal cancer is often fairly easy to diagnose because it is in a fairly easy-to-reach area. Some cases of anal cancer in people at high risk for that disease are diagnosed by screening tests, such as the digital rectal exam and/or anal Pap test, but most people are diagnosed after their cancer starts to cause symptoms.

Signs and symptoms of anal cancer

Some cases of anal cancer cause no symptoms at all. In more than half of patients, bleeding occurs and is often the first sign of the disease. The bleeding is usually minor. At first, most people assume that hemorrhoids are the cause of their bleeding. Hemorrhoids are painful, swollen veins in the anus and rectum that may bleed. They are a benign and fairly common cause of rectal bleeding.

Itching can also be a symptom. This is more often a sign of AIN, which should also be treated. Important symptoms of anal cancer include:

- Rectal bleeding
- Rectal itching
- Pain in the anal area
- Change in the diameter of stool
- Abnormal discharge from the anus
- Swollen lymph nodes in the anal or groin areas

There are a number of benign conditions, like hemorrhoids, fissures, fistulas, and anal warts that can cause similar symptoms. But if any of the signs or symptoms of anal cancer are present, discuss them with your doctor without delay. Remember, the sooner you receive a correct diagnosis, the sooner you can start treatment, and the more effective your treatment will be.

Procedures used to diagnose anal cancer

Sometimes a doctor will detect anal cancer during a routine physical exam or during a minor procedure, such as removing a hemorrhoid. Treating cancers found in this way is often very effective because the tumors are found early in the course of the disease.

An unusual growth may also be found on a digital rectal exam. But since doctors cannot see what they feel, other steps may be needed if you have symptoms or if your doctor suspects you have anal cancer.

Endoscopy

Endoscopy is the use of a tube with a lens or video camera on the end to examine an inner part of the body. Several types of endoscopy may be used to look for the cause of anal symptoms. For these tests you either lie on your side on top of an examining table, with your knees bent up to your chest, or you bend forward over the table. Types of endoscopy include:

Anoscopy: Anoscopy uses a short, hollow tube (an anoscope), which is 3 to 4 inches long and about 1 inch in diameter, and may have a light on the end of it. The doctor coats the anoscope with a lubricant and then gently pushes it into the anus and rectum. By shining a light into this tube, the doctor has a clear view of the lining of the lower rectum and anus. This is usually not painful.

Rigid proctosigmoidoscopy: The rigid proctosigmoidoscope is similar to an anoscope, except that the proctoscope is 10 inches long, so it allows the doctor to view the rectum as well as the lower part of the sigmoid colon. This test usually requires that you take laxatives or have an enema beforehand to make sure the bowels are empty.

Biopsy

If a suspicious growth is found, your doctor will need to take a sample of tissue to see if it is cancer. This is called a *biopsy*. This can often be done through the scope itself. You may get a local anesthetic to numb the area before the biopsy is taken. Then, a small piece of the tissue is cut out and sent to a lab.

A *pathologist* (a doctor specializing in lab diagnosis of diseases) will look at the sample under a microscope. If cancer is present, the pathologist will send back a report describing the cell type and extent of the cancer.

If the tumor is very small and has not grown below the surface of the anus into other tissues, your doctor may attempt to remove the entire tumor during the biopsy.

Other types of biopsy may be used to check for cancer spread to lymph nodes, such as:

Fine-needle aspiration biopsy: Anal cancer sometimes spreads through the lymphatic system to lymph nodes. Lymph nodes are bean-sized collections of immune system cells. Swollen lymph nodes in the groin can be a sign of spreading anal cancer. Lymph nodes may also become swollen from an infection. To see if cancer is causing an enlarged lymph node, your doctor may withdraw a small sample of fluid and tissue from the lymph node with a thin needle. The lab will study this fluid to look for the presence of cancer cells. This procedure is called a *fine-needle aspiration biopsy*. If cancer is found in a lymph node, an operation to remove the lymph nodes in that area may then be done.

Sentinel node biopsy: This test is sometimes used to help determine if cancer that has already been diagnosed has spread to the lymph nodes. In this test a low-level radioactive tracer material is injected around the tumor. Often a blue dye is injected into the tumor at the same time. The groin lymph nodes are scanned to see where the radioactive material has traveled. The doctor removes any radioactive or blue-stained lymph nodes. A

pathologist then looks at the nodes for evidence of cancer cells. This helps tell how far the cancer may have spread, because these nodes would be the ones that any cancer cells leaving the tumor would have spread to first. While this test has been shown to be useful for some other cancers, it's not yet clear how helpful it is for anal cancer.

Imaging studies

If cancer is found, you may have certain tests to see how far it has spread. Some of these tests are used more often than others.

Ultrasound

Ultrasound uses sound waves and their echoes to produce a picture of internal organs or masses. A small microphone-like instrument, called a *transducer*, emits high-frequency sound waves. These sound waves pass into the area of the body being studied and are echoed back. The echoes are picked up by the transducer and converted by a computer into an image on a screen. Ultrasounds are very safe and use no radiation.

For most ultrasound exams the transducer is placed on the skin to take pictures of internal organs. For anal cancer, though, the transducer is inserted directly into the rectum. This is known as *transrectal* or *endorectal ultrasound*. The test can be slightly uncomfortable, but it usually is not painful. It is used to see how deep the cancer has grown into the tissues surrounding the anus.

Computed tomography

The computed tomography (CT) scan is an x-ray procedure that produces detailed cross-sectional images of your body. Instead of taking one picture, like a standard x-ray, a CT scanner takes many pictures as it rotates around you. A computer then combines these into images that represent slices of the part of your body that is being studied. A CT scan can be used to tell if the anal cancer has spread into the liver or other organs.

Before any pictures are taken, you may be asked to drink 1 to 2 pints of a liquid called "oral contrast." This helps outline the intestine so that certain areas are not mistaken for tumors. You may also receive an IV (intravenous) line through which a different kind of contrast dye (IV contrast) is injected. This helps better outline structures in your body.

The injection can cause some flushing (redness and warm feeling that may last hours to days). A few people are allergic to the dye and get hives. Rarely, more serious reactions like trouble breathing and low blood pressure can occur. Medicine can be given to prevent and treat allergic reactions. Be sure to tell the doctor if you have ever had a reaction to any contrast material used for x-rays.

CT scans can also be used to guide a biopsy needle precisely into a suspected area of cancer spread. For a *CT-guided needle biopsy*, the patient remains on the CT scanning table, while a doctor advances a biopsy needle in the body toward the location of the mass. CT scans are repeated until the doctor is confident that the needle is within the mass. A fine-needle biopsy sample (tiny fragment of tissue) or a core-needle biopsy

sample (a thin cylinder of tissue about ½ inch long and less than 1/8 inch in diameter) is then removed and looked at under a microscope.

CT scans take longer than regular x-rays and you will need to lie still on a table while they are being done. You might feel a bit confined by the equipment while the pictures are being taken.

Magnetic resonance imaging

Magnetic resonance imaging (MRI) scans use radio waves and strong magnets instead of x-rays to make images of the body. The energy from the radio waves is absorbed by the body and then released in a specific pattern formed by the type of tissue and by certain diseases. A computer translates the pattern into a detailed image of parts of the body. Like a CT scanner, this produces cross-sectional slices of the body. An MRI can produce slices that are parallel with the length of your body. As with a CT scan, a contrast material might be used, but it is not needed as often.

MRI scans are more uncomfortable than CT scans. They take longer -- often up to an hour. You have to be placed inside tube-like equipment. This is confining and can upset people that suffer from claustrophobia (a fear of enclosed spaces). If you have trouble with close spaces, let your doctor know before the MRI scan. Sometimes medication can be given just before the scan to reduce anxiety. Another option is to use a special "open" MRI machine that is less confining and more comfortable for such people. The MRI machine makes a buzzing or clanging noise that some people may find disturbing. Some places will provide headphones with music to block this sound.

Chest x-ray

This test may be done to find out whether anal cancer has spread to the lungs.

Positron emission tomography (PET)

PET scans use glucose (a form of sugar) that contains a low-level radioactive atom. Because they are very active, cancer cells in the body absorb larger amounts of the sugar than normal cells and display more radioactivity. A special camera can be used to detect this radioactivity. PET is useful when your doctor thinks the cancer has spread, but doesn't know where. PET scans can be used instead of several different x-rays because it scans your whole body.

How is anal cancer staged?

Staging is the process of finding out how far a cancer has spread. This is important because treatment options and outlook for recovery and survival depend on the cancer's stage. If you have anal cancer, ask your cancer care team to explain the staging in a way that you understand. Knowing all you can about staging lets you take a more active role in making informed decisions about your treatment.

The tests described in the section, “How is anal cancer diagnosed?” are the ones used to determine the stage of the cancer.

Staging of anal cancer uses a system created by the American Joint Committee on Cancer (AJCC). The staging description that follows applies only to tumors in the anal canal, not to cancers that involve only the anal margin or perianal skin.

The TNM system

The *TNM system* for staging contains 3 key pieces of information:

- **T** describes the size of the primary tumor, measured in centimeters (cm), and whether the cancer has spread to organs next to the tumor.
- **N** describes the extent of spread to nearby (regional) lymph nodes.
- **M** indicates whether the cancer has metastasized (spread) to other organs of the body.

Numbers or letters appear after *T*, *N*, and *M* to provide more details about each of these factors:

- The numbers 0 through 4 indicate increasing severity.
- The letter X means "cannot be assessed" because the information is not available.
- The letters "is" mean "carcinoma in situ," which means the tumor is contained within the top layer of anal tissue and has not yet reached deeper layers of tissue.

T categories for anal cancer

TX: Primary tumor cannot be assessed

T0: No evidence of primary tumor

Tis: Carcinoma in situ

T1: The tumor is 2 cm (about 4/5 inch) across or smaller

T2: Tumor is between 2 and 5 cm in size (about 1 to 2 inches).

T3: Tumor is larger than 5 cm.

T4: Tumor of any size that is growing into nearby organ(s), such as the vagina, urethra (the tube that carries urine out of the bladder), prostate gland, or bladder

N categories for anal cancer

NX: Regional lymph nodes cannot be assessed

N0: No regional lymph node spread

N1: Spread to lymph nodes near the rectum

N2: Spread to lymph nodes on one side of the groin and/or pelvis

N3: Spread to lymph nodes near the rectum and in the pelvis or groin, or to both sides of the groin or pelvis

M categories for anal cancer

M0: No distant spread

M1: Distant spread to internal organs or lymph nodes of the abdomen

Stage grouping

To make this information more helpful, these TNM descriptions can be grouped together into a simpler set of stages, labeled stage 0 through stage IV.

Stage 0: Tis, N0, M0: Stage 0 is very early cancer (or pre-cancer) that exists only in the top layer of anal tissue. This stage is also known as carcinoma in situ.

Stage I: T1, N0, M0: The cancer cells have spread beyond the top layer of anal tissue and is no longer carcinoma in situ. The tumor is less than 2 cm (about 4/5 inch) in size. It has not spread to lymph nodes or distant sites.

Stage II: T2 or 3, N0, M0: The cancer is larger than 2 cm in size, but it has not spread to nearby organs or lymph nodes. It has not spread to distant sites.

Stage IIIA: *(*T1-3, N1, M0) *or (*T4, N0, M0): The cancer can be any size and either has spread to the lymph nodes around the rectum(N1), *or* it has grown into nearby organs (T4), such as the vagina or the bladder without spreading to nearby lymph nodes. It has not spread to distant sites.

Stage IIIB: *(*T4, N1, M0), *or (*Any T, N2-3, M0): Either the cancer has grown into nearby organs, such as the vagina or the bladder, and has also spread to lymph nodes around the rectum, *or* it can be of any size but has spread to lymph nodes in the groin, with or without spread to lymph nodes around the rectum. It has not spread to distant sites.

Stage IV: Any T, Any N, M1: The cancer has spread to distant organs or tissues. It can be any size and may or may not have spread to lymph nodes.

Recurrent: Cancer that comes back after treatment is called recurrent. If the cancer comes back in or near the place it started it is called a local recurrence. If the cancer comes back in another part of the body, it is called a distant recurrence.

Survival by stage

Survival rates are often used by doctors as a standard way of discussing a person's prognosis (outlook). Some patients with cancer may want to know the survival statistics for people in similar situations, while others may not find the numbers helpful, or may

even not want to know them. If you decide that you don’t want to know them, stop reading here and skip to the next section.

The 5-year survival rate refers to the percentage of patients who live at least 5 years after their cancer is diagnosed. Of course, many people live much longer than 5 years (and many are cured).

In order to get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. Improvements in treatment since then may result in a more favorable outlook for people now being diagnosed with anal cancer.

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they cannot predict what will happen in any particular person's case. Many other factors may affect a person's outlook, such as their general state of health, the type of cancer, and how well the cancer responds to treatment. Your doctor can tell you how the numbers below may apply to you, as he or she is familiar with the aspects of your particular situation.

The following statistics come from the National Cancer Data Base and are based on cancers diagnosed between 1998 and 1999. In addition to dividing the cancers by stage, the National Cancer Database divides anal cancers based on histology (how the cells look under the microscope) into squamous cell cancers and nonsquamous cell cancers (See the section about invasive anal cancers in, “What is anal cancer?” for more details.)

	5-year survival for anal cancer	
Stage	**Squamous cancers**	**Nonsquamous cancers**
I	71%	59%
II	64%	53%
IIIA	48%	38%
IIIB	43%	24%
IV	21%	7%

How is anal cancer treated?

This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience.

The treatment information in this document is not official policy of the Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor.

Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

General treatment information

No matter what cell type or stage of anal cancer you have, treatment is available. The choice of treatment you receive depends on many factors. The location, type, and the stage (extent of spread) of the tumor are important. In choosing your treatment plan, you and your cancer care team will also take into account your age, the general state of your health, and your personal preferences.

The 3 main methods of treatment for anal cancer are surgery, radiation therapy, and chemotherapy. Often the best approach combines 2 or more of these strategies. In the past, surgery was the only treatment that could cure anal cancer, but now most anal cancers are treated with radiation and chemotherapy combined (called *chemoradiation* or *chemoradiotherapy*). This approach often eliminates the need for surgery.

Your recovery is the goal of your cancer care team. If the cancer can't be cured, the goal may be to help you live as well as possible for as long as possible. This may involve treatment to remove or destroy as much of the cancer as possible and to prevent the tumor from growing, spreading, or returning for as long as possible. Sometimes, treatment is aimed at relieving symptoms such as pain or bleeding and improving the person's quality of life, even if it will not result in a cure.

Surgery for anal cancer

Surgery is no longer the standard option for most people with anal cancer. In people who do need surgery, the type of operation depends on the type and location of the tumor.

Local resection

Local resection is used most commonly to treat cancers of the anal margin. A local resection is an operation that removes only the tumor, plus a small margin of the normal tissue around the tumor. Local resection can be used if the cancer is small and has not spread to nearby tissues or lymph nodes. In most cases, local resection preserves the sphincter (the muscular ring that opens and closes the anus). This allows the bowels to move (and be controlled) normally after the surgery. Many small tumors of the anal margin can be treated with local resection.

Abdominoperineal resection

Abdominoperineal resection (APR) is a more extensive operation. In this surgery, the surgeon makes incisions in the abdomen and around the anus to remove the anus and the rectum. The surgeon may also take out some of the lymph nodes in the groins during this operation, although this step (called a *lymph node dissection*) can also be done later.

The anus (and the anal sphincter) is removed, so a new opening needs to be made to let stool leave the body. This opening is called a *colostomy*, or an *ostomy*. It is a permanent

opening in the abdomen where the end of the colon is attached so that feces can exit the body. A bag to collect the feces is attached to the body over the opening. For more information on colostomies, refer to our document, *Colostomy: A Guide.*

An APR was commonly done in the past for cancers of the anal canal, but it can almost always be avoided by treating the patient with combined radiation therapy and chemotherapy instead. It is now more often used as an option if other treatments don't get rid of the cancer or if the cancer comes back after treatment.

Radiation therapy for anal cancer

Radiation therapy uses a beam of high-energy rays (or particles) to destroy cancer cells or slow their rate of growth. Sometimes doctors give radiation to shrink a tumor so that it can be removed more easily during surgery. There are 2 major forms of radiation therapy: external beam and brachytherapy.

External-beam radiation therapy (EBRT)

The most common way to deliver radiation is to use a focused beam of radiation from a machine outside the body. This is known as external-beam radiation therapy. Treatments are usually given 5 days a week for a period of 5 weeks or so.

Radiation can harm nearby healthy tissue along with the cancer cells. To reduce the risk of side effects, doctors carefully figure out the exact dose you need and aim the beam as accurately as they can.

Side effects of radiation therapy vary based on the area of the body treated and the dose of radiation given. Skin changes (like a sunburn) are common and improve after radiation is stopped. Temporary anal irritation and pain with discomfort during bowel movements may also occur. Other possible side effects include fatigue, nausea, or diarrhea. Long-term side effects can also occur. Damage to anal tissue by radiation may cause scar tissue to form. This scar tissue can sometimes keep the anal sphincter from working as it should. Radiation to the pelvis can weaken the bones, increasing the risk of fractures of the pelvis or hip. Radiation can also damage blood vessels that nourish the lining of the rectum and lead to chronic radiation proctitis (inflammation of the lining of the rectum). This can cause rectal bleeding and pain.

The radiation field may include some of the pelvis in order to treat lymph nodes in the groin, because the cancer will often spread to these lymph nodes. Doctors aren't sure this is always needed. People with small tumors may not need radiation therapy to the groin lymph nodes because the cancer is less likely to spread. If the doctors think the cancer has spread to the lymph nodes, because they are enlarged, then they will either treat them with radiation therapy or surgery.

Internal radiation (brachytherapy)

Another method of delivering radiation is to place small sources of radioactive materials in or near the tumor. This method, *internal radiation,* concentrates the radiation in the

area of the cancer. It is also called *brachytherapy*, *interstitial radiation*, and *intracavitary radiation*. This may involve implanting permanent radioactive pellets, or "seeds," which release their dose slowly over time, or other techniques where the radioactive substance is in the body for only a brief period. Internal radiation can be more convenient because it usually requires only one or a few sessions, but it may require some type of surgery.

Brachytherapy is used much less often than external-beam radiation therapy to treat anal cancer. When it is used, it is usually given along with external radiation. The possible side effects are often similar to those seen with external radiation.

Chemotherapy for anal cancer

Chemotherapy (chemo) uses drugs to treat cancer. Some drugs can be swallowed in pill form, while others need to be injected into a vein or muscle. The drugs enter the bloodstream to reach and destroy the cancer cells throughout the body. This makes chemo a systemic or "whole body" treatment.

Some drugs kill the cancer cells directly. Chemo can also make it easier for radiation to kill the cells. In anal cancer, chemotherapy combined with radiation therapy can often cure the cancer without the need for surgery. Often, chemo is given alone at first, followed by chemo with radiation (*chemoradiation*). Chemo may also be given after chemoradiation, to help shrink the tumor further. Chemotherapy often uses 2 or more drugs because one drug can boost the effect of the other. The main combination used to treat anal cancer is 5-fluorouracil (5-FU) and mitomycin. The combination of 5-FU and cisplatin is also used fairly often.

Chemotherapy drugs can reach just about any place inside the body. Doctors sometimes give chemo after surgery has removed the cancer. The chemo is meant to destroy any cancer cells that were left behind because they were too small to see. This is called adjuvant therapy. It is meant to lower the chance of the cancer coming back. Chemo may also be used to treat anal cancer that has spread to distant sites, such as the liver or lungs.

Chemotherapy drugs can also damage some normal cells, which can cause side effects. This can depend on the specific drugs, the amount taken, and the length of treatment. Common temporary side effects might include:

- Nausea and vomiting
- Loss of appetite
- Hair loss
- Diarrhea
- Mouth sores
- Low blood counts

Because chemotherapy can damage the blood-producing cells of the bone marrow, patients may have low blood cell counts. This can result in:

- An increased chance of infection (due to a shortage of white blood cells)
- Bleeding or bruising after minor cuts or injuries (due to a shortage of blood platelets)
- Fatigue or shortness of breath (due to low red blood cell counts)

If you get chemo, it is important to tell your doctor or nurse about any side effects as soon as you notice them. Your cancer care team can help you deal with them. For example, anti-nausea drugs can help control nausea and vomiting. Sometimes changing the treatment dosage or how you take your medicines can reduce side effects. Most side effects will stop when your course of treatment ends.

Clinical trials for anal cancer

You may have had to make a lot of decisions since you've been told you have cancer. One of the most important decisions you will make is choosing which treatment is best for you. You may have heard about clinical trials being done for your type of cancer. Or maybe someone on your health care team has mentioned a clinical trial to you.

Clinical trials are carefully controlled research studies that are done with patients who volunteer for them. They are done to get a closer look at promising new treatments or procedures.

If you would like to take part in a clinical trial, you should start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service for a list of clinical trials that meet your medical needs. You can reach this service at 1-800-303-5691 or on our Web site at www.cancer.org/clinicaltrials. You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll-free at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials Web site at http://www.cancer.gov.

There are requirements you must meet to take part in any clinical trial. If you do qualify for a clinical trial, it is up to you whether or not to enter (enroll in) it.

Clinical trials are one way to get state-of-the art cancer treatment. They are the only way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

You can get a lot more information on clinical trials in our document called *Clinical Trials: What You Need to Know*. You can read it on our Web site or call our toll-free number (1-800-227-2345) and have it sent to you.

Complementary and alternative therapies for anal cancer

When you have cancer you are likely to hear about ways to treat your cancer or relieve symptoms that your doctor hasn't mentioned. Everyone from friends and family to Internet groups and Web sites offer ideas for what might help you. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

What exactly are complementary and alternative therapies?

Not everyone uses these terms the same way, and they are used to refer to many different methods, so it can be confusing. We use *complementary* to refer to treatments that are used *along with* your regular medical care. *Alternative* treatments are used *instead of* a doctor's medical treatment.

Complementary methods: Most complementary treatment methods are not offered as cures for cancer. Mainly, they are used to help you feel better. Some methods that are used along with regular treatment are meditation to reduce stress, acupuncture to help relieve pain, or peppermint tea to relieve nausea. Some complementary methods are known to help, while others have not been tested. Some have been proven not to be helpful, and a few have even been found harmful.

Alternative treatments: Alternative treatments may be offered as cancer cures. These treatments have not been proven safe and effective in clinical trials. Some of these methods may pose danger, or have life-threatening side effects. But the biggest danger in most cases is that you may lose the chance to be helped by standard medical treatment. Delays or interruptions in your medical treatments may give the cancer more time to grow and make it less likely that treatment will help.

Finding out more

It is easy to see why people with cancer think about alternative methods. You want to do all you can to fight the cancer, and the idea of a treatment with no side effects sounds great. Sometimes medical treatments like chemotherapy can be hard to take, or they may no longer be working. But the truth is that most of these alternative methods have not been tested and proven to work in treating cancer.

As you consider your options, here are 3 important steps you can take:

- Look for "red flags" that suggest fraud. Does the method promise to cure all or most cancers? Are you told not to have regular medical treatments? Is the treatment a "secret" that requires you to visit certain providers or travel to another country?
- Talk to your doctor or nurse about any method you are thinking about using.
- Contact us at 1-800-227-2345 to learn more about complementary and alternative methods in general and to find out about the specific methods you are looking at.

The choice is yours

Decisions about how to treat or manage your cancer are always yours to make. If you want to use a non-standard treatment, learn all you can about the method and talk to your doctor about it. With good information and the support of your health care team, you may be able to safely use the methods that can help you while avoiding those that could be harmful.

Treatment options by stage

The type of treatment your cancer care team will recommend depends on the type of cancer and how far it has spread. This section sums up the options for anal cancer treatment according to the *stage of disease*. Anal tumors affecting the anal margin or the perianal skin (and not the anal canal) are considered to be skin cancers. Information about their treatment can be found in our document, *Skin Cancer: Basal and Squamous Cell*. These cancers are not treated in the same way as anal canal cancers.

Stage 0

Stage 0 tumors can often be completely removed by surgery (local resection). Radiation therapy and chemotherapy (chemo) are rarely needed.

Stages I and II

Local resection can be used to remove small tumors (usually less than 1 centimeter or ½ inch) that do not involve the sphincter. In some cases, resection may be followed with chemo and radiation therapy.

The standard treatment for anal cancers that can't be removed without harming the anal sphincter is radiation therapy combined with chemotherapy (chemoradiation). Chemoradiation is as good as (or even better than) removing the cancer as part of a radical surgery called *abdominoperineal resection (APR).* APR involves removing the anus and rectum and requires a colostomy to be formed. Chemoradiation can work just as well and avoid the need for a colostomy.

Using radiation therapy combined with chemo has been shown to be better than using radiation alone in the treatment of anal cancer. The 2 treatments are given over the same time period. The chemo usually consists of 5-FU with mitomycin C. The mitomycin is given as a short intravenous (IV) injection, usually at the start of radiation treatment and then again near the end, at around 4 to 6 weeks. The 5-FU is often given by a long IV infusion over 4 to 5 days and repeated in 4 to 6 weeks. In some cases, your doctor may suggest internal radiation along with the external beam radiation.

If the cancer has not completely gone away after radiation and chemo have been completed, surgery may be needed to remove what remains. But it is important to know that it may take several weeks after completing radiation therapy to see the full effects of treatment on the cancer. Doctors may observe any possible remaining cancer for months as it may continue to shrink and even go away without further treatment. Sometimes additional chemo (with or without extra radiation) may be given to try to shrink any cancer remaining. Any cancer that is left will then be removed with surgery.

Stages IIIA and IIIB

In most cases, the first treatment will be combined radiation therapy and chemo (as is used in stage I and II disease).

If the tumor shrinks but some cancer remains after the chemoradiation, it may be watched closely to see if it gets larger. If it does, more treatment is needed. Some patients are given more chemo. The drugs most often used are 5-FU plus cisplatin. Sometimes more radiation is given as well (this is called a radiation *boost*). Another option is to remove the cancer with surgery. This is most often an APR, but sometimes only a local resection is needed. If the cancer has spread to local lymph nodes, these may be removed with surgery or treated with radiation therapy.

Some doctors treat patients with larger tumors with chemo prior to starting chemoradiation. The chemo often consists of the drugs 5-FU and cisplatin, which may be given for a few cycles to shrink the cancer before starting chemoradiation.

Stage IIIB anal cancer can be hard to treat, so patients with this stage might be helped by taking part in a clinical trial.

Stage IV

In this stage, the cancer has spread to distant organs or tissues. Most often, anal cancer first spreads to the lungs, but it can spread anywhere, including the liver, brain, and bones.

Stage IV anal cancer is not thought to be curable. Treatment is aimed at controlling the disease and relieving symptoms. To do this, doctors may recommend surgery, radiation therapy, chemo, or some combination of these methods. People with this stage of anal cancer might also want to think about taking part in a clinical trial.

Anal melanoma

Melanoma doesn't respond well to chemotherapy or radiation, so surgery to remove the cancer is the main treatment when possible. Early stage anal melanomas are treated with surgery to remove the tumor and a rim of surrounding normal tissue. If the tumor is large or has grown into deeper tissues (such as the sphincter muscle) a bigger operation, such as an abdominoperineal resection may be needed. If the melanoma has spread to other organs, it is treated like skin melanoma that has spread. For more information, see our document, *Melanoma Skin Cancer.*

Recurrent anal cancer

Cancer is called recurrent when it come backs after treatment. Recurrence can be local (in or near the same place it started) or distant (spread to organs such as the lungs or bone). If your cancer returns in the anus or nearby lymph nodes after treatment, your treatment depends on what treatment you had the first time. For example, if you had surgery alone, you may receive radiation therapy and chemotherapy. If you first had chemoradiation, then you can be treated with surgery and/or chemotherapy. Treating recurrent anal cancer often requires an abdominoperineal resection (APR). Again, clinical trials may prove to be valuable for people with recurrent anal cancer.

In some people, the cancer will come back in distant sites or organs in the body. The most common site is the liver. Another common site is the lung. The main treatment for this is chemotherapy, but in rare cases surgical removing the cancer might be an option. The typical chemotherapy drugs used are 5-FU and cisplatin. Chemotherapy may not be curative, but it may help to reduce any symptoms from the disease.

HIV-infected patients

Most of the time people with HIV infection can be given the same treatment as others with anal cancer, and they can have a good outcome. Patients who have advanced HIV disease and weakened immune systems may need to have less intensive chemotherapy.

More treatment information

For more details on treatment options -- including some that may not be addressed in this document -- the National Comprehensive Cancer Network (NCCN) and the National Cancer Institute (NCI) are good sources of information.

The NCCN, made up of experts from many of the nation's leading cancer centers, develops cancer treatment guidelines for doctors to use when treating patients. Those are available on the NCCN Web site (www.nccn.org).

The NCI provides treatment guidelines via its telephone information center (1-800-4-CANCER) and its Web site (www.cancer.gov). Detailed guidelines intended for use by cancer care professionals are also available on www.cancer.gov.

What should you ask your doctor about anal cancer?

As you deal with your cancer and the process of treatment, you need to have honest, open discussions with your cancer care team. You should feel free to ask any question that's on your mind, no matter how trivial it might seem. Among the questions you might want to ask are:

- What kind of anal cancer do I have?
- Has my cancer spread beyond the primary site?
- What is the stage of my cancer? What does the staging mean in my case?
- What treatment choices do I have?
- What treatment would you recommend for me?
- What side effects can I expect from my treatment?
- What are the other risks of treatment?

- How soon after treatment starts will we know if it's working?
- How long will it take me to recover from treatment?
- How soon after treatment can I return to my normal activities, such as work, school, exercise, or sex?
- Will I need to have a colostomy?
- Based on what you've learned about my cancer, what is my outlook?
- What are the chances that my cancer will recur?
- Does one type of treatment reduce the risk of recurrence more than another?
- What should I do to be ready for treatment?
- Should I get a second opinion?
- How long will my treatment, including follow-up, last?

You will no doubt have other questions about your own situation. Be sure and write your questions down so you will remember to ask them during each visit with your cancer care team. Keep in mind, too, that doctors are not the only ones who can provide you with information. Other health care professionals, such as nurses and social workers, may have the answers you seek.

What happens after treatment for anal cancer?

For some people with anal cancer, treatment may remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer coming back. (When cancer comes back after treatment, it is called *recurrence*.) This is a very common concern in people who have had cancer.

It may take a while before your fears lessen. But it may help to know that many cancer survivors have learned to live with this uncertainty and are living full lives. Our document, *Living with Uncertainty: The Fear of Cancer Recurrence,* gives more detailed information on this.

For other people, the cancer may never go away completely. These people may get regular treatments with chemotherapy, radiation therapy, or other therapies to try to help keep the cancer in check. Learning to live with cancer that does not go away can be difficult and very stressful. It has its own type of uncertainty. Our document, *When Cancer Doesn't Go Away*, talks more about this.

Follow-up care

When treatment ends, your doctors will still want to watch you closely. It is very important to go to all of your follow-up appointments. During these visits, your doctors will ask questions about any problems you may have and may do exams and lab tests or x-rays and scans to look for signs of cancer or treatment side effects. Almost any cancer treatment can have side effects. Some may last for a few weeks to months, but others can last the rest of your life. This is the time for you to talk to your cancer care team about any changes or problems you notice and any questions or concerns you have.

Follow-up doctor visits after chemoradiation may be scheduled as often as every 3 months for at least 2 years. During these visits, your doctor will ask about symptoms and do a physical exam, which will include a rectal exam and an exam of the anus. Blood tests and imaging studies such as CT scans or x-rays may also be ordered.

It is important to keep health insurance. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

Should your cancer come back our document, *When Your Cancer Comes Back: Cancer Recurrence* can give you information on how to manage and cope with this phase of your treatment.

For patients with colostomies

Permanent colostomies are rarely needed now to treat anal cancer. If you have a colostomy, follow-up is an important concern. You may feel worried or isolated from normal activities. A wound, ostomy, continence nurse (WOCN) or enterostomal therapist (a health care professional trained to help people with their colostomies) can teach you how to care for your colostomy. You can also ask the American Cancer Society about programs offering information and support in your area. For more information on colostomies, refer to our document, *Colostomy: A Guide.*

Seeing a new doctor

At some point after your cancer diagnosis and treatment, you may find yourself seeing a new doctor who does not know anything about your medical history. It is important that you be able to give your new doctor the details of your diagnosis and treatment. Make sure you have the following information handy:

- A copy of your pathology report(s) from any biopsies or surgeries
- If you had surgery, a copy of your operative report(s)
- If you were in the hospital, a copy of the discharge summary that doctors prepare when patients are sent home
- If you were treated with radiation, a copy of the treatment summary

- If you were treated with chemotherapy (or other drugs), a list of your drugs, their doses, and when you took them
- Copies of your x-rays and imaging tests (these can be put onto a DVD)

The doctor may want copies of this information for his records, but always keep copies for yourself.

Lifestyle changes

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life – making choices to help you stay healthy and feel as well as you can. This can be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term. Some people even start during cancer treatment.

Making healthier choices

For many people, a diagnosis of cancer helps them focus on their health in ways they may not have thought much about in the past. Are there things you could do that might make you healthier? Maybe you could try to eat better or get more exercise. Maybe you could cut down on the alcohol, or give up tobacco. Even things like keeping your stress level under control may help. Now is a good time to think about making changes that can have positive effects for the rest of your life. You will feel better and you will also be healthier.

You can start by working on those things that worry you most. Get help with those that are harder for you. For instance, if you are thinking about quitting smoking and need help, call the American Cancer Society for information and support. This tobacco cessation and coaching service can help increase your chances of quitting for good.

Eating better

Eating right can be hard for anyone, but it can get even tougher during and after cancer treatment. Treatment may change your sense of taste. Nausea can be a problem. You may not feel like eating and lose weight when you don't want to. Or you may have gained weight that you can't seem to lose. All of these things can be very frustrating.

If treatment caused weight changes or eating or taste problems, do the best you can and keep in mind that these problems usually get better over time. You may find it helps to eat small portions every 2 to 3 hours until you feel better. You may also want to ask your cancer team about seeing a dietitian, an expert in nutrition who can give you ideas on how to deal with these treatment side effects.

One of the best things you can do after cancer treatment is put healthy eating habits into place. You may be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Getting to and staying at a healthy weight, eating a healthy diet, and limiting your alcohol intake may lower your risk for a number of types of cancer, as well as having many other health benefits.

Rest, fatigue, and exercise

Extreme tiredness, called *fatigue*, is very common in people treated for cancer. This is not a normal tiredness, but a "bone-weary" exhaustion that doesn't get better with rest. For some people, fatigue lasts a long time after treatment, and can make it hard for them to exercise and do other things they want to do. But exercise can help reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel better physically and emotionally and can cope better, too.

If you were sick and not very active during treatment, it is normal for your fitness, endurance, and muscle strength to decline. Any plan for physical activity should fit your own situation. An older person who has never exercised will not be able to take on the same amount of exercise as a 20-year-old who plays tennis twice a week. If you haven't exercised in a few years, you will have to start slowly – maybe just by taking short walks.

Talk with your health care team before starting anything. Get their opinion about your exercise plans. Then, try to find an exercise buddy so you're not doing it alone. Having family or friends involved when starting a new exercise program can give you that extra boost of support to keep you going when the push just isn't there.

If you are very tired, you will need to balance activity with rest. It is OK to rest when you need to. Sometimes it's really hard for people to allow themselves to rest when they are used to working all day or taking care of a household, but this is not the time to push yourself too hard. Listen to your body and rest when you need to. (For more information on dealing with fatigue, please see *Fatigue in People With Cancer* and *Anemia in People With Cancer*.)

Keep in mind exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- Along with a good diet, it will help you get to and stay at a healthy weight.
- It makes your muscles stronger.
- It reduces fatigue and helps you have more energy.
- It can help lower anxiety and depression.
- It can make you feel happier.
- It helps you feel better about yourself.

And long term, we know that getting regular physical activity plays a role in helping to lower the risk of some cancers, as well as having other health benefits.

How about your emotional health?

When treatment ends, you may find yourself overcome with many different emotions. This happens to a lot of people. You may have been going through so much during

treatment that you could only focus on getting through each day. Now it may feel like a lot of other issues are catching up with you.

You may find yourself thinking about death and dying. Or maybe you're more aware of the effect the cancer has on your family, friends, and career. You may take a new look at your relationship with those around you. Unexpected issues may also cause concern. For instance, as you feel better and have fewer doctor visits, you will see your health care team less often and have more time on your hands. These changes can make some people anxious.

Almost everyone who has been through cancer can benefit from getting some type of support. You need people you can turn to for strength and comfort. Support can come in many forms: family, friends, cancer support groups, church or spiritual groups, online support communities, or one-on-one counselors. What's best for you depends on your situation and personality. Some people feel safe in peer-support groups or education groups. Others would rather talk in an informal setting, such as church. Others may feel more at ease talking one-on-one with a trusted friend or counselor. Whatever your source of strength or comfort, make sure you have a place to go with your concerns.

The cancer journey can feel very lonely. It is not necessary or good for you to try to deal with everything on your own. And your friends and family may feel shut out if you do not include them. Let them in, and let in anyone else who you feel may help. If you aren't sure who can help, call your American Cancer Society at 1-800-227-2345 and we can put you in touch with a group or resource that may work for you

If treatment stops working

If cancer keeps growing or comes back after one kind of treatment, it is possible that another treatment plan might still cure the cancer, or at least shrink it enough to help you live longer and feel better. But when a person has tried many different treatments and the cancer has not gotten any better, the cancer tends to become resistant to all treatment. If this happens, it's important to weigh the possible limited benefits of a new treatment against the possible downsides. Everyone has their own way of looking at this.

This is likely to be the hardest part of your battle with cancer -- when you have been through many medical treatments and nothing's working anymore. Your doctor may offer you new options, but at some point you may need to consider that treatment is not likely to improve your health or change your outcome or survival.

If you want to continue to get treatment for as long as you can, you need to think about the odds of treatment having any benefit and how this compares to the possible risks and side effects. In many cases, your doctor can estimate how likely it is the cancer will respond to treatment you are considering. For instance, the doctor may say that more chemo or radiation might have about a 1% chance of working. Some people are still tempted to try this. But it is important to think about and understand your reasons for choosing this plan.

No matter what you decide to do, you need to feel as good as you can. Make sure you are asking for and getting treatment for any symptoms you might have, such as nausea or pain. This type of treatment is called *palliative care*.

Palliative care helps relieve symptoms, but is not expected to cure the disease. It can be given along with cancer treatment, or can even be cancer treatment. The difference is its purpose - the main purpose of palliative care is to improve the quality of your life, or help you feel as good as you can for as long as you can. Sometimes this means using drugs to help with symptoms like pain or nausea. Sometimes, though, the treatments used to control your symptoms are the same as those used to treat cancer. For instance, radiation might be used to help relieve bone pain caused by cancer that has spread to the bones. Or chemo might be used to help shrink a tumor and keep it from blocking the bowels. But this is not the same as treatment to try to cure the cancer.

At some point, you may benefit from hospice care. This is special care that treats the person rather than the disease; it focuses on quality rather than length of life. Most of the time, it is given at home. Your cancer may be causing problems that need to be managed, and hospice focuses on your comfort. You should know that while getting hospice care often means the end of treatments such as chemo and radiation, it doesn't mean you can't have treatment for the problems caused by your cancer or other health conditions. In hospice the focus of your care is on living life as fully as possible and feeling as well as you can at this difficult time. You can learn more about hospice in our document called *Hospice Care*.

Staying hopeful is important, too. Your hope for a cure may not be as bright, but there is still hope for good times with family and friends -- times that are filled with happiness and meaning. Pausing at this time in your cancer treatment gives you a chance to refocus on the most important things in your life. Now is the time to do some things you've always wanted to do and to stop doing the things you no longer want to do. Though the cancer may be beyond your control, there are still choices you can make.

What's new in anal cancer research and treatment?

Important research into anal cancer is currently under way in many hospitals, medical centers, and other institutions around the country. Each year, scientists find out more about what causes the disease, how to prevent it, and how to improve treatment.

Causes and prevention

Research has identified the human papilloma virus (HPV) as a major factor in causing many cases of anal cancer. Researchers are learning how HPV affects molecules inside anal cells to cause them to become cancerous.

Improved understanding of the molecular changes inside anal cancer cells is expected to help scientists develop new drugs to fight this disease.

HIV treatment

The immune deficiency of people with HIV infections can contribute to getting anal cancer. Although modern drug treatments for HIV can improve the immune response in those infected with the virus, this has not lowered the risk of anal cancer.

Early detection

Ongoing research is being done on the value of screening tests for anal cancer, especially in people with major risk factors. The test studied most is anal cytology, sometimes called the anal Pap test. This test may be useful in early diagnosis of anal cancer and pre-cancer (called *anal intraepithelial neoplasia* (AIN). In this test, cells are gently scraped from the lining layer of the anus and checked under a microscope. Some doctors already recommend this test for people at high risk for anal cancers, such as those who are HIV positive.

Research is also in progress on treating AIN to help prevent cancer from developing.

Treatment

Radiation

In the past several years, studies have shown the benefits of combining radiation with chemotherapy. This approach has reduced the number of surgeries needed for anal cancer, including the need for permanent colostomies.

New *radiosensitizing agents* -- chemotherapy and other drugs that increase the effect of radiation therapy -- are being studied in clinical trials. Combining these treatments may allow people to get lower doses of radiation and chemotherapy, which could lessen the possible side effects.

Doctors are learning more about how to give external radiation more accurately and effectively and decrease the effects on normal healthy tissues. Other research is being done to learn about the possible benefits of combining external radiation and interstitial (internal) radiation therapy.

Drug treatment

New drug combinations are being studied. For example, clinical trials have looked at the value of giving more chemo in stage III cancers.

Some studies are looking at the use of newer targeted therapies to treat anal cancer. For example, doctors are trying to add the monoclonal antibody cetuximab (Erbitux), which is used in colorectal cancer, to see if it can help make chemotherapy work better.

Studies are also looking at using imiquimod cream to treat anal intraepithelial neoplasia (AIN). Imiquimod is FDA approved as a treatment for anal and genital warts. It acts by boosting the body's immune response. It has been used "off-label" to treat AIN in HIV

positive men with good results, and more recently was shown to be helpful in a clinical trial. Imiquimod is a cream that is applied to the problem area 3 times a week to treat AIN.

Surgery

Doctors are also studying ways to improve surgery and its side effects. For instance, studies are now looking at implanting an artificial bowel sphincter in people who have an extensive APR. The hope is that this artificial sphincter might allow people to avoid the need for a permanent colostomy. Currently such treatment is only available in carefully monitored trials.

Vaccines

The HPV vaccines available at this time help prevent HPV infection, but do not treat infections already present. Researchers have also been working on vaccines to treat women and men who already have HPV infections, by causing their body's immune system cells to attack the HPV-infected cells. Another goal of this research is to help the immune system attack pre-cancers and even cancers that contain HPV. An experimental vaccine has shown promise so far in treating pre-cancers of the vulva, but results for anal cancer or AIN are not yet available.

Additional resources for anal cancer

More information from your American Cancer Society

The following information may also be helpful to you. These materials may be ordered from our toll-free number, 1-800-227-2345.

After Diagnosis: A Guide for Patients and Families (also available in Spanish)

Caring for the Patient with Cancer at Home: A Guide for Patients and Families (also available in Spanish)

Colostomy: A Guide

Living with Uncertainty: The Fear of Cancer Recurrence

Pain Control: A Guide for People With Cancer and Their Families (also available in Spanish)

Questions About Smoking, Tobacco, and Health (also available in Spanish)

Understanding Chemotherapy: A Guide for Patients and Families (also available in Spanish)

Understanding Radiation Therapy: A Guide for Patients and Families (also available in Spanish)

Books

The following books are available from the American Cancer Society. Call us at 1-800-227-2345 to ask about costs or to place your order.

American Cancer Society's Guide to Pain Control

Caregiving: A Step-By-Step Resource for Caring for the Person With Cancer at Home

Coming to Terms With Cancer: A Glossary of Cancer-Related Terms

Informed Decisions, Second Edition: The Complete Book of Cancer Diagnosis, Treatment, and Recovery

National Organizations and Web Sites*

In addition to the American Cancer Society, other sources of patient information and support include:

National Cancer Institute
Toll-free number: 1-800-4-CANCER (1-800-422-6237); TTY: 1-800-332-8615
Web site: www.cancer.gov

National Coalition for Cancer Survivorship
Toll-free number: 1-888-650-9127
1-877-NCCS-YES (1-877-622-7937) for some publications and Cancer Survivor Toolbox® orders
Web site: www.canceradvocacy.org

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at **1-800-227-2345** or visit www.cancer.org.

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1 · 800 · ACS-2345 or www.cancer.org