



Vaginal 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.

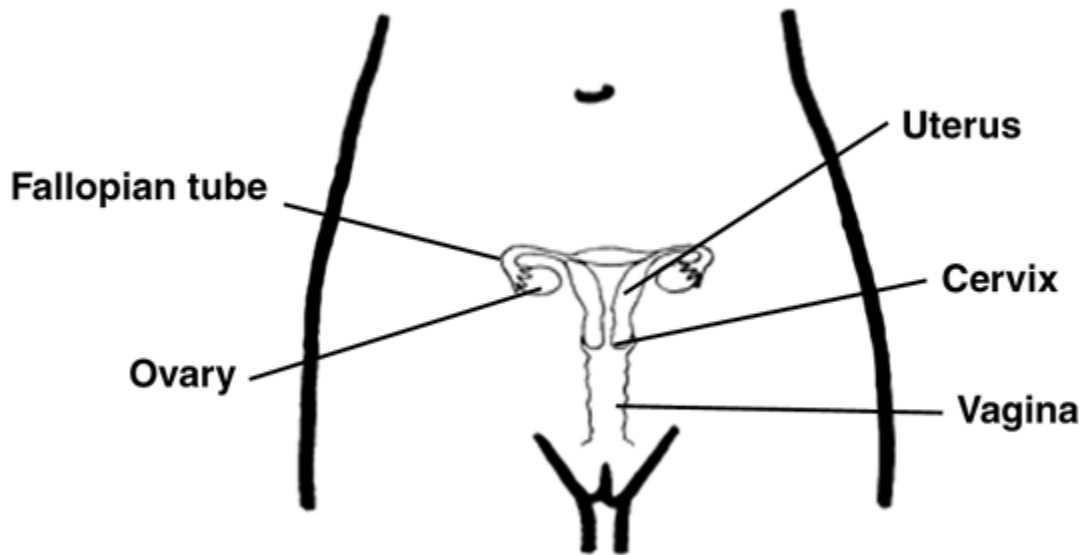
Not all tumors are cancerous. Tumors that aren't cancer are called benign. Benign tumors can cause problems – they can grow very large and press on healthy organs and tissues. But they cannot grow into (invade) other tissues. Because they can't invade, they also can't spread to other parts of the body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

What is vaginal cancer?

The vagina

The vagina is a 3- to 4-inch (7 ½- to 10-cm) tube. It is sometimes called the *birth canal*. The vagina goes from the cervix (the lower part of the uterus) to open up at the vulva (the external genitals). The vagina is lined by a layer of flat cells called *squamous* cells. This layer of cells is also called *epithelium* (or *epithelial lining*) because it is formed by epithelial cells.

The vaginal wall underneath the epithelium contains connective tissue, muscle tissue, lymph vessels, and nerves. The vagina is usually in a collapsed state with its walls touching each other. The vaginal walls have many folds that help the vagina to open and expand during sexual intercourse or the birth of a baby. Glands near the opening of the vagina secrete mucus to keep the vaginal lining moist.



Types of vaginal cancer

There are several types of vaginal cancer.

Squamous cell carcinoma

About 70 of every 100 cases of vaginal cancer are *squamous cell carcinomas*. These cancers begin in the squamous cells that make up the epithelial lining of the vagina. These cancers are more common in the upper area of the vagina near the cervix. Squamous cell cancers of the vagina often develop slowly. First, some of the normal cells of the vagina get pre-cancerous changes. Then some of the pre-cancer cells turn into cancer cells. This process can take many years.

The medical term most often used for this pre-cancerous condition is *vaginal intraepithelial neoplasia* (VAIN). "Intraepithelial" means that the abnormal cells are only found in the surface layer of the vaginal skin (epithelium). There are 3 types of VAIN: VAIN1, VAIN2, and VAIN3, with 3 indicating furthest progression toward a true cancer. VAIN is more common in women who have had their uterus removed (hysterectomy) and in those who were previously treated for cervical cancer or pre-cancer.

In the past, the term *dysplasia* was used instead of VAIN. This term is used much less now. When talking about dysplasia, there is also a range of increasing progress toward cancer - first, mild dysplasia; next, moderate dysplasia; and then severe dysplasia.

Adenocarcinoma

Cancer that begins in gland cells is called *adenocarcinoma*. About 15 of every 100 cases of vaginal cancer are adenocarcinomas. The usual type of vaginal adenocarcinoma

typically develops in women older than 50. One certain type, called *clear cell adenocarcinoma*, occurs more often in young women who were exposed to diethylstilbestrol (DES) in utero (when they were in their mother's womb). (See the section called "What are the risk factors for vaginal cancer?" for more information on DES and clear cell carcinoma.)

Melanoma

Melanomas develop from pigment-producing cells that give skin its color. These cancers usually are found on sun-exposed areas of the skin but can form on the vagina or other internal organs. About 9 of every 100 cases of vaginal cancer are melanomas. Melanoma tends to affect the lower or outer portion of the vagina. The tumors vary greatly in size, color, and growth pattern. More information about melanoma can be found in our document called *Melanoma Skin Cancer*.

Sarcoma

A sarcoma is a cancer that begins in the cells of bones, muscles, or connective tissue. Up to 4 of every 100 cases of vaginal cancer are sarcomas. These cancers form deep in the wall of the vagina, not on its surface. There are several types of vaginal sarcomas. *Rhabdomyosarcoma* is the most common type of vaginal sarcoma. It is most often found in children and is rare in adults. A sarcoma called *leiomyosarcoma* is seen more often in adults. It tends to occur in women older than 50.

Other cancers

Cancers of the vagina are much less common than cancers that start in other organs (such as the cervix, uterus, rectum, or bladder) and then spread to the vagina. These cancers are named after the place where they started. Also, a cancer that involves both the cervix and vagina is considered a cervical cancer. Likewise, if the cancer involves both the vulva and the vagina, it is considered a vulvar cancer.

This document refers only to cancers that start in the vagina, also known as primary vaginal cancers.

What are the key statistics about vaginal cancer?

Vaginal cancer is rare. Only about 1 of every 100 cancers of the female reproductive system is a vaginal cancer. The American Cancer Society's most recent estimates for vaginal cancer in the United States are for 2012,

- About 2,680 new cases will be diagnosed
- About 840 women will die of this cancer.

The 5-year survival rate refers to the percentage of patients who live at least 5 years after their cancer is diagnosed. Five-year rates are used to produce a standard way of discussing prognosis. Of course, many people live much longer than 5 years. Five-year relative survival rates assumes that people will die of other causes and compares the observed survival with that expected for people without vaginal cancer. This is a more accurate way to describe the prognosis for patients with a particular type and stage of cancer.

For all cases of vaginal cancer combined, the relative 5-year survival is about 50%. For squamous cell carcinoma of the vagina, the relative 5-year survival is 54%, while for adenocarcinoma of the vagina it is almost 60%. For vaginal melanoma, the 5-year relative survival is only 13%.

What are the risk factors for vaginal 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, exposing skin 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, does not mean that you will get the disease. And not having any risk factors doesn't mean that you won't get it, either.

Scientists have found that certain risk factors make a woman more likely to develop vaginal cancer. Even if a woman with vaginal cancer has one or more risk factors, it is impossible to know for sure how much that risk factor contributed to causing the cancer. And many women with vaginal cancer do not have any apparent risk factors.

Age

Squamous cell cancer of the vagina occurs mainly in older women. Only 15% of cases are found in women younger than 40. Almost half of cases occur in women who are 70 years old or older.

Diethylstilbestrol (DES)

DES is a hormonal drug that was given to some women to prevent miscarriage between 1940 and 1971. Women whose mothers took DES (when pregnant with them) develop clear-cell adenocarcinoma of the vagina or cervix more often than would normally be expected. There is about 1 case of this type of cancer in every 1,000 daughters of women who took DES during their pregnancy. This means that about 99.9% of DES daughters do not develop this cancer.

DES-related clear cell adenocarcinoma is more common in the vagina than the cervix. The risk appears to be greatest in those whose mothers took the drug during their first 16 weeks of pregnancy. Their average age when they are diagnosed is 19 years. Since the use of DES during pregnancy was stopped by the FDA in 1971, even the youngest DES daughters are older than 35 -- past the age of highest risk. But there is no age when a

woman is safe from DES-related cancer. Doctors do not know exactly how long women remain at risk.

DES daughters have an increased risk of developing clear cell carcinomas, but women don't have to be exposed to DES for clear cell carcinoma to develop. In fact, women were diagnosed with this type of cancer before DES was invented.

DES daughters are also more likely to have high grade cervical dysplasia (CIN 3) and vaginal dysplasia (VAIN 3) when compared to women who were never exposed.

Vaginal adenosis

Normally, the vagina is lined by flat cells called squamous cells. In about 40% of women who have already started having periods, the vagina may have one or more areas where it is lined instead by glandular cells. These cells look like those found in the glands of the cervix, the lining of the body of the uterus (endometrium), and the lining of the fallopian tubes. These areas of gland cells are called *adenosis*. It occurs in nearly all women who were exposed to DES during their mothers' pregnancy. Having adenosis increases the risk of developing clear cell carcinoma, but this cancer is still very rare. The risk of clear cell carcinoma in a woman who has adenosis that is not related to DES is very, very small. Still, many doctors feel that any woman with adenosis should have very careful screening and follow-up.

Human papilloma virus

Up to 90% of vaginal cancers and pre-cancers (vaginal intraepithelial neoplasia -- VAIN) contain the human papilloma virus (HPV). HPV is a group of more than 100 related viruses. They are called papilloma viruses because some of them cause a type of growth called a *papilloma*. Papillomas -- more commonly known as warts -- are not cancers. Different HPV types can cause different types of warts in different parts of the body. Some types cause common warts on the hands and feet. Other types tend to cause warts on the lips or tongue.

Certain HPV types can infect the outer female and male genital organs and the anal area, causing raised, bumpy warts. These warts may barely be visible or they may be several inches across. The medical term for genital warts is *condyloma acuminatum*. 2 types of HPV, HPV 6 and HPV 11, cause most cases of genital warts. These 2 types are seldom linked to cancer, and so are called *low-risk* types of HPV.

Certain types of HPV have been strongly linked with vaginal cancers and pre-cancers. These types, HPV types 16 and 18, are considered high-risk types of HPV because they are strongly linked to cancer. They can also cause cancers of the cervix and vulva in women, cancer of the penis in men, and anal and oral cancers (in men and women).

HPV is passed from one person to another during skin-to-skin contact with an infected area of the body. Although HPV can be spread during sex -- including vaginal intercourse, anal intercourse, and oral sex - sex doesn't have to occur for the infection to spread. All that is needed is 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 cervix and then spread to the vagina.

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 people the body is able to clear the infection on its own. In some, however, the infection does not go away and becomes chronic. Chronic infection, especially with high-risk HPV types, can eventually cause certain cancers, including vaginal cancer.

In women, HPV infections occur mainly at younger ages and are less common in women over 30. The reason for this is not clear. A person can be infected with HPV 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.

Vaccines have been developed to help prevent infection with some types of HPV. Right now, 2 different HPV vaccines have been approved for use in the United States by the Food and Drug Administration (FDA): Gardasil[®] and Cervarix[®]. These are discussed in more detail later in this document.

Cervical cancer

Having cervical cancer or pre-cancer (cervical intraepithelial neoplasia or cervical dysplasia) increases a woman's risk of vaginal squamous cell cancer. This is most likely because cervical and vaginal cancers have similar risk factors, such as HPV infection and smoking.

Some studies suggest that treating cervical cancer with radiation therapy may increase the risk of vaginal cancer, but this was not seen in other studies, and the issue remains unresolved.

Smoking

Smoking cigarettes more than doubles a woman's risk of getting vaginal cancer.

Alcohol

Drinking alcohol might affect the risk of vaginal cancer. A study of alcoholic women found more cases of vaginal cancer than was expected. But this study was flawed because it didn't look at other factors that can alter risk, such as smoking and HPV infection. A more recent study that did take these other risk factors into account found a decreased risk of vaginal cancer in women who do not drink alcohol at all.

Human immunodeficiency virus

Infection with HIV (human immunodeficiency virus), the virus that causes AIDS, also increases the risk of vaginal cancer.

Vaginal irritation

In some women, stretching of the pelvic ligaments may cause the uterus to sag into the vagina or even extend outside the vagina. This condition is called *uterine prolapse* and can be treated by surgery or by wearing a pessary, a device to keep the uterus in place. Some studies suggest that long-term (chronic) irritation of the vagina in women using a pessary may slightly increase the risk of squamous cell vaginal cancer. But this association is extremely rare, and no studies have conclusively proven that pessaries actually cause vaginal cancer.

Do we know what causes vaginal cancer?

The exact cause of most vaginal cancers is not known. But scientists have found that it is associated with a number of other conditions described in the section, "What are the risk factors for vaginal cancer?" Research is now being done to learn more about how these risk factors cause cells of the vagina to become cancerous.

Research has shown that normal cells make substances called *tumor suppressor gene products* to keep from growing too rapidly and becoming cancers. High-risk HPV (human papilloma virus) types (like 16 and 18) produce 2 proteins (E6 and E7) that can interfere with the functioning of known tumor suppressor gene products.

As mentioned in the section on risk factors, women exposed to diethylstilbestrol (DES) as a fetus (that is, their mothers took DES during pregnancy) are at increased risk for developing clear cell carcinoma. DES also increases the likelihood of vaginal adenosis (gland-type cells in the vaginal lining rather than the usual squamous cells). Most women with vaginal adenosis never develop vaginal clear cell carcinoma. However, those with a rare type of adenosis (called *atypical tuboendometrial adenosis*) do have an increased risk of developing this cancer.

Can vaginal cancer be prevented?

The best way to reduce the risk of vaginal cancer is to avoid known risk factors and to find and treat any vaginal pre-cancers. But since many women with vaginal cancer have no known risk factors, it is not possible to completely prevent this disease.

Avoid HPV exposure

Infection with human papillomavirus (HPV) is a risk factor for vaginal cancer. In women, HPV infections occur mainly at younger ages and are less common in women over 30. The reason for this is not clear. Most of these infections in young women disappear, but

in some cases the HPV DNA remains inside cells of a woman's cervix and vagina. This can lead to pre-cancerous changes and even to cancer many years later.

Certain types of sexual behavior increase a woman's risk of getting a genital HPV infection, such as:

- Having sex at an early age
- Having many sex partners
- Having a partner who has had many sex partners
- Having sex with uncircumcised males

Delaying sex until you are older can help you avoid HPV. It also helps if you limit your number of sex partners and avoid having sex with someone who has had many other sex partners. Remember that HPV can be present for years without causing any symptoms. It does not always cause warts or any other symptoms. Someone can have the virus and pass it on without knowing it.

HPV and men

The 2 main factors influencing the risk of genital HPV infection in men 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.

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.

The risk of being infected with HPV is also strongly linked to having many sexual partners (over a man's lifetime).

Condoms and HPV

Condoms ("rubbers") provide some protection against HPV. One study found that when condoms are used correctly every time sex occurs, they can lower the HPV infection rate by about 70%. Condoms cannot protect completely because they don't cover every possible HPV-infected area of the body, such as skin on the genital or anal area. Still, condoms do 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.

Get vaccinated

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, but so far it has only been shown to help prevent cervical cancers and pre-cancers and not any of the other cancers linked to HPV infection (such as vaginal cancer).

More HPV vaccines are being developed and tested.

Don't smoke

Not smoking is another way to lower vaginal cancer risk. Women who don't smoke are also less likely to develop a number of other cancers, such as those of the lungs, mouth, throat, bladder, kidneys, and several other organs.

Find and treat pre-cancerous conditions

Most vaginal squamous cell cancers are believed to start out as pre-cancerous changes, called *vaginal intraepithelial neoplasia or VAIN*. VAIN may be present for years before turning into a true (invasive) cancer. These pre-cancers can be found with the same Pap test that is used to screen for cervical cancer and pre-cancer. If a pre-cancer is found, it can be treated, stopping cancer before it really starts.

Still, since vaginal cancer and VAIN are rare, doctors do not often do other tests to look for them in women who do not have a prior history of pre-cancer or cancer of the cervix, vagina, or vulva.

The American Cancer Society recommends these guidelines for the early detection of cervical cancer:

- All women should begin cervical cancer screening about 3 years after they start having sex (vaginal intercourse). A woman who waits until she is over 18 to have sex should start screening no later than age 21. Screening should be done every year with the regular Pap test or every 2 years using the liquid-based Pap test.
- Beginning at age 30, women who have had 3 normal Pap test results in a row may be screened less often -- every 2 to 3 years. Testing can be with either the conventional (regular) or liquid-based Pap test. Some women -- such as those who were exposed to diethylstilbestrol (DES) before birth, and those with a weakened immune system

(from HIV infection, an organ transplant, chemotherapy, or chronic steroid use) -- should continue getting tested yearly.

- Another reasonable option for women over 30 is to get screened every 3 years -- but not more frequently -- with either the conventional or liquid-based Pap test, *plus* the HPV DNA test.
- Women 70 years of age or older who have had 3 or more normal Pap tests in a row and no abnormal Pap test results in the last 10 years may choose to stop having cervical cancer screening. Women with a history of cervical cancer, DES exposure before birth, HIV infection or a weakened immune system should continue to have screening as long as they are in good health.
- Women who have had a total hysterectomy (the uterus and cervix are removed) may also choose to stop having cervical cancer screening, unless the surgery was done as a treatment for cervical cancer or pre-cancer or for other gynecologic cancers. Women who have had a hysterectomy without removing the cervix should continue to follow the guidelines above.

See our documents called *Cervical Cancer* and *Cervical Cancer: Prevention and Early Detection* for more information about finding female reproductive system cancers early.

How Pap tests and pelvic examinations are done

First, the skin of the outer lips (labia majora) and inner lips (labia minora) is examined for any visible abnormalities. Then the health care professional inserts a speculum, a metal or plastic instrument that keeps the vagina open so that the cervix and vagina can be seen clearly. Next, for the Pap test, a sample of cells and mucus is lightly scraped from the exocervix (outer part) using a spatula or a broom. A small brush is used to sample the endocervix (the inside part of the cervix that is closest to the body of the uterus). Then, the speculum is removed. The doctor then will check the organs of the pelvis by inserting 1 or 2 gloved fingers of one hand into the vagina while he or she palpates (feels) the lower abdomen, just above the pubic bone, with the other. The doctor may do a rectal exam at this time also. It is very important to know that a Pap test is not always done when a pelvic exam is done, so if you are uncertain you should ask if one was done.

Vaginal intraepithelial neoplasia (VAIN; pre-cancer of the vagina) usually can't be seen during a routine exam of the vagina. This is why the Pap test is so important. Because cervical cancer is much more common than vaginal cancer, Pap test samples are scraped or brushed from the cervix. However, some cells of the vaginal lining are usually also picked up at the same time. That allows cases of VAIN to be found in women whose vaginal lining is not intentionally scraped. In women whose cervix has been removed by surgery, Pap test samples are taken from the lining of the upper vagina.

Many women with VAIN may also have a pre-cancer of the cervix (known as *cervical intraepithelial neoplasia* or *CIN*). If abnormal cells are seen on a Pap test, the next step is a procedure called *colposcopy*, in which the cervix, the vagina, and at times the vulva are examined with a special instrument called a *colposcope*.

There are 2 main options, conventional cytology and liquid-based cytology, for preparing cell samples for the Pap test so that they can be examined under a microscope in the laboratory.

Conventional cytology: The first option is to smear the sample directly onto a glass microscope slide, which is then sent to the laboratory. For about 50 years, all cervical cytology (Pap test) samples were handled this way. This method works quite well and is relatively inexpensive, but it does have some drawbacks. One problem with this method is that the cells smeared onto the slide are sometimes piled up on each other, making it hard to see the cells at the bottom of the pile. Also, white blood cells (pus), increased mucus, yeast cells, or bacteria from infection or inflammation can hide the cervical/vaginal cells. Another problem with direct smears is that if the slides are not treated (with a preservative) right away, the cells can get dried out. This can make it difficult to tell if there is something wrong with the cells. The Pap test may need to be repeated if the cells cannot be seen well (due to any of the above problems).

Liquid-based cytology: Another method is to put the sample of cells directly into a special preservative liquid (instead of putting them on a slide directly). This is then sent to the lab. Technicians use special lab instruments that spread some of the cells in the liquid onto glass slides to look at under the microscope. This method is called liquid-based cytology, or a liquid-based Pap test. The liquid helps remove some of the mucus, bacteria, yeast, and pus cells in a sample. It also allows the cells to be spread more evenly on the slide and keeps them from drying out and becoming distorted. Cells kept in the liquid can also be tested for HPV. Using liquid-based testing reduces the chance that the Pap test will need to be repeated, but it does not seem to find more pre-cancers than a regular Pap test. The liquid based test is also more likely to find cell changes that are not pre-cancerous but that will need to be checked out further -- leading to unnecessary tests. This newer method is more expensive than a usual Pap test.

No matter which way is used, the slides are looked at by specially trained technologists (cytotechnologists) and doctors (pathologists). Another way to improve the Pap test by using computerized instruments that can spot abnormal cells in Pap smears. A machine that can read Pap tests has been approved by the US Food and Drug Administration (FDA) to read Pap tests first (instead of them being examined by a technologist). It is also approved by the FDA for rechecking Pap test results that were read as normal by technologists. Any smear identified as abnormal by the machine would then be reviewed by a doctor or a technologist.

Can vaginal cancer be found early?

Some cases of vaginal cancer can be found early. They may produce symptoms that cause patients to seek medical attention, but many vaginal cancers do not cause symptoms until after they have reached an advanced stage. Pre-cancerous areas of vaginal intraepithelial neoplasia (VAIN) do not usually produce any symptoms. Fortunately, routine Pap testing can find some cases of VAIN and early invasive vaginal cancer.

How is vaginal cancer diagnosed?

If a woman has any of the signs or symptoms of vaginal cancer, she should see a doctor. If the Pap test detects abnormal cells, or if the pelvic exam results are not normal, more tests will be needed. This may mean referral to a gynecologist (specialist in problems of the female genital system).

Signs and symptoms of vaginal cancer

More than 8 out of 10 women with invasive vaginal cancer have one or more symptoms, such as:

- Abnormal vaginal bleeding (often after intercourse)
- Abnormal vaginal discharge
- A mass that can be felt
- Pain during intercourse

Symptoms of advanced vaginal cancer may be painful urination, constipation, and continuous pain in the pelvis.

Having these symptoms does not always mean that you have cancer. In fact, these symptoms are more likely to be caused by a benign condition, like an infection. The only way to know for sure what is causing these problems is to see your health care professional. If you have any of these symptoms, discuss them with your doctor right away. Remember, the sooner the problem is correctly diagnosed, the sooner you can start treatment, and the more effective your treatment will be.

Medical history and physical exam

The first step is for the doctor to take a complete medical history to check for risk factors and symptoms. Then your doctor will physically examine you, including a pelvic exam with a Pap test and possible biopsy.

Colposcopy

If certain symptoms suggest cancer or if the Pap test shows abnormal cells, you will need to have a test called colposcopy. In this procedure you will lie on the exam table as you do for a pelvic exam. A speculum is placed in the vagina. The doctor will use the colposcope to examine the cervix and vagina. The colposcope stays outside of the body and has magnifying lenses (like binoculars). When the doctor looks through the colposcope, he or she can see the vaginal walls and the surface of the cervix closely and clearly. Sometimes a weak solution of acetic acid (similar to vinegar) or iodine is applied to make any abnormal areas easier to see. Using a colposcope to look at the vagina is called vaginoscopy.

Colposcopy itself is no more painful than a speculum exam and can be done safely even if you are pregnant. If an abnormal area is seen on the cervix or vagina, a biopsy will be done. The biopsy can be slightly painful and may cause some pelvic cramping.

Biopsy

Certain signs and symptoms may strongly suggest vaginal cancer, but many of them can be caused by conditions that aren't cancer. The only way to be certain that cancer is present is to do a biopsy. In this procedure, a small piece of tissue from the suspicious area is removed and examined under the microscope. A pathologist (a doctor specializing in diagnosing diseases by laboratory tests) will look at the tissue sample under a microscope to see if cancer or a pre-cancerous condition is present and, if so, what type it is.

Imaging tests

Chest x-ray

If vaginal cancer is diagnosed, a plain x-ray of your chest may be done to see if your cancer has spread to your lungs. This is very unlikely unless your cancer is far advanced. This x-ray can be done in any outpatient setting.

Computed tomography (CT)

The CT scan is an x-ray procedure that produces detailed cross-sectional images of your body. Instead of taking one picture, as does a conventional x-ray, a CT scanner takes many pictures as it rotates around you. A computer then combines these pictures into an image of a slice of your body (think of a loaf of sliced bread). The machine will take pictures of multiple slices of the part of your body that is being studied.

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 take longer than regular x-rays and you will need to lie still on a table while they are being done. Also, you might feel a bit confined by the ring-like equipment you're in when the pictures are being taken.

A CT scan can provide information about the size, shape, and position of a tumor, and can be helpful to see if the cancer has spread to other organs. It can also help find enlarged lymph nodes that might have cancer cells.

CT scans can also be used to precisely guide a biopsy needle into a suspected area of cancer spread. For this procedure, called a CT-guided needle biopsy, you remain on the CT scanning table while a doctor moves a biopsy needle toward the mass. CT scans are repeated until the doctor is sure that the needle is inside 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 removed and looked at under a microscope.

Magnetic resonance imaging (MRI)

MRI scans use radio waves and strong magnets instead of x-rays. The energy from the radio waves is absorbed and then released in a pattern formed by the type of tissue and by certain diseases. A computer translates the pattern of radio waves given off by the tissues into a very detailed image of parts of the body. Not only does this produce cross sectional slices of the body like a CT scanner, it can also produce slices that are parallel with the length of your body.

Sometimes a contrast material is injected into a vein to help better see some structures in the body. The contrast used for MRI is different than the one used for CT, so being allergic to one does not mean that you are allergic to the other. MRI scans are a little more uncomfortable than CT scans. First, they take longer -- often up to an hour. Also, you have to be placed inside a tube, which is confining and can upset people with claustrophobia (a fear of close spaces). Newer, “open MRI” machines can help people with this fear. The machine also makes a thumping noise that many people find annoying. Some places will provide headphones with music to block this out.

MRI images are particularly useful in examining pelvic tumors. They may often detect enlarged lymph nodes in the groin. They are also helpful in detecting cancer that has spread to the brain or spinal cord. This rarely occurs in vaginal cancer.

Positron emission tomography

Positron emission tomography (PET) uses glucose (a form of sugar) that contains a radioactive atom. Because cancers use glucose at a higher rate than normal tissues, the radioactivity tends to concentrate in the cancer. A special camera is used to detect the radioactivity. This test can be helpful for spotting collections of cancer cells, and can be useful to see if the cancer has spread to lymph nodes. PET scans are also 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 they scan your whole body. Special machines that combine a CT scan and a PET scan can even better pinpoint the tumor. PET scans are not often used in vaginal cancer, but they may be helpful in finding areas of cancer spread.

Endoscopic tests

These tests are not often used to evaluate women with vaginal cancer.

Proctosigmoidoscopy

Proctosigmoidoscopy is a procedure that looks at the rectum and part of the colon. It is done to check for spread of vaginal cancer to the rectum or colon. In this procedure a slender, flexible, hollow, lighted tube is placed into the rectum. Any areas that look suspicious will be biopsied. This test may be somewhat uncomfortable, but it should not be painful. Proctosigmoidoscopy may be recommended for patients whose vaginal cancers are large and/or located in the part of the vagina next to the rectum and colon.

Cystoscopy

Cystoscopy is a procedure that looks at the inside of the bladder. It is done to check for spread of vaginal cancer to the bladder. This procedure can be done in the doctor's office or clinic. You may be given an intravenous medication to make you drowsy. A thin tube with a lens and light is inserted into the bladder through the opening called the urethra. If suspicious areas or growths are seen, a biopsy will be done. Cystoscopy may be recommended if a vaginal cancer is large and/or located in the front wall of the vagina, near the bladder.

How is vaginal cancer staged?

The FIGO/AJCC system for staging vaginal cancer

Staging is the process of finding out how far the cancer has spread. It is very important because your treatment options and the outlook for your recovery and survival (prognosis) depend on the stage of your cancer.

The stage of most vaginal cancers is most often described using the *FIGO* (International Federation of Gynecology and Obstetrics) System of Staging combined with the American Joint Committee on Cancer (AJCC) TNM system. This system classifies the diseases in Stages 0 through IV depending on the extent of the tumor (T), whether the cancer has spread to lymph nodes (N) and whether it has spread to distant sites (M for metastasis). The system described here is the most recent AJCC system, which went into effect January 2010. Any differences between the AJCC system and the FIGO system are explained in the text.

Vaginal cancer is staged clinically, which means that staging doesn't take into account what is found during surgery.

These systems are not used to stage vaginal melanoma, which is staged like melanoma of the skin. Information about melanoma staging can be found in our document called *Melanoma Skin Cancer*.

Tumor extent (T)

Tis: Cancer cells are only in the most superficial layer of cells of the vagina without growth into the underlying tissues. This stage is also called *carcinoma in situ* (CIS) or vaginal *intraepithelial neoplasia 3* (VAIN 3). It is not included in the FIGO system.

T1: The cancer is only in the vagina.

T2: The cancer has grown through the vaginal wall, but not as far as the pelvic wall.

T3: The cancer is growing into the pelvic wall.

T4: The cancer is growing into the bladder or rectum or is growing out of the pelvis.

Lymph node spread of cancer (N)

N0: The cancer has not spread to lymph nodes

N1: The cancer has spread to lymph nodes in the pelvis or groin (inguinal region)

Distant spread of cancer (M)

M0: The cancer has not spread to distant sites

M1: The cancer has spread to distant sites.

Stage grouping

Once the T, N, and M categories have been assigned, this information is combined to assign an overall stage in a process called stage grouping. The stages identify tumors that have a similar outlook and are treated in a similar way.

Stage 0 (Tis, N0, M0): In this stage, cancer cells are only in the top layer of cells lining the vagina (the epithelium) and have not grown into the deeper layers of the vagina. Cancers of this stage cannot spread to other parts of the body. Stage 0 vaginal cancer is also called *carcinoma in situ* (CIS) or *vaginal intraepithelial neoplasia 3* (VAIN 3). This stage is not included in the FIGO system.

Stage I (T1, N0, M0): The cancer has grown through the top layer of cells but it has not grown out of the vagina and into nearby structures (T1). It has not spread to nearby lymph nodes (N0) or to distant sites (M0).

Stage II (T2, N0, M0): The cancer has spread to the connective tissues next to the vagina but has not spread to the wall of the pelvis or to other organs nearby (T2). (The pelvis is the internal cavity that contains the internal female reproductive organs, rectum, bladder, and parts of the large intestine.) It has not spread to nearby lymph nodes (N0) or to distant sites (M0).

Stage III: Either of the following:

T3, any N, M0: The cancer has spread to the wall of the pelvis (T3). It may (or may not) have spread to nearby lymph nodes (any N), but it has not spread to distant sites (M0).

OR

T1 or T2, N1, M0: The cancer is in the vagina (T1) and it may have grown into the connective tissue nearby (T2). It has spread to lymph nodes nearby (N1), but has not spread to distant sites (M0).

Stage IVA (T4, Any N, M0): The cancer has grown out of the vagina to organs nearby (such as the bladder or rectum) (T4). It may or may not have spread to lymph nodes (any N). It has not spread to distant sites (M0).

Stage IVB (Any T, Any N, M1): Cancer has spread to distant organs such as the lungs (M1).

Survival rates for vaginal cancer

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.

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).

Five-year disease specific survival rates assume that some people will die of other causes and only count the deaths from the cancer itself. This is a more accurate way to describe the prognosis for patients with a particular type and stage of cancer.

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 vaginal 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 overall health, the treatment they receive, 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 numbers below come from the National Cancer Institute's SEER database, and are based on women with vaginal cancer (any type) who were diagnosed between 1990 and 2004.

Survival rates for vaginal cancer, by stage

AJCC Stage	5-Year Disease Specific Survival Rate
I	84%
II	75%
III and IV	57%

How is vaginal 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

After the diagnostic tests are done, your cancer care team will recommend a treatment plan. Don't feel rushed about considering your options. If there is anything you do not understand, ask to have it explained again. The choice of treatment depends on the type of cancer and stage of the disease when it is diagnosed.

Other factors might play a part in choosing the best treatment plan. These could include your age, your overall state of health, whether you plan to have more children, and other personal considerations. Be sure you understand all the risks and side effects of the various therapies before making a decision about treatment.

You may want to get a second opinion. This can provide more information and help you feel confident about the treatment plan you choose. Some insurance companies require a second opinion before they will pay for treatments.

Invasive vaginal cancer is treated mainly with radiation therapy and surgery. Chemotherapy in combination with radiation may be used to treat advanced disease (see the "Chemotherapy" section). Some other treatments are available to treat pre-cancers of the vagina (vaginal epithelial neoplasia, VAIN).

Whenever possible, treatment is given with the goal of completely removing or destroying the cancer. If a cure is not possible, removing or destroying much of the cancer in order to prevent the tumor from growing, spreading, or returning for as long as possible is important. If the cancer has spread widely, the main goal of treatment is

palliation (relieving pain, blockage of the urinary or intestinal system, or other symptoms).

Laser surgery for vaginal cancer

In this treatment, a beam of high-energy light is used to vaporize the abnormal tissue. This is a very effective treatment for VAIN, and works well for large lesions. However, this is not a treatment for invasive cancer. For laser surgery to be an option, the doctor must be certain that the worst lesion was biopsied and that invasive cancer is not a concern.

Topical therapy for vaginal cancer

Topical therapy puts the drug directly onto the cancer. This is another way to treat VAIN, but is not used to treat invasive vaginal cancer.

One choice is to apply the chemotherapy drug, fluorouracil (5-FU), directly to the lining of the vagina. This is repeated weekly for about 10 weeks or given nightly for 1 to 2 weeks. This treatment has drawbacks. It can cause severe vaginal and vulvar irritation. Also, it may not work as well using the laser or simply removing the lesion with surgery.

A second drug that can be used topically is called imiquimod. This drug comes in a cream to be applied to the area of VAIN. Imiquimod is not chemotherapy drug. Instead, it acts by boosting the body's immune response to the area of abnormal tissue. This treatment has led to improvement of VAIN (the lesions changed from VAIN 2 or 3 to VAIN 1). In some women, it has caused VAIN to go away completely.

Radiation therapy for vaginal cancer

Radiation therapy uses high-energy rays (such as gamma rays or x-rays) and particles (such as electrons, protons, or neutrons) to kill cancer cells. In treating vaginal cancers, radiation is delivered from outside the body in a procedure that is much like having a diagnostic x-ray. This is called *external beam radiation therapy*. It is sometimes used along with chemotherapy to treat more advanced cancers to shrink them so they can be removed with surgery. Radiation alone may be used to treat lymph nodes in the groin and pelvis.

Another way to deliver radiation is to place radioactive material inside the vagina. This is called *intracavitary brachytherapy* or *internal radiation therapy*. The 2 main types of intracavitary brachytherapy are low-dose rate and high-dose rate. For the low-dose rate treatment, the radioactive material is inside a cylindrical container that is placed in the vagina and stays in place for a day or 2. Although gauze packing helps hold the cylinder in place, you have to remain in bed (in the hospital) during the treatment. With high dose-rate intracavitary brachytherapy, the radiation source doesn't need to stay in place for long. This allows it to be given in an outpatient setting. Three or four treatments are given 1 or 2 weeks apart. With these intracavitary methods, radiation mainly affects the tissue in contact with the cylinder. This lessens the chance of bladder and bowel side effects.

Another type of brachytherapy, called *interstitial radiation*, uses radioactive material inside needles that are placed directly into the cancer and surrounding tissues.

Vaginal cancer is most often treated with a combination of external and internal radiation with or without low doses of chemotherapy.

Side effects of radiation therapy

Radiation can destroy nearby healthy tissue along with the cancerous cells. Side effects depend on the area being treated, the amount of radiation, and the way that the radiation is given. Side effects tend to be more severe for external beam radiation than for brachytherapy.

Common side effects of radiation therapy include tiredness, upset stomach, or loose bowels. Serious fatigue, which may not occur until about 2 weeks after treatment begins, may also occur. When radiation is given to the pelvis, diarrhea is common, but can usually be controlled with over-the-counter medicines. Nausea and vomiting may also occur, but can be treated with medicines. These side effects tend to be worse when chemotherapy is given with radiation. Pelvic radiation can also lead to premature menopause. Radiation to the pelvis can also weaken the bones, making them more likely to break from a fall or other trauma.

Skin changes can also be a side effect of radiation. These may range from mild temporary redness to permanent discoloration. The skin may become raw and tender. It may also release fluid, making infection more likely, so care must be taken to clean and protect the area exposed to radiation.

Radiation to the pelvis can also cause severe irritation of the intestines and rectum (called *radiation colitis*), leading to diarrhea and bloody stool. If severe, radiation colitis can cause holes or tears forming in the intestines (called *perforations*).

Pelvic radiation can also cause problems with the bladder (*radiation cystitis*), leading to discomfort and an urge to urinate often. In rare cases, radiation can cause abnormal connections to form between the vagina and the bladder, rectum, or uterus (these are called *fistulas*).

Radiation can cause the normal tissue of the vagina to become irritated and sore. It may also cause scar tissue to form in the vagina. The scar tissue can make the vagina shorter or more narrow (this is called vaginal stenosis). When this happens, sex (vaginal intercourse) can become painful. Stretching the walls of the vagina a few times a week can help prevent this problem.

One way to do this is to have vaginal intercourse at least 3 to 4 times a week. Since this may be hard to do while getting cancer treatment, another option is to use a vaginal dilator. A dilator is a plastic or rubber tube used to stretch out the vagina. It feels much like putting in a large tampon for a few minutes. Even if a woman is not interested in staying sexually active, keeping her vagina normal in size allows comfortable gynecologic exams. This is an important part of follow-up after treatment. Vaginal estrogens may also be used to relieve dryness, painful intercourse and help maintain the

size of the vagina. Still, vaginal dryness and pain with intercourse can be long-term side effects from radiation.

Surgery for vaginal cancer

Surgery is usually only used for small stage I tumors and for cancers that were not cured by radiation. Surgery is not often used to treat squamous cell cancers of the vagina, but it is used for sarcomas and melanomas.

The extent of the surgery depends on the size and stage of the cancer.

Local excision

In this procedure, the surgeon removes the cancer along with a surrounding rim of normal tissue. This is sometimes called a *wide excision*. For VAIN, a local excision may be all that is needed. For small stage I cancers, treatment may include a radical wide local excision along with a procedure to evaluate the lymph nodes.

Vaginectomy

Vaginectomy is surgery to remove the vagina. If only part of the vagina is removed, it is called a *partial vaginectomy*. If the entire vagina is removed, it is called a *total vaginectomy*. A radical vaginectomy is when the vagina is removed along with the supporting tissues around it.

Trachelectomy

Vaginal cancer is most often found in the upper part of the vagina (near the cervix), so removing the cancer sometimes means also removing the cervix. If only the cervix is removed (leaving the rest of uterus behind), the operation is called a *trachelectomy*. This operation is rarely used to treat vaginal cancer.

Hysterectomy

Sometimes to remove a vaginal cancer, the uterus and cervix must be removed, as well. This operation is called a *hysterectomy* or total hysterectomy (TH). In operations done for cancer, the connective tissue that surrounds and supports the uterus is often removed as well. In that case, the operation is called a *radical hysterectomy*. In either case, there are 2 major ways to remove the uterus. If it is removed through the vagina it is called a *vaginal hysterectomy* (or VH). If the uterus is removed through an incision in the abdomen, it is called an *abdominal hysterectomy* (or total abdominal hysterectomy; TAH). The approach that is best for you and your cancer will be discussed with you before surgery. The fallopian tubes and ovaries are often removed in the same operation. This procedure is known as a *bilateral salpingo-oophorectomy* (or BSO). You may see the abbreviation TAHBSO, which stands for total abdominal hysterectomy bilateral salpingo-oophorectomy.

Vaginal reconstruction

If all or most of the vagina must be removed, it is possible to reconstruct (rebuild) a vagina with tissue from another part of the body, which will allow a woman to have sexual intercourse. A new vagina can be surgically created out of skin, intestinal tissue, or myocutaneous (muscle and skin) grafts.

A reconstructed vagina produces little or no natural lubricant when a woman becomes sexually excited. A woman should prepare for intercourse by using a lubricating gel inside the vagina. If the vagina was rebuilt using muscle and skin from the leg, touching the new vagina may make a woman feel as though her thigh is being stroked. This is because the walls of the vagina are still attached to their original nerve supply. Over time, these feelings become less distracting and may even become sexually stimulating. (For more information about vaginal reconstruction, see our document, *Sexuality for the Woman With Cancer*.)

Lymphadenectomy

Lymphadenectomy is the removal of lymph nodes. It is sometimes called *lymph node dissection*. For vaginal cancer, lymph nodes from the groin area or from inside the pelvis near the vagina may be removed to check for cancer spread.

Removing lymph nodes in the groin or pelvis can result in poor fluid drainage from the legs. The fluid builds up, leading to leg swelling that is severe and doesn't go down at night when you are lying down. This is called *lymphedema*. Support stockings or special compression devices may help reduce swelling. Women with lymphedema need to be very careful to avoid infection in the affected leg or legs. They can do this by taking these precautions:

- Protect the leg and foot from sharp objects and care for any cuts, scratches, or burns right away
- Avoid sunburn of the affected leg(s) and avoid cutting or tearing the cuticles of the toenails
- Report any redness, swelling, or other signs of infection to the nurse or doctor without delay

More information about lymphedema can be found in our document called *Understanding Lymphedema (For Cancers Other Than Breast Cancer)*.

Pelvic exenteration

Pelvic exenteration is an extensive operation that includes vaginectomy and removing the pelvic lymph nodes, as well as of one or more of the following structures: the lower colon, rectum, bladder, uterus, and cervix. How much has to be removed depends on how far the cancer has spread.

If the bladder is removed, a new way to store and get rid of urine is needed. Usually a short segment of intestine is used to function as a new bladder. This may be connected to the abdominal wall so that urine is drained periodically when the woman places a catheter into a small opening (called a *urostomy*). Or urine may drain continuously into a small plastic bag attached to the front of the abdomen over the opening.

If the rectum and part of the colon are removed, a new way to eliminate solid waste is needed. This is done by attaching the remaining intestine to the abdominal wall so that stool can pass through a small opening (called a *colostomy*) into a small plastic bag worn on the front of the abdomen. Sometimes it's possible to remove a piece of the colon and then reconnect it. In that case, no bags or external appliances are needed.

Pelvic exenteration is rarely needed to treat vaginal cancer – radiation therapy is usually used first, and then less extensive surgery may be all that is needed to control cancer that comes back. Still, this procedure may be used for vaginal cancers that have come back after treatment with radiation therapy. It is also sometimes needed to treat vaginal cancers when radiation therapy cannot be used. This occurs when women were treated with radiation for cervical cancer in the past. That is because treating the same area with radiation more than once can cause severe complications.

Chemotherapy for vaginal cancer

Chemotherapy (chemo) uses anti-cancer drugs that are usually given intravenously (into a vein), by mouth, or applied to the skin in an ointment. Drugs taken by mouth or injected into a vein, called *systemic chemotherapy*, enter the bloodstream to reach throughout the body, making this treatment potentially useful for cancer that has spread to distant sites.

In systemic chemotherapy, the drug enters the bloodstream and circulates throughout the body to reach and destroy the cancer cells. So far, systemic chemotherapy has not been shown to work well in treating vaginal cancer. It may be helpful as a way to shrink tumors before surgery. Chemo is also sometimes given with radiation to make radiation work better.

Systemic chemotherapy can reach cancer cells in just about any place inside the body, but the drugs can also affect some normal, healthy cells. This is what causes some of the side effects of chemotherapy. Careful attention is given to avoiding or reducing the side effects of chemotherapy. These side effects depend on the type and dose of drugs given and the length of time they are taken.

Many of the drugs used in cancer chemotherapy work by attacking cells that are rapidly dividing. This is helpful in killing cancer cells, but these drugs can also affect normal cells, leading to side effects. Side effects of chemotherapy depend on the type of drugs, the amount taken, and the length of time you are treated. Common side effects include:

- Hair loss
- Mouth sores
- Loss of appetite

- Diarrhea
- Nausea and vomiting
- Increased chance of infections (due to low white blood cell counts)
- Easy bruising or bleeding (due to low blood platelets)
- Fatigue (due to low red blood cells)
- Changes in the menstrual cycle, premature menopause, and infertility (inability to become pregnant). Most women with vaginal cancer, however, are postmenopausal

Other side effects can occur depending on what drug is used. For example, cisplatin can cause nerve damage (called *neuropathy*). This can lead to numbness, tingling, or even pain in the hands and feet.

Most side effects are temporary and stop when the treatment is over, but chemo drugs can have some long-lasting or even permanent effects. Ask your cancer care team about the chemo drugs you will receive and what side effects you can expect. Also be sure to talk with them about any side effects you do have so that they can be treated. For example, you can be given medicine to reduce or prevent nausea and vomiting.

In the past, chemotherapy has been mainly used to treat women with advanced cancer. Some doctors suggest that it be given along with radiation for women with less advanced disease (like it is used for cervical cancer). Some small groups of patients have been reported to have been treated this way, but using combined chemo and radiation has not yet been compared to other, more standard treatments in a clinical trial.

When chemo is given, the treatment is similar to that used for cervical cancer. Drugs that have been used include cisplatin, fluorouracil (5-FU), paclitaxel (Taxol[®]), and docetaxel (Taxotere[®]).

Clinical trials for vaginal 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 www.cancer.gov/clinicaltrials.

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 and have it sent to you.

Complementary and alternative therapies for vaginal 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 and type of vaginal cancer

The type of treatment your cancer care team will recommend depends on the type of vaginal cancer you have and how far the cancer has spread. This section summarizes the choices available according to the stage of your cancer.

Vaginal intraepithelial neoplasia (VAIN)

Many cases of low-grade VAIN (VAIN 1) will go away on their own, so some doctors will choose to watch them closely without starting treatment. This means getting repeat Pap tests -- often with colposcopy if needed. If the area of VAIN doesn't go away or gets worse, treatment is started. VAIN 2 is not likely to go away on its own, so treatment is usually started right away.

VAIN is treated using topical therapy (like 5-FU or imiquimod) or laser treatment. Less often, surgery is used to remove the lesion. Surgery may be chosen if other treatments fail or if the doctor wants to be sure that the area isn't invasive cancer. Surgery may involve a wide local excision, removing the abnormal area and a rim of surrounding normal tissue. A partial vaginectomy (removal of part of the vagina) is rarely needed to treat VAIN.

Stage 0 (VAIN 3 or CIS)

The usual treatment options are laser vaporization, removing the affected areas with surgery, and intracavitary radiation.

Topical chemotherapy with 5-FU cream is also an option, but this requires treatment at least weekly for 10 weeks. This treatment can severely irritate the vagina and vulva. Topical immunotherapy with imiquimod may also be used.

If the cancer comes back again after these treatments, surgery (partial vaginectomy) may be needed. The surgeon would remove the entire tumor and enough surrounding normal tissue to ensure that it doesn't come back.

Stage I

Squamous cell cancers: Radiation therapy is used for most stage I vaginal cancers. If the cancer is less than 5 mm thick (about 3/16 inch), intracavitary radiation is used. Interstitial radiation is an option for some tumors, but it is not often used. Intracavitary radiation may be combined with external beam radiation for larger tumors.

Removing part or the entire vagina is an option for some cancers (partial or radical vaginectomy). Reconstructive surgery to create a new vagina after treatment of the cancer is an option if a large portion of the vagina has been removed.

If the cancer is in the upper vagina, it may be treated by a radical hysterectomy, bilateral radical pelvic lymph node removal, and radical or partial vaginectomy.

Following a radical partial or complete vaginectomy, postoperative radiation (external beam) may be used to treat tiny deposits of cancer cells that have spread to lymph nodes in the pelvis.

Adenocarcinomas: For cancers in the upper part of the vagina, the treatment is surgery: a radical hysterectomy, partial or radical vaginectomy, and removal of pelvic lymph nodes. This can be followed by reconstructive surgery if needed or desired. Radiation therapy may be given as well.

For cancers lower down in the vagina, one choice is to give both either interstitial or intracavitary radiation therapy and external radiation beam therapy. The lymph nodes in the groin and/or pelvis are treated with external beam radiation therapy.

Stage II

The usual treatment is radiation, using a combination of brachytherapy and external beam radiation.

Radical surgery (radical vaginectomy or pelvic exenteration) is an option for some patients with stage II vaginal squamous cell cancer if it is small and in the upper vagina. It is also used to treat women who have already had radiation therapy for cervical cancer and who would not be able to tolerate additional radiation without severe damage to normal tissues.

Chemotherapy with radiation may also be used to treat stage II disease.

Giving chemotherapy to shrink the cancer before radical surgery has shown promising results.

Stage III or IVA

The usual treatment is radiation therapy, often with both brachytherapy and external beam radiation. Curative surgery is generally not attempted. Chemotherapy may be combined with radiation to help it work better.

Stage IVB

Since the cancer has spread to distant sites, it cannot be cured. Patients often receive radiation therapy to the vagina and pelvis to improve symptoms and reduce bleeding. . Chemotherapy may also be given, but it has not been shown to help patients live longer. Because there is no accepted treatment for this stage, often the best option is to enroll in a clinical trial.

Recurrent squamous cell cancer or adenocarcinoma of the vagina

If a cancer comes back after treatment it is called recurrent. If the cancer comes back in the same area as it was in the first place, it is called a *local recurrence*. If it comes back in another area (like the liver or lungs), it is called a *distant recurrence*.

A local recurrence of a stage I or stage II vaginal cancer may be treated with radical surgery (such as pelvic exenteration). If the cancer was originally treated with surgery, radiation therapy is an option. Surgery is the usual choice when the cancer has come back after radiation therapy.

Higher-stage cancers are difficult to treat when they recur. They usually cannot be cured by currently available treatments. Care focuses mostly on relieving symptoms, although participation in a clinical trial of new treatments may be helpful.

For a distant recurrence, the goal of treatment is to help the woman feel better. Surgery, radiation, or chemotherapy may be used. Again, a clinical trial is a good option.

Melanoma

Surgery is the main treatment for vaginal melanoma. Because vaginal melanoma is very rare, it hasn't been well studied. Doctors are still not certain about how much tissue needs to be removed to give the best chance of cure. One choice is to remove the cancer and a margin of the normal tissue around it. This is how a melanoma on the skin of an arm or leg would be treated. Another option is to remove the entire vagina and some tissue from nearby organs. Some (or all) of the lymph nodes that drain the area of the tumor are also removed and checked for cancer spread.

There are a few drugs that can be helpful in treating metastatic melanoma, but this disease rarely responds well to chemotherapy. Radiation therapy may also be used for melanoma that has spread. It is most often used for spread to the brain or spinal cord. A

good option for women with metastatic vaginal melanoma is to receive treatment as a part of a clinical trial. For more information on melanoma, see our document called *Melanoma Skin Cancer*, which discusses the biology and treatment of melanoma and the role of lymph node surgery and treatment of advanced disease.

Rhabdomyosarcoma

Treatment of rhabdomyosarcoma is discussed in our document called *Rhabdomyosarcoma*.

More treatment information for vaginal cancer

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 vaginal cancer?

It is important to have honest, open discussions with your cancer care team. They want to answer all of your questions, no matter how minor you might think they are. Among the questions you might want to ask are:

- What kind of vaginal 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?
- Based on what you've learned about my cancer, how long do you think I'll survive?
- What side effects can I expect from my treatment?
- How long will it take me to recover from treatment?
- When can I go back to work after treatment?

- Will I be able to have sex after treatment? What reconstructive surgery, if any, will I need?
- What are the chances that my cancer will come back?
- What should I do to be ready for treatment?
- Should I get a second opinion?

You will no doubt have other questions about your own situation. Be sure to write your questions down so that you 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 be able to answer your questions.

What happens after treatment for vaginal cancer?

For some people with vaginal 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 called *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 called *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 pelvic exams and Pap tests as well as 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.

Treatment can leave vaginal tissue fragile and prone to injury. Follow-up will require examination of these tissues for injury or tightening and scarring. Some women will be

advised to use vaginal dilators, which a woman inserts in her vagina to gently stretch her vaginal tissue to correct any lack of an elastic quality of the tissue. This can improve her vaginal tissue in becoming more elastic and normal over time.

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 called *When Your Cancer Comes Back: Cancer Recurrence* can give you information on how to manage and cope with this phase of your treatment.

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 hospitalized, a copy of the discharge summary that doctors prepare when patients are sent home
- If you had radiation therapy, a copy of your treatment summary
- If you had chemotherapy, a list of your drugs, drug doses, and when you took them

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

Lifestyle changes after vaginal cancer

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 at 1-800-227-2345 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 does having vaginal cancer affect 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 for vaginal cancer 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 vaginal cancer research and treatment?

Research is under way to find new ways to prevent and treat cancer of the vagina. There are some promising new developments.

Oncogenes and tumor suppressor genes

Scientists are learning more about how certain genes called *oncogenes and tumor suppressor genes* control cell growth and how changes in these genes cause normal vaginal cells to become cancerous. The ultimate goal of this research is gene therapy, which replaces the damaged genes in cancer cells with normal genes to stop the abnormal behavior of these cells. For example, scientists have learned that there is an abnormality of chromosome 3 in many vaginal cancers. Better understanding of how this may play a role in the development of the cancer might lead to better treatment.

HPV vaccines

Gardasil, a vaccine against HPV, has been shown to reduce the risk of vaginal cancer. Cervarix, the other HPV vaccine currently available, might also reduce vaginal cancer risk, but this has not been proven.

Radiation therapy

Studies are under way to determine the best way to combine external beam therapy and brachytherapy to treat the cancer and limit damage to normal tissue.

Reconstructive surgery

Surgeons are developing new operations for repairing the vagina after radical surgery.

Chemotherapy

Doctors have found that vaginal cancer does respond to certain types of chemotherapy. Clinical trials will be needed to find out if combining chemotherapy with radiation therapy is better than radiation therapy alone.

Additional resources for vaginal cancer

More information from your American Cancer Society

We have selected some related information that 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)

Sexuality for the Woman With Cancer (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)

Human Papilloma Virus (HPV), Cancer, and HPV vaccines: Frequently Asked Questions

Melanoma Skin Cancer

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

Cancer in the Family: Helping Children Cope with a Parent's Illness

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

National organizations and Web sites*

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

Foundation for Women's Cancer (formerly the Gynecologic Cancer Foundation)

Toll-free number: 1-800-444-4441

Telephone number: 1-312-578-1439

Web site: www.foundationforwomenscancer.org/

National Cancer Institute

Toll-free number: 1-800-422-6237 (1-800-4-CANCER); TYY: 1-800-332-8615

Web site: www.cancer.gov

National Coalition for Cancer Survivorship

Toll free number: 1-888-650-9127

Web site: www.canceradvocacy.org

Centers for Disease Control and Prevention (CDC) DES Update

Toll-free number: 1-888-232-6789

Web site: www.cdc.gov/des

**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.

References: Vaginal cancer detailed guide

American Cancer Society. *Cancer Facts and Figures 2012*. Atlanta, Ga: American Cancer Society; 2012.

Ault KA, Future II study group. Effect of prophylactic human papillomavirus L1 virus-like-particle vaccine on risk of cervical intraepithelial neoplasia grade 2, grade 3, and adenocarcinoma in situ: a combined analysis of four randomised clinical trials. *Lancet*. 2007 Jun 2;369(9576):1861–1868.

Benedetti Panici P, Bellati F, Plotti F, et al. Neoadjuvant chemotherapy followed by radical surgery in patients affected by vaginal carcinoma. *Gynecol Oncol*. 2008 Aug 15. [Epub ahead of print].

Bleeker MC, Hogewoning CJ, Voorhorst FJ, et al. Condom use promotes regression of human papillomavirus-associated penile lesions in male sexual partners of women with cervical intraepithelial neoplasia. *Int J Cancer*. 2003 Dec 10;107(5):804-810.

Castellsagué X, Bosch FX, Muñoz N, Meijer CJ, et al. Male circumcision, penile human papilloma virus infection, and cervical cancer in female partners. *N Engl J Med*. 2002 Apr 1; 346(15):1105-1112.

Centers for Disease Control and Prevention (CDC). FDA licensure of bivalent human papillomavirus vaccine (HPV2, Cervarix) for use in females and updated HPV vaccination recommendations from the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep*. 2010 May 28;59(20):626-629.

Daling JR, Madeleine MM, Schwartz SM, et al. A population-based study of squamous cell vaginal cancer: HPV and cofactors. *Gynecol Oncol* 2002; 84:263–270.

Dalrymple JL, Russell AH, Lee SW, et al. Chemoradiation for primary invasive squamous carcinoma of the vagina. *Int J Gynecol Cancer*. 2004 Jan-Feb;14(1):110–117.

Eifel PJ, Berek JS, Markman MA. Cancer of the Cervix, Vagina and Vulva. In: DeVita VT, Hellman S, Rosenberg SA, eds. *Cancer: Principles and Practice of Oncology*, 8th edition Philadelphia, Pa: Lippincott Williams & Wilkins; 2008:1396–543.

Flannelly G. Preinvasive diseases of the cervix, vagina, and vulva. In: *Gynecologic Cancer: Controversies in Management*. Gershenson D, Gore M, McGuire W, Quinn M, Thomas G, editors. Elsevier Science, pp 79–92. 2004.

FUTURE I/II Study Group, Dillner J, Kjaer SK, Wheeler CM, et al. Four year efficacy of prophylactic human papillomavirus quadrivalent vaccine against low grade cervical, vulvar, and vaginal intraepithelial neoplasia and anogenital warts: randomised controlled trial. *BMJ*. 2010 Jul 20;341:c3493.

Garland SM, Hernandez-Avila M, Wheeler CM, et al. Quadrivalent vaccine against human papillomavirus to prevent anogenital diseases. *N Engl J Med*. 2007;356:1928–1943

Gray RH, Serwadda D, Kong X, Makumbi F, et al. Male circumcision decreases acquisition and increases clearance of high-risk human papillomavirus in HIV-negative men: a randomized trial in Rakai, Uganda. *J Infect Dis*. 2010 May 15;201(10):1455-1462.

Grigsby PW. Vaginal Cancer. In: *Gynecologic Cancer: Controversies in Management*. Gershenson D, Gore M, McGuire W, Quinn M, Thomas G, editors. Elsevier Science, pp 113–118, 2004.

Kosary CL. Cancer of the Vagina. In: Ries LAG, Young JL, Keel GE, Eisner MP, Lin YD, Horner M-J (editors). SEER Survival Monograph: Cancer Survival Among Adults: U.S. SEER Program, 1988-2001, Patient and Tumor Characteristics. National Cancer Institute, SEER Program, NIH Pub. No. 07-6215, Bethesda, MD, 2007.

Lu B, Wu Y, Nielson CM, Flores R, et al. Factors associated with acquisition and clearance of human papillomavirus infection in a cohort of US men: a prospective study. *J Infect Dis*. 2009 Feb 1;199(3):362-371.

Madsen BS, Jensen HL, van den Brule AJ, Wohlfahrt J, Frisch M. Risk factors for invasive squamous cell carcinoma of the vulva and vagina--population-based case-control study in Denmark. *Int J Cancer*. 2008;122:2827–2834.

Paavonen J, Naud P, Salmerón J, Wheeler CM, Chow SN, Apter D, et al. Efficacy of human papillomavirus (HPV)-16/18 AS04-adjuvanted vaccine against cervical infection and precancer caused by oncogenic HPV types (PATRICIA): final analysis of a double-blind, randomised study in young women. *Lancet*. 2009 Jul 25;374(9686):301–314.

PDQ database. Vaginal Cancer. Bethesda, Md: National Cancer Institute; 7/22/2010. Accessed at <http://www.cancer.gov/cancertopics/pdq/treatment/vaginal/HealthProfessional> on April 13, 2011.

Perez CA, Gersell DJ, McGuire WP, Morris M. Vagina. In: Hoskins WJ, Perez CA, Young RC, eds. *Principles and Practice of Gynecologic Oncology*. Philadelphia, Pa: Lippincott Williams & Wilkins; 2000:811–840.

Rotmensch J, Yamada SD. Neoplasms of the vulva and vagina. In: Kufe DW, Pollock RE, Weichselbaum RR, Bast RC, Gansler TS, Holland JF, Frei E. *Cancer Medicine* 6. Hamilton, Ont: BC Decker; 2003. 1769–1777.

Samant R, Lau B, E C, Le T, Tam T. Primary vaginal cancer treated with concurrent chemoradiation using Cis-platinum. *Int J Radiat Oncol Biol Phys*. 2007;69:746-50. Epub 2007 May 18.

Shah CA, Goff BA, Lowe K, Peters WA 3rd, Li CI. Factors affecting risk of mortality in women with vaginal cancer. *Obstet Gynecol*. 2009 May;113(5):1038–1045.

Society of Gynecologic Oncologists Clinical Practice Guidelines: Vaginal cancer. *Oncology*. 1998;12:449–452.

Tobian AA, Serwadda D, Quinn TC, Kigozi G, et al. Male circumcision for the prevention of HSV-2 and HPV infections and syphilis. *N Engl J Med*. 2009 Mar 26;360(13):1298-1309.

Tokudome S, Suzuki S, Ichikawa H, et al. Condom use promotes regression of cervical intraepithelial neoplasia and clearance of human papillomavirus: a randomized clinical trial. *Int J Cancer*. 2004 Oct 20;112(1).

Weiderpass E, Ye W, Tamimi R, Trichopolous D, Nyren O, Vainio H, Adami HO. Alcoholism and risk for cancer of the cervix uteri, vagina, and vulva. *Cancer Epidemiol Biomarkers Prev*. 2001;10:899–901.

Winer RL, Hughes JP, Feng Q, et al. Condom use and the risk of genital human papillomavirus infection in young women. *N Engl J Med*. 2006 Jun 22;354(25):2645-2654.

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