



## CERVICAL CANCER

### What Is Cancer?

Cancer develops when cells in a part of the body begin to grow out of control. Although there are many kinds of cancer, they all start because of out-of-control growth of abnormal cells.

Normal body cells grow, divide, and die in an orderly fashion. During the early years of a person's life, normal cells divide more rapidly until the person becomes an adult. After that, cells in most parts of the body divide only to replace worn-out or dying cells and to repair injuries.

Because cancer cells continue to grow and divide, they are different from normal cells. Instead of dying, they outlive normal cells and continue to form new abnormal cells.

Cancer cells develop because of damage to DNA. This substance is in every cell and directs all its activities. Most of the time when DNA becomes damaged the body is able to repair it. In cancer cells, the damaged DNA is not repaired. People can inherit damaged DNA, which accounts for inherited cancers. Many times though, a person's DNA becomes damaged by exposure to something in the environment, like smoking.

Cancer usually forms as a tumor. Some cancers, like leukemia, do not form tumors. Instead, these cancer cells involve the blood and blood-forming organs and circulate through other tissues where they grow.

Often, cancer cells travel to other parts of the body, where they begin to grow and replace normal tissue. This process is called metastasis. Regardless of where a cancer may spread, however, it is always named for the place it began. For instance, breast cancer that spreads to the liver is still called breast cancer, not liver cancer.

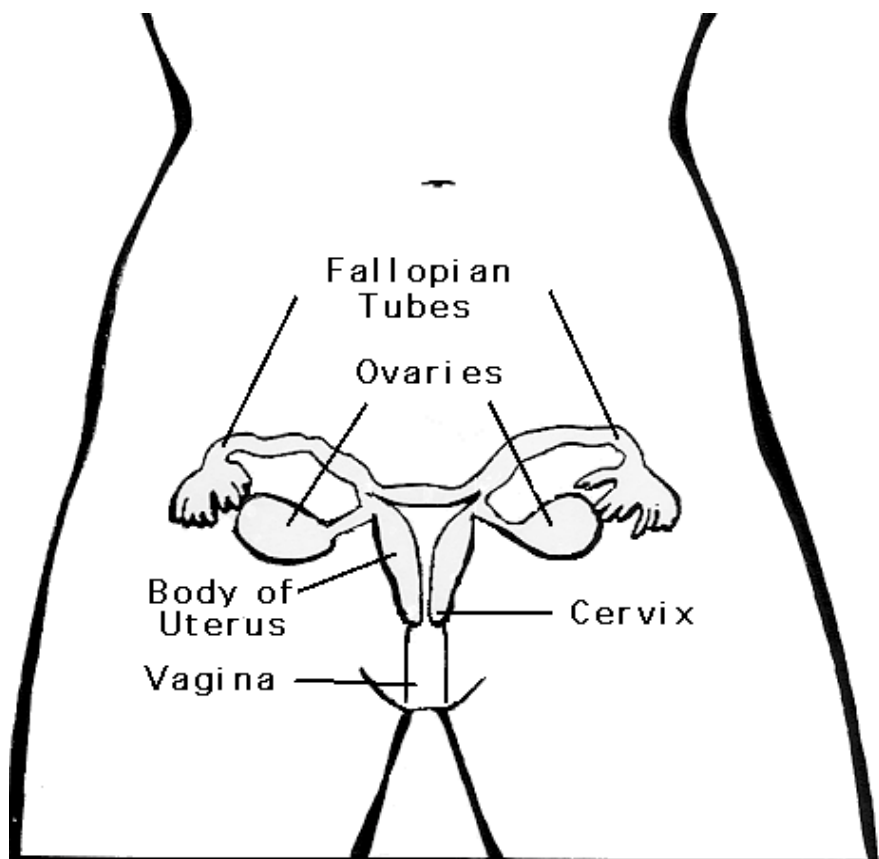
Not all tumors are cancerous. Benign (non-cancerous) tumors do not spread (metastasize) to other parts of the body and, with very rare exceptions, are not life threatening.

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.

Cancer is the second leading cause of death in the United States. Nearly half of all men and a little over one third of all women in the United States will develop cancer during their lifetimes. Today, millions of people are living with cancer or have had cancer. The risk of developing most types of cancer can be reduced by changes in a person's lifestyle, for example, by quitting smoking and eating a better diet. The sooner a cancer is found and treatment begins, the better are the chances for living for many years.

## **What Is Cervical Cancer?**

The cervix is the lower part of the uterus (womb). The upper part, or body, of the uterus, is where a fetus grows. The cervix connects the body of the uterus to the vagina (birth canal). The part of the cervix closest to the body of the uterus is called the endocervix. The part next to the vagina is the ectocervix. Most cervical cancers start where these 2 parts meet.



Cancer of the cervix (also known as cervical cancer) begins in the lining of the cervix. Cervical cancers do not form suddenly. Normal cervical cells gradually develop pre-cancerous changes that turn into cancer. Doctors use several terms to describe these pre-cancerous changes, including cervical intraepithelial neoplasia (CIN), squamous intraepithelial lesion (SIL), and dysplasia.

There are 2 main types of cervical cancers: *squamous cell carcinoma* and *adenocarcinoma*. Cervical cancers and cervical precancers are classified by how they look under a microscope. About 80% to 90% of cervical cancers are squamous cell carcinomas, which are composed of cells that resemble the flat, thin cells called squamous cells that cover the surface of the endocervix. Squamous cell carcinomas most often begin where the ectocervix joins the endocervix.

The remaining 10% to 20% of cervical cancers are adenocarcinomas. Adenocarcinomas are becoming more common in women born in the last 20 to 30 years. Cervical adenocarcinoma develops from the mucus-producing gland cells of the endocervix. Less commonly, cervical cancers have features of both squamous cell carcinomas and adenocarcinomas. These are called adenosquamous carcinomas or mixed carcinomas.

Only some women with pre-cancerous changes of the cervix will develop cancer. This process usually takes several years but sometimes can happen in less than a year. For most women, pre-cancerous cells will remain unchanged and go away without any treatment. But if these precancers are treated, almost all true cancers can be prevented. Pre-cancerous changes and specific types of treatment for precancers are discussed in the section, "Can Cervical Cancer Be Prevented?"

Precancerous changes can be separated into different categories based on how the cells of the cervix look under a microscope. These categories are discussed in the section, "Can Cervical Cancer Be Prevented?"

### **What Are the Key Statistics About Cervical Cancer?**

The American Cancer Society estimates that in 2007, about 11,150 cases of invasive cervical cancer will be diagnosed in the United States. Some researchers estimate that non-invasive cervical cancer (carcinoma in situ) is about 4 times more common than invasive cervical cancer.

About 3,670 women will die from cervical cancer in the United States during 2007. Cervical cancer was once one of the most common causes of cancer death for American women. Between 1955 and 1992, the number of cervical cancer deaths in the United States dropped by 74%. The main reason for this change is the increased use of the Pap test. This screening procedure can find changes in the cervix before cancer develops. It can also find early cancer in its most curable stage. The death rate from cervical cancer continues to decline by nearly 4% a year.

Cervical cancer tends to occur in midlife. Half of women diagnosed with this cancer are between the ages of 35 and 55. It rarely occurs in women younger than 20. Although cervical cancer does affect young women, many older women do not realize that the risk of developing cervical cancer is still present as they age. Slightly over 20% of women with cervical cancer are diagnosed when they are over 65. It is important for older women to continue having regular Pap tests at least until age 70, and possibly longer. See the section, "Can Cervical Cancer Be Prevented?" for more specific information on current American Cancer Society screening recommendations.

Cervical cancer occurs most often in Hispanic women; the rate is over twice that in non-Hispanic white women. African-American women develop this cancer about 50% more often than non-Hispanic white women.

The 5-year relative survival rate for the earliest stage of invasive cervical cancer is 92%. The overall (all stages combined) 5-year survival rate for cervical cancer is about 72%.

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* exclude patients dying of other diseases. This means that anyone who died of another cause, such as heart disease, is not counted.

Keep in mind that 5-year survival rates are based on patients diagnosed and initially treated more than 5 years ago. Improvements in treatment often result in a more favorable outlook for recently diagnosed patients.

## **What Are the Risk Factors for Cervical Cancer ?**

A risk factor is anything that increases 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 cancers of the lung, mouth, larynx, bladder, kidney, and several other organs. But having a risk factor, or even several, does not mean that you will get the disease.

Several risk factors increase your chance of developing cervical cancer. Women without any of these risk factors rarely develop cervical cancer. Although these risk factors increase the odds of developing cervical cancer, many women with these risks do not develop this disease. When a woman develops cervical cancer or precancerous changes, it is not possible to say with certainty that a particular risk factor was the cause.

In thinking about the following risk factors, it helps to focus on those that you can change or avoid (smoking, for example, or sexual behaviors that can lead to human papilloma virus infection), rather than those that you cannot (such as your age and family history). However, it is still important to know about risk factors that cannot be changed, because it's even more important for women with these factors to get regular Pap tests to detect cervical cancer early.

Cervical cancer risk factors include:

**Human papilloma virus infection:** The most important risk factor for cervical cancer is infection by the human papilloma virus (HPV). Doctors believe that women must have been infected by this virus before they will develop cervical cancer. HPVs are a group of more than 100 types of viruses called papilloma viruses because some of them can also cause warts, or papillomas, which are non-cancerous (benign) tumors. Certain types, however, cause cancer of the cervix. These are called "high-risk" types of HPV and include HPV 16, HPV 18, HPV 31, HPV 33, and HPV 45, as well as some others. About two thirds of all cervical cancers are caused by HPV 16 and 18.

Other types of HPVs cause different types of warts in different parts of your body. Some types cause common warts on the hands and feet. Other types tend to cause warts on the lips or tongue. Genital HPVs may cause warts to appear on or around the female and male genital organs and the anal area. These HPV types are passed from one person to another during skin-to-skin sexual contact, including vaginal and anal intercourse, and possibly during oral sex.

When HPV occurs on the skin of the external (outer) genital organs and anal area, it often causes raised bumpy warts. These may be barely visible or they may be several inches across. The medical term for genital warts is condyloma acuminatum. Most genital warts are caused by 2 HPV types: HPV 6 and HPV 11. These seldom are linked to cervical cancer and are called "low-risk" types. Other sexually transmitted HPVs have been linked with genital or anal cancers in both men and women.

There is currently no cure or treatment for HPV infection. Many women will have HPV but very few will ever develop cervical cancer. Usually the infection disappears without any treatment, because the woman's immune system has been successful in fighting the virus. In the future, however this problem may disappear, because vaccines have been developed that will prevent infection with HPV. Right now, one vaccine has been approved for use by FDA and it protects against HPV types 16, 18, 6, and 11, but others are in development.

HPV infection usually causes no symptoms. However, the warts and abnormal cell growth caused by HPV can be treated effectively.

Precancerous changes in the cervix are diagnosed when abnormal cells are found with a Pap test or biopsy (these are discussed further in the section, "Can Cervical Cancer Be Prevented?"). HPV infection causes changes in cells of the cervix that can be found by the Pap test. New tests can identify HPVs by finding their DNA in the cells. Many doctors are now testing for HPV if the Pap test result is mildly abnormal (doctors refer

to these findings as atypical squamous cells, or ASC). If a high-risk type of HPV is present, they will do a colposcopy and consider further treatment.

Certain types of sexual behavior increase a woman's risk of getting HPV infection:

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

HPV infection occurs mainly in young women and is less common in women over 30. The reason for this is not known. Uncircumcised men are thought to be more likely to harbor the virus. HPV can be present for years with no symptoms, and HPV infection does not always cause warts or other symptoms; so you can be infected with HPV and pass it on without knowing it. Recent studies show that condoms ("rubbers"), while they do provide some protection, do not completely protect against HPV. This is because HPV can be passed from person to person by skin-to-skin contact with any HPV-infected area of the body, such as skin of the genital or anal area not covered by the condom. The absence of visible warts cannot be used to decide whether caution is needed, because HPV can be passed to another person even when there are no visible warts or other symptoms.

Although condoms do not completely protect against HPV, it is still important to use condoms to protect against AIDS and other sexually transmitted illnesses that are passed on through some body fluids.

Although it is necessary to have had HPV for cervical cancer to develop, most women with this virus do not develop cancer. Doctors feel that other factors must come into play for cancer to develop. Some of the known factors are listed below.

**Smoking:** Women who smoke are about twice as likely as non-smokers to get cervical cancer. Smoking exposes the body to many cancer-causing chemicals that affect more than the lungs. These harmful substances

are absorbed by the lungs and carried in the bloodstream throughout the body. Tobacco by-products have been found in the cervical mucus of women who smoke. Researchers believe that these substances damage the DNA of cells in the cervix and may contribute to the development of cervical cancer.

**Human immunodeficiency virus (HIV) infection:** HIV is the virus that causes acquired immunodeficiency syndrome (AIDS). Because this virus damages the body's immune system, it makes women more at risk for HPV infections, which may increase the risk of cervical cancer. Scientists believe that the immune system is important in destroying cancer cells and slowing their growth and spread. In women infected with HIV, a cervical precancer might develop into an invasive cancer faster than it normally would.

**Chlamydia infection:** Chlamydia is a relatively common kind of bacteria that can infect the female reproductive system. It is spread by sexual contact. Although infection may cause symptoms, many women do not know they are infected unless samples taken at the time of their Pap test are analyzed for this type of bacteria.

Some recent studies suggest that women whose blood test results show past or current chlamydia infection are at greater risk for cervical cancer than are women with a negative blood test. Although further studies are needed to confirm this finding, there is already good reason to avoid this infection and to have it treated with antibiotics promptly after diagnosis. Long-term chlamydia infection is well known as a cause of pelvic inflammation that can lead to infertility.

**Diet:** Women with diets low in fruits and vegetables may be at increased risk for cervical cancer. Also overweight women are more likely to develop this cancer.

**Oral contraceptives (birth control pills):** There is evidence that long-term oral contraceptive (OC) use increases the risk of cancer of the cervix. Some research suggests a relationship between using OCs for 5 or more years and an increase in the risk of cervical cancer. In one study the risk was increased fourfold in women who used OCs longer than 10 years.

In the meantime, the American Cancer Society believes that a woman and her doctor should discuss whether the benefits of using OCs outweigh this very slight potential risk. A woman with multiple sexual partners should use condoms to lower her risk of sexually transmitted illnesses no matter what other form of contraception she uses.

**Multiple pregnancies:** Women who have had many full-term pregnancies have an increased risk of developing cervical cancer. No one really knows why this is, but it has been proven beyond doubt by large studies. One theory is this may be because some of the women may have had a higher exposure to HPV. Also, studies have pointed to hormonal changes during pregnancy as possibly making women more susceptible to HPV infection or cancer growth. Another thought is that the immune system of pregnant women might be weaker, allowing for HPV infection and cancer growth.

**Low socioeconomic status:** Low socioeconomic status is also a risk factor for cervical cancer. Many women with low incomes do not have ready access to adequate health care services, including Pap tests. This means they may not get treated for precancerous cervical disease.

**Diethylstilbestrol (DES):** DES is a hormonal drug that was prescribed between 1940 and 1971 for some women thought to be at increased risk for miscarriages. Of every 1,000 women whose mother took DES when pregnant with them, about 1 develops clear-cell adenocarcinoma of the vagina or cervix. Stated another way, about 99.9% of "DES daughters" do not develop these cancers.

Clear cell adenocarcinomas are 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. The average age at diagnosis of DES-related clear-cell adenocarcinoma is 19 years. Most DES daughters are now between 35 and 65, so the number of new cases of DES-related cervical and vaginal clear-cell adenocarcinoma has been decreasing during the past 2 decades. However, this type of cancer has recently been found in a woman in her early 40s, and doctors still do not know exactly how long women remain at risk for DES-related cancers.

Although DES daughters have an increased risk of developing clear cell carcinomas, about 40% of women with this cancer have not been exposed to DES or related medications. Some of these patients' mothers might have taken DES but did not recall the name of the drug. It is certain, however, that women don't have to be exposed to DES for clear cell carcinoma to develop since some cases of the disease were diagnosed before DES was invented. Some studies suggest that DES daughters are also at somewhat increased risk of developing squamous cell cancer of the cervix and precancerous changes of cervical squamous cells.

**Family history of cervical cancer:** Cervical cancer may run in some families. If your mother or sister had cervical cancer, your chances of developing the disease are increased by 2 to 3 times. Some researchers suspect that some instances of this familial tendency are caused by an inherited condition that makes some women less able to fight off HPV infection than others. In other instances, women from the same family as a patient already diagnosed may be more likely to have one or more of the other non-genetic risk factors previously described in this section.

## Do We Know What Causes Cervical Cancer?

In recent years, scientists have made much progress toward understanding the steps that take place in cells of the cervix when cancer develops. In addition, they have identified several risk factors that increase the odds that a woman might develop cervical cancer.

The development of normal human cells mostly depends on the information contained in the cells' chromosomes. Chromosomes are large molecules of DNA. DNA is the chemical that carries the instructions for nearly everything our cells do. We usually resemble our parents because they are the source of our DNA. However, DNA affects more than our outward appearance.

During the past few years, scientists have made great progress in understanding how certain changes in DNA can cause normal cells to become cancerous.

Some genes (packets of our DNA) contain instructions for controlling when our cells grow and divide. Certain genes that promote cell division are called *oncogenes*. Others that slow down cell division or cause cells to die at the right time are called *tumor suppressor genes*. Cancers can be caused by DNA mutations (gene defects) that turn on oncogenes or turn off tumor suppressor genes. Scientists now think that HPV causes the production of 2 proteins known as E6 and E7. When these are produced, they turn off some tumor suppressor genes. This may allow uncontrolled growth of the cervical lining cells, which in some cases will lead to cancer.

But HPV does not completely explain what causes cervical cancer. Most women with HPV don't get cervical cancer, and certain other risk factors influence which women exposed to HPV are more likely to develop cervical cancer.

**Smoking:** Smoking produces cancer-causing chemicals that damage the DNA of cervical cells and contribute to the development of cancer.

**Immune system deficiency:** Another possible cause is immune system deficiency. Our immune system helps keep us free of cancer. HIV (the AIDS virus) infection makes a woman's immune system less able to fight HPV and early cervical cancers.

## Can Cervical Cancer Be Prevented?

Since the most common form of cervical cancer starts with precancerous changes, there are 2 ways to stop this disease from developing. The first way is to prevent the precancers, and the second is to find and treat precancers before they become cancerous.

### Avoiding Risk Factors

You can prevent most precancers of the cervix by avoiding exposure to HPV. Delaying having sexual intercourse if you are young can help you avoid HPV. Limiting your number of sexual partners and avoiding sex with people who have had many other sexual partners lower your risk of exposure to HPV. Remember that HPV does not always cause warts or other symptoms, so a person may have the virus and pass it on without knowing it.

Condoms provide some protection. A recent study found that condoms ("rubbers") can protect against HPV. Although the protection is not complete, condoms reduced the infection rate by about 70%. That only occurred if condoms were always used and used correctly and consistently. Condoms do not protect completely because HPV can be passed from person to person through skin-to-skin contact with any HPV-infected area of the body, such as skin of the genital or anal area not covered by the condom. Even if there are no visible warts or other symptoms, a person with HPV can still pass on the virus to another person. HPV can be present for years with no symptoms.

Still, condoms may provide some protection against HPV, and they also protect against HIV and other sexually transmitted diseases that are passed on through some body fluids. Not smoking is another important way to reduce the risk of cervical precancer and cancer.

**Vaccines:** Vaccines have been developed that can immunize people against HPV. So far, vaccines that protect against types 6 and 11 and types 16 and 18 have been shown to be effective in preventing genital warts caused by 6 and 11 and preventing the cervix cell changes caused by types 16 and 18. This vaccine can only be used to prevent HPV infection -- before an abnormal Pap test develops -- and not to treat an existing infection.

The vaccine, called Gardasil, has been approved by the FDA and should be covered by most insurers, as well as by government programs that pay for vaccinations in children under 18.

To be most effective, the HPV vaccine should be given before a person becomes sexually active. The Federal Advisory Committee on Immunization Practices (ACIP) has recommended that the vaccine be routinely given to females aged 11 to 12 and as early as age 9 years at the discretion of doctors. The committee also recommended women ages 13 to 26 who have not yet been vaccinated receive "catch-up" vaccinations. The American Cancer Society also recommends that the vaccine be routinely given to females aged 11 to 12 and as early as age 9 years at the discretion of doctors. The independent panel making the Society recommendations concluded there was insufficient evidence of benefit to recommend catch-up vaccination of all women age 19 to 26 years. As a result, the Society recommends "catch-up" vaccinations for females ages 13 to 18 only, and that women aged 19 to 26 talk to their health care provider about whether to get the vaccine, based on the risk of previous HPV exposure and potential benefit from vaccination.

The vaccine requires a series of 3 injections over a one-year period. The second injection is given about 2 months after the first one, and the third is given 4 months after the second. The cost of the vaccine is around \$360 and this cost does not include the doctor's fee or the cost of giving injections.

It is important to realize that the vaccine doesn't protect against all cancer-causing types of HPV, so Pap tests are still necessary. One other benefit is that the vaccine protects against the 2 viruses that cause 90% of genital warts.

For more information on the vaccine and HPV, please see our document, *Human Papilloma Virus: Questions and Answers*.

### **Finding Precancerous Changes**

The second way to prevent cervix cancer is to have testing (including a Pap test) to detect HPV and precancers. Treatment of precancers can stop cervical cancer before it is fully developed. Most invasive cervical cancers are found in women who have not had regular Pap tests.

### **The American Cancer Society recommends the following guidelines for early detection:**

- All women should begin cervical cancer testing (screening) about 3 years after they begin having vaginal intercourse, but no later than when they are 21 years old. Testing should be done every year with the regular Pap test or every 2 years using the newer liquid-based Pap test.
- Beginning at age 30, women who have had 3 normal Pap test results in a row may get tested every 2 to 3 years with either the conventional (regular) or liquid-based Pap test. Women who have certain risk factors such as diethylstilbestrol (DES) exposure before birth, HIV infection, or a weakened immune system due to organ transplant, chemotherapy, or chronic steroid use should continue to be tested yearly.
- Another reasonable option for women over 30 is to get tested every 3 years (but not more frequently) with either the regular Pap test or liquid-based Pap test, plus the HPV DNA test (see below for more information on this 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 testing. Women with a history

of cervical cancer, DES exposure before birth, HIV infection, or a weakened immune system should continue to have testing as long as they are in good health.

- Women who have had a total hysterectomy (removal of the uterus and cervix) may also choose to stop having cervical cancer testing, unless the surgery was done as a treatment for cervical cancer or precancer. Women who have had a hysterectomy without removal of the cervix (simple hysterectomy) should continue to follow the guidelines above.

Some women believe that they do not need exams by a health care professional once they have stopped having children. This is not correct. They should continue to follow American Cancer Society guidelines.

Although the Pap test has been more successful than any other screening test in preventing a cancer, it is not perfect. One of its limitations is that Pap tests are examined by humans, so an accurate analysis of the hundreds of thousands of cells in each sample is not always possible. Engineers, scientists, and doctors are working together to improve this test. Because some abnormalities may be missed (even when samples are examined in the best laboratories), it is not a good idea to have this test less often than American Cancer Society guidelines recommend.

### **Increasing the Accuracy of Your Pap Tests**

There are several things you can do to make your Pap test as accurate as possible:

- Try not to schedule an appointment for a time during your menstrual period.
- Do not douche for 48 hours before the test.
- Do not have sexual intercourse for 48 hours before the test.
- Do not use tampons, birth control foams, jellies, or other vaginal creams or vaginal medications for 48 hours before the test.

### **Pelvic Exam Versus Pap Test**

Many people confuse pelvic exams with Pap tests. The pelvic exam is part of a woman's routine health care.

During a pelvic exam, the doctor looks at and feels the reproductive organs, including the uterus and the ovaries and may screen for sexually transmitted illnesses. But the pelvic exam will not find cervical cancer at an early stage and cannot find abnormal cells of the cervix. The Pap test is usually done just before the pelvic exam,

when the doctor removes cells from the cervix by gently scraping or brushing with a special instrument. Pelvic exams may help find other types of cancers and reproductive problems, but only Pap tests give information on early cervical cancer or precancers.

### How the Pap Test Is Done

Cytology is the branch of science that deals with the structure and function of cells. It also refers to tests to diagnose cancer by looking at cells under the microscope. The Pap test (or Pap smear) is a procedure used to collect cells from the cervix for cervical cytology testing.

The health care professional first places a speculum, a metal or plastic instrument that keeps the vagina open so that the cervix can be seen clearly, inside the vagina. Next, a sample of cells and mucus is lightly scraped from the ectocervix (part next to the vagina) using a small spatula. A small brush or a cotton-tipped swab is used to take a sample from the endocervix (part closest to the body of the uterus). There are 2 main options for preparing the cell samples for testing in the laboratory, where specially trained technologists (cytotechnologists) and doctors (pathologists) look at the samples under a microscope.

The sample can be smeared directly onto a glass microscope slide, which is then sent to the laboratory. For about 50 years, all cervical cytology samples were handled this way. This method works quite well and is relatively inexpensive. However, cells smeared onto the slide are sometimes piled up on each other, so cells at the bottom of the pile cannot be clearly seen. Also, infections of the cervix or vagina may cause inflammatory (pus) cells, increased mucus, yeast cells, or bacteria that hide the cervical cells. Another problem with direct smears is that the cells may become distorted by drying out. Cells can be difficult to examine accurately if they are not treated with alcohol to preserve them immediately after they are spread on the slide.

A newer method called liquid-based cytology, or liquid-based Pap test, can remove some of the mucus, bacteria, yeast, and pus cells in a sample and can spread the cervical cells more evenly on the slide. Instead of being directly placed on a slide, the sample is placed into a special preservative solution. This new method, also known by brand names ThinPrep or AutoCyte, also prevents cells from drying out and becoming distorted. Recent studies show that liquid-based testing can slightly improve detection of cancers, greatly improve detection of precancers (SILs -- described below), and reduce the number of tests that need to be repeated. This method is more expensive than a usual Pap smear.

Another approach to improving the Pap test is the use of computerized instruments that can spot abnormal cells in Pap tests. The AutoPap instrument has been approved by the US Food and Drug Administration (FDA) for retesting Pap test samples that were interpreted as normal by technologists. It is also approved by the FDA for initial testing of Pap tests, instead of testing by a technologist. However, a technologist would still examine all smears identified as abnormal by the AutoPap.

These computerized instruments can find abnormal cells that are sometimes missed by technologists. Most of the abnormal cells found in this way are in rather early stages, such as atypical squamous cells (ASCs), but high-grade abnormalities missed by human testing are sometimes found by the computerized instrument. Scientists do not yet know whether the instrument can find enough high-grade abnormalities missed by human testing to have a significant impact on preventing invasive cervical cancers. Automated testing also increases the cost of the cervical cytology testing.

For now, the most important way to improve early detection of cervical cancer is to make certain that all women are tested according to American Cancer Society guidelines. Unfortunately, many of the women most at risk for cervical cancer are not being tested often enough or at all.

## How Pap Test Results Are Reported

The most widely used system for describing Pap test results is The Bethesda System (TBS). This system has been revised twice since it was developed in 1988 -- first in 1991 and, most recently, in 2001. The information that follows is based on the 2001 version. The general categories are:

- negative for intraepithelial lesion or malignancy
- epithelial cell abnormalities
- other malignant neoplasms

**Negative for intraepithelial lesion or malignancy:** This first category means that no signs of cancer or precancerous changes or other significant abnormalities were found. Some specimens in this category appear entirely normal. Other findings may be unrelated to cervical cancer, such as evidence of reproductive system infections (yeast, herpes, or Trichomonas, for example). Some cases may also show reactive cellular changes, which is a response of cervical cells to infection or other irritation.

**Epithelial cell abnormalities:** The second TBS category, epithelial cell abnormalities, means that the cells of the lining layer of the cervix show changes that might be cancer or a precancerous condition. This category is divided into several groups for squamous cells and glandular cells.

The epithelial cell abnormalities for squamous cells are called:

- Atypical squamous cells (ASCs); these are further divided into ASC-US and ASC-H
- Low-grade squamous intraepithelial lesions (SILs)
- High-grade SILs
- Squamous cell carcinoma

**Atypical squamous cells:** This term is used when it is not possible to tell (from how the cells look under a microscope) whether the abnormal cells are caused by an infection, another cause of irritation, or by a precancer. The Pap test is usually repeated after several months, or other tests, such as colposcopy (explained below) and biopsy may be recommended, depending on the patient's history and the results of previous Pap

tests and whether a high grade SIL is suspected (ASC-H). Most doctors recommend having an HPV test in this situation. If this shows no HPV, then only usual follow-up is needed. If it does show HPV, colposcopy is recommended.

**Squamous intraepithelial lesions (SILs):** These abnormalities are subdivided into low-grade SIL and high-grade SIL. All patients should have colposcopy. High-grade SILs are less likely than low-grade SILs to go away without treatment and are more likely to eventually develop into cancer if they are not treated. However, treatment can cure all SILs and prevent true cancer from developing. A Pap test cannot determine for certain whether a woman has a high- or low-grade SIL. It merely flags the result as fitting into one of these abnormal categories. The need for treatment is based on further testing and examination (see below). The HPV test is less helpful because most of these women will test positive for HPV.

**Squamous cell carcinoma:** This cytology result shows that the woman is likely to have an invasive squamous cell cancer. Further testing will be done to be sure of the diagnosis before doctors recommend treatments such as radiation therapy, chemotherapy, or radical surgery.

The Bethesda System also describes epithelial cell abnormalities for glandular cells. Cancers of the glandular cells are reported as adenocarcinomas. In some cases, the pathologist examining the cells can suggest whether the adenocarcinoma started in the endocervix, in the endometrium (the upper part of the uterus), or elsewhere in the body. When the glandular cells have features that do not permit a clear decision as to whether they are cancerous, the term used is atypical glandular cells. The patient usually undergoes further testing if her cervical cytology result shows atypical glandular cells.

**Other types of cancer:** These can be uncommon forms of cancer such as malignant melanoma, sarcomas, and lymphoma. Compared with squamous cell carcinoma and adenocarcinoma, these cancers affect the cervix very rarely.

### The HPV DNA Test

As mentioned earlier, the most important risk factor for developing cervical cancer is having had the human papillomavirus (HPV). Doctors can now test for the types of HPV that are most likely to cause cervical cancer ("high-risk" types) by looking for pieces of their DNA in cervical cells. The test is done in a similar way to the Pap test in terms of how the sample is collected, and in some cases can even be done on the same sample.

### The HPV DNA test can be used in 2 situations:

- The FDA has approved it for use as a screening test in combination with the Pap test in women over 30 years old (see American Cancer Society screening guidelines above). It does NOT replace the Pap test. It is not recommended as a screening test in women under 30 because the test is not as useful in this population. Women in their 20s who are sexually active are much more likely to have an HPV infection (most of which will go away on their own), so the results of the test are not as significant and may be more confusing. For more information, see the American Cancer Society document, "What Every Woman Should Know About Cervical Cancer and the Human Papilloma Virus."
- The HPV DNA test is also used in women with slightly abnormal Pap test results to find out if more testing or treatment might be needed (see next section).

### Other Tests for Women With Abnormal Cervical Cytology Results

Because the Pap test is a screening test rather than a diagnostic test, if you have an abnormal result, you will need to have other tests (colposcopy and biopsy, and sometimes an endocervical scraping) to find out whether a precancerous change or cancer is present. Nearly all doctors recommend one or more of these tests for women with a Pap result of SIL or atypical glandular cells.

Doctors are less certain about what to do when the result is atypical squamous cells. Some recommend colposcopy and biopsy if ASC-H and less commonly for ASC-US, and others recommend a repeat Pap test after

several months for ASC-US. In making decisions about follow-up, some doctors take into account your previous Pap test results, whether you have any cervical cancer risk factors, whether you have remembered to have Pap tests done in the past, and whether the test result is ASC-H or ASC-US.

Recently, some doctors have started using an intermediate step, testing for HPV. If a high-risk type of HPV is found in women with atypical squamous cells, doctors are more inclined to do a colposcopy for all ages.

Generally, if you have SIL or ASC-H, a colposcopy will be done. If the biopsy shows SIL, or cervical intra-epithelial neoplasia, steps will be taken to prevent an actual cancer from developing.

**Colposcopy:** If certain symptoms suggest cancer or if the Pap test shows abnormal cells, you will need to have an additional test called a colposcopy. In this procedure you will lie on the exam table as you do with a pelvic exam. A speculum is placed in the vagina to expose the cervix. The doctor will use the colposcope to examine the cervix. The colposcope is an instrument with magnifying lenses very much like binoculars. With the colposcope, doctors can see the surface of the cervix closely and clearly. The doctor will usually "treat" your cervix with a weak solution of acetic acid (similar to vinegar). This will highlight any abnormal areas.

The exam is not painful, has no side effects, and can be done safely even if you are pregnant. If abnormal areas are seen on the cervix, a biopsy (removal of a small tissue sample usually after numbing the cervix) is done. The sample is sent to a pathologist to look at under a microscope. A biopsy is the only way to tell for certain whether an abnormal area is a precancer, a true cancer, or neither.

- **Cervical biopsies:** Several types of biopsies are used to diagnose cervical precancers and cancers. For precancers and early cancers, some types of biopsies can completely remove the abnormal tissue and may be the only treatment needed. In some situations, additional treatment of precancers or cancers is needed.
- **Colposcopic biopsy:** For this type of biopsy, a doctor or other health care professional first examines the cervix with a colposcope to find the abnormal areas. Using a biopsy forceps, he or she will remove a small (about 1/8-inch) section of the abnormal area on the surface of the cervix. The biopsy procedure

may cause mild cramping or brief pain, and you may have light bleeding afterward. A local anesthetic may be used to numb the cervix.

- **Endocervical curettage (endocervical scraping):** This procedure is usually done at the same time as the colposcopic biopsy. A narrow instrument (the curette) is inserted into the endocervical canal (the passage between the outer part of the cervix and the inner part of the uterus). Some of the tissue lining the endocervical canal is removed by scraping with the curette. This tissue sample is sent to the laboratory for examination.
- Because the colposcope allows a view only of the outer part of the cervix and not into the endocervix, health care professionals use an endocervical speculum or endocervical scraping to find out if this area is affected by precancer or cancer. A local anesthetic may be used to numb the cervix. Patients may have a temporary sensation, similar to a severe menstrual cramp, and they may have light bleeding after the procedure.
- **Cone biopsy:** In this procedure, also known as conization, the doctor removes a cone-shaped piece of tissue from the cervix. The base of the cone is formed by the ectocervix (outer part of the cervix), and the point or apex of the cone is from the endocervical canal.

The transformation zone (the border between the ectocervix and endocervix) is contained within the cone. This is the area of the cervix where precancers and cancers are most likely to develop. The cone biopsy is also a treatment and can be used to completely remove many precancers and very early cancers.

There are 2 methods commonly used for cone biopsies: the loop electrosurgical excision procedure (LEEP; also called large loop excision of the transformation zone [LLETZ]) and the cold knife cone biopsy.

- **LEEP (LLETZ):** The tissue is removed with a thin wire loop that is heated by electrical current and acts as a scalpel. For this procedure, a local anesthetic is used, and it can be done in your doctor's office. It takes only about 10 minutes. You may have mild cramping during and after the procedure, and mild to moderate bleeding may persist for several weeks.
- **Cold knife cone biopsy:** A surgical scalpel or a laser as a scalpel is used rather than a heated wire to remove tissue. It requires general anesthesia (you are asleep during the operation) and is done in a hospital, but no overnight stay is needed. After the procedure, cramping and some bleeding may persist for a few weeks.

**How biopsy results are reported:** The terms for reporting biopsy results are slightly different from The Bethesda System for reporting Pap test results. Instead of The Bethesda System term "squamous intraepithelial

lesion (SIL)," biopsy reports use 2 other terms, "cervical intraepithelial neoplasia (CIN)" and, rarely, "dysplasia," to refer to precancerous changes. The terms for reporting cancers ("squamous cell carcinoma" and "adenocarcinoma") are the same.

### **How Patients With Abnormal Pap Test Results Are Treated to Prevent Cervical Cancers From Developing**

If an area of SIL is seen during the colposcopy and usually confirmed by biopsy, your doctor will be able to remove the abnormal area by using such biopsy techniques as the LEEP (LLETZ procedure) or a cold knife cone biopsy or by destroying the abnormal cells with cryosurgery or laser surgery.

During cryosurgery, the doctor uses a metal probe cooled with liquid nitrogen to kill the abnormal cells by freezing them.

In laser surgery, the doctor uses a focused beam of high-energy light to vaporize (burn off) the abnormal tissue. This is done through the vagina, with local anesthesia.

Both of these outpatient treatments can be done in a doctor's office or clinic. After treatment, you may have a watery brown discharge for a few weeks.

These treatments are almost always effective in destroying precancers and preventing them from developing into true cancers. You will need follow-up exams to make sure that the abnormality does not come back. If it does, treatments can be repeated.

### **Can Cervical Cancer Be Found Early?**

Cervical cancer can usually be found early by having regular Pap tests. As Pap testing has become more common, pre-invasive lesions (precancers) of the cervix are found far more frequently than invasive cancer. Being alert to any signs and symptoms of cervical cancer (see "How Is Cervical Cancer Diagnosed?") can also help avoid unnecessary delays in diagnosis. Early detection greatly improves the chances of successful treatment and prevents any early cervical cell changes from becoming cancerous.

### **The Importance of the Pap Testing Finding Cervical Cancer and Pre-cancerous Changes**

Cervical cancer deaths are higher in populations around the world where women do not have routine Pap tests. In fact, cervical cancer is the major cause of cancer deaths in women in many developing countries. These cases are usually diagnosed at an invasive late stage, rather than as precancers or early cancers.

Despite the benefits of Pap test screening, not all American women take advantage of it. Between 60% and 80% of American women with newly diagnosed invasive cervical cancer have not had a Pap test in the past 5 years, and many of these women have never had a Pap test. In particular, elderly, African-American, and/or low-income women are less likely to have regular Pap tests.

### **Financial Assistance for Low-Income Women**

Breast cancer and cervical cancer testing is now more available to medically underserved women through the National Breast and Cervical Cancer Early Detection Program (NBCCEDP). This program offers breast and cervical cancer early detection testing to women without health insurance for free or at very little cost.

The NBCCEDP tries to reach as many women in medically underserved communities as possible, including older women, women without health insurance, and women of racial and ethnic minority groups. Although each state runs its own program, the Centers for Disease Control and Prevention (CDC) give matching funds and support to each state program.

Offered mainly through nonprofit organizations and local health clinics, this program is aimed at providing testing for breast and cervical cancer in medically underserved women. Each state's Department of Health will have information on how to contact the nearest program participant.

## **How Is Cervical Cancer Diagnosed?**

### **Signs and Symptoms of Cervical Cancer**

Cervical precancers and early cancers usually show no symptoms or signs. A woman usually develops symptoms when the cancer has become invasive and invades nearby tissue. When this happens, the most common symptom is abnormal vaginal bleeding.

An unusual discharge from the vagina (separate from your normal monthly menstrual period) can be a sign of cervical cancer. Such discharge may include blood spots or light bleeding and may occur between your periods. Also, menstrual bleeding may last longer and be heavier than usual. Bleeding after menopause or increased vaginal discharge also may be symptoms.

Bleeding following intercourse, douching, or after a pelvic exam is a common symptom of cervical cancer but not precancer.

Pain during intercourse may also indicate cervical cancer.

However, all of these signs and symptoms can be caused by conditions other than cervical cancer. For example, an infection can cause pain or, rarely, bleeding. If you have any of these signs or other suspicious symptoms, you should see your health care professional right away. Ignoring symptoms may allow the cancer to progress to a more advanced stage and lower your chance for effective treatment.

Even better, don't wait for symptoms to appear. Have a regular Pap test and pelvic examination.

Your primary doctor can often treat precancers. However, if your biopsy result indicates that you have cervical cancer, you may need to consult with a surgeon who specializes in treating this type of cancer. If there is a question of invasive cancer, your doctor will refer you to a gynecologic oncologist, a doctor who specializes in women's reproductive system cancers. Some patients will be referred to a radiation oncologist, a doctor who specializes in treating cancers with radiation.

Many of the diagnostic tests described below are not necessary for every patient. Decisions about using these tests are based on the results of the physical exam and initial biopsy.

### **Medical History and Physical Exam**

Getting your complete personal and family medical history is the first step your doctor will take in your consultation. This includes information related to risk factors and symptoms of cervical cancer. A complete physical exam will help evaluate your general state of health. In addition, special attention will be paid to your lymph nodes for evidence of metastasis (cancer spread).

### **Cystoscopy, Proctoscopy, and Examination Under Anesthesia**

These are most often done in women who have large tumors. They are not necessary if the cancer is caught early. In cystoscopy a slender tube with a lens and a light is placed into the bladder through the urethra. If you have cervical cancer, this allows your doctor to check your bladder and urethra to see if your cancer is growing into these areas.

Small tissue samples can also be removed during cystoscopy for pathologic (microscopic) testing. This procedure can be done using a local anesthetic, but some patients may need general anesthesia. Your doctor will let you know what to expect before and after the procedure.

Proctoscopy is a visual inspection of the rectum through a lighted tube to check for spread of cervical cancer into your rectum. Your doctor will also do a pelvic exam while you are under anesthesia to find out whether the cancer has spread beyond the cervix.

### **Imaging Studies**

If your doctor finds that you have cervical cancer, certain imaging studies may be done. These include magnetic resonance imaging (MRI) and computed tomography (CT) scans. These studies can show whether the cancer has spread beyond the cervix.

**Chest x-ray:** A plain x-ray of your chest will 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. If the results are normal, you probably don't have cancer in your lungs.

**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, like 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 takes pictures of multiple slices of the part of your body that is being studied. Often after the first set of pictures is taken you may receive an intravenous injection of a contrast agent, or "dye," that helps better outline structures in your body. A second set of pictures is then taken.

CT scans take longer than regular x-rays and you will need to lie still on a table while they are being done. But just like other computerized devices, they are getting faster and your stay might be pleasantly short. The newest CT scanners take only seconds to complete the study. Also, you might feel a bit confined by the ring-like equipment you're in when the pictures are being taken.

The contrast dye is injected through an IV (intravenous) line. Some people are allergic to the dye and get hives, a flushed feeling, or, rarely, more serious reactions like trouble breathing and low blood pressure can occur. Be sure to tell your doctor if you have ever had a reaction to any contrast material used for x-rays. If you have, you may need medicine before you can have such an injection during your test.

You may also be asked to drink a contrast solution. This helps outline your intestine if your doctor is looking at organs in your abdomen. The CT scan will provide precise information about the size, shape, and position of a tumor and can help find enlarged lymph nodes that might contain cancer.

**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.

MRI images are particularly useful in examining pelvic tumors. They are also helpful in detecting cancer that has spread to the brain or spinal cord.

A contrast material might be injected just as with CT scans, but is used less often. MRI scans take longer -- often up to an hour. Also, you have to be placed inside a tube-like piece of equipment, which is confining and

can upset people with claustrophobia (a fear of enclosed spaces). The machine makes a thumping noise that you may find annoying. Some places provide headphones with music to block this out.

**Intravenous urography:** Intravenous urography (also known as intravenous pyelogram, or IVP) is useful in finding abnormalities of the urinary tract, such as changes caused by spread of cervical cancer to the pelvic lymph nodes, which may compress or block a ureter. However, this test is rarely used in the initial evaluation of patients with cervical cancer. An IVP is an x-ray of the urinary system taken after injecting a special dye into a vein. This dye is removed from the bloodstream by the kidneys and passes into the ureters and bladder. You will not usually need an IVP if you have already had a CT or MRI.

**Positron emission tomography:** Positron emission tomography (PET) uses glucose (a form of sugar) that contains a radioactive atom. Cancer cells in the body absorb large amounts of the radioactive sugar and a special camera can detect the radioactivity. This test is 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. Newer devices combine a CT scan and a PET scan to even better pinpoint the tumor. However, this test is rarely used for patients with early cervical cancer.

## How Is Cervical Cancer Staged?

The process of finding out how far the cancer has spread is called staging. Information is gathered from exams and diagnostic tests to determine the size of the tumor, how deeply the tumor has invaded tissues within and around the cervix, and the spread to lymph nodes or distant organs (metastasis). This is an important process because the stage of the cancer is the key factor in selecting the right treatment plan.

A staging system is a way for members of the cancer care team to summarize the extent of a cancer's spread. Cervical cancer is staged with the FIGO (International Federation of Gynecology and Obstetrics) System of Staging. This system classifies the disease in stages 0 through IV. It is based on clinical staging rather than surgical staging. This means that the extent of disease is evaluated by the doctor's physical examination and a few other tests that are done in some cases, such as cystoscopy and proctoscopy.

If surgery is done, it may reveal that the cancer has spread more than the doctors initially thought. This new information may change the treatment plan, but it does not change the patient's FIGO stage. This staging system is different from those for other cancers. The systems for other cancers take into account whether the cancer has spread to local lymph nodes. The FIGO doesn't, even though we know the outlook worsens if the cancer has spread to lymph nodes.

**Stage 0:** The tumor is *carcinoma in situ*. If your cancer is in this stage, it is very superficial (only affecting the surface), is found only in the layer of cells lining the cervix, and has not invaded deeper tissues of the cervix.

**Stage I:** If your cancer is this stage, it has invaded the cervix, but it has not spread anywhere else.

**Stage IA:** This is the earliest form of stage I. There is a very small amount of cancer, and it can be seen only under a microscope.

**Stage IA1:** The area of invasion is less than 3 mm (about 1/8-inch) deep and less than 7 mm (about 1/4-inch) wide.

**Stage IA2:** The area of invasion is between 3 mm and 5 mm (about 1/5-inch) deep and less than 7 mm (about 1/4-inch) wide.

**Stage IB:** In this stage, the cancer usually can be seen without a microscope. But this stage also includes cancers that have spread deeper than 5 mm (about 1/5 inch) into connective tissue of the cervix or are wider than 7 mm and can only be seen using a microscope.

**Stage IB1:** The cancer is visible but no larger than 4 cm (about 1 3/5 inches).

**Stage IB2:** The cancer is visible and larger than 4 cm.

**Stage II:** In this stage, the cancer has spread beyond the cervix to nearby areas, but it is still inside the pelvic area.

**Stage IIA:** The cancer has spread beyond the cervix to the upper part of the vagina. It is not in the lower third of the vagina.

**Stage IIB:** The cancer has spread to the tissue next to the cervix, called the parametrial tissue.

**Stage III:** The cancer has spread to the lower part of the vagina or the pelvic wall. The cancer may be blocking the ureters (tubes that carry urine from the kidneys to the bladder).

**Stage IIIA:** The cancer has spread to the lower third of the vagina but not to the pelvic wall.

**Stage IIIB:** The cancer extends to the pelvic wall and/or blocks urine flow to the bladder.

**Note:** *In the alternate staging system by the American Joint Committee on Cancer, stage IIIB is defined by the fact that the cancer has spread to lymph nodes in the pelvis.*

**Stage IV:** This is the most advanced stage of cervical cancer. The cancer has spread to nearby organs or other parts of the body.

**Stage IVA:** The cancer has spread to the bladder or rectum, which are organs close to the cervix.

**Stage IVB:** The cancer has spread to distant organs beyond the pelvic area, such as the lungs.

### 5-year Survival Rates by Stage

Listed below are listed the chances a woman will live *5 years after* treatment for the various stages of cervical cancer. These are overall survival figures, so they also include women who die of other causes. The numbers are approximate and come from women treated more than 10 years ago.

Stage	5-Year
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### **Survival Rate**

<b>IA</b>	Above 95%
<b>IB1</b>	Around 90%
<b>IB2</b>	Around 80%-85%
<b>IIA/B</b>	Around 75%-78%
<b>IIIA/B</b>	Around 47%-50%
<b>IV</b>	Around 20%-30%

## **How Is Cervical 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.*

The options for treating each patient with cervical cancer depend on the stage of disease. The stage of a cancer describes its size, depth of invasion, and how far it has spread.

After establishing the stage of your cervical cancer, your cancer care team will recommend one or more treatment options. Consider your options without feeling rushed. If there is anything you do not understand, ask for explanations. Although the choice of treatment depends largely on the stage of the disease at the time of diagnosis, other factors that may influence your options are your age, your general health, your individual circumstances, and your preferences. Be sure that you understand all the risks and side effects of the various treatments before making a decision.

It is often a good idea to seek a second opinion, especially with doctors experienced in treating cervical cancer.

A second opinion can provide more information and help you feel more confident about the treatment plan that

is being considered. Some insurance companies require a second opinion before they will agree to pay for certain treatments. Almost all will pay for a second opinion.

The 3 main methods of cancer treatment are surgery, radiation therapy, and chemotherapy. Sometimes the best treatment approach uses 2 or more of these methods. Your recovery is the goal of your cancer care team. If a cure is not possible, the goal may be to remove or destroy as much of the cancer as possible to prevent the tumor from growing, spreading, or returning for as long as possible. Sometimes treatment is aimed at relieving symptoms. This is called palliative treatment.

## **Surgery**

**Cryosurgery:** A metal probe cooled with liquid nitrogen is used to kill the abnormal cells by freezing them. Cryosurgery is used for treating preinvasive cervical cancer but not for treating invasive cancer.

**Laser surgery:** A focused laser beam, directed through the vagina, is used to vaporize (burn off) abnormal cells or to remove a small piece of tissue for study. Laser surgery is used as treatment for preinvasive cervical cancer. It is not used to treat invasive cancer.

**Conization:** A cone-shaped piece of tissue is removed from the cervix. This is done using a surgical or laser knife (cold knife cone biopsy) or using a thin wire heated by electricity (the LEEP or LEETZ procedure). (See the section, "Can Cervical Cancer Be Prevented?" for more information.) A cone biopsy is rarely used as the sole treatment, except in women with early (stage IA) cancer who might want to have children. It may be used to establish the diagnosis of cancer before treatment with additional surgery or radiation.

**Simple hysterectomy:** This is surgical removal of the uterus (the body of the uterus and the cervix). The structures next to the uterus (parametria and uterosacral ligaments) are not removed. The vagina remains

entirely intact, and pelvic lymph nodes are not removed. The ovaries and fallopian tubes are usually left in place unless they are affected by some other disease or the patient is at least 45 to 50 years old.

The uterus is removed through a surgical incision in the front of the abdomen or through the vagina. General or epidural (regional) anesthesia is used. A hospital stay of 3 to 5 days is common for an abdominal hysterectomy, and complete recovery takes about 4 to 6 weeks. For a vaginal hysterectomy, the hospital stay is usually 1 to 2 days followed by a 2- to 3-week recovery period. This surgery results in infertility (inability to have children). Complications are unusual but could include excessive bleeding, wound infection, or damage to the urinary or intestinal systems.

A simple hysterectomy is done to treat stage IA cervical cancers. The operation is used for some stage 0 cancers (carcinoma in situ), for instance, when the abnormal cells are in the surgical margins (edges) of the cone biopsy. The same operation is also used to treat some non-cancerous conditions. The most common of these is leiomyomas, a type of benign tumor commonly known as fibroids.

**Radical hysterectomy and pelvic lymph node dissection:** Like a simple hysterectomy, this operation removes the entire uterus. However, the tissues next to the uterus (parametria and uterosacral ligaments), the upper part (about 1 inch) of the vagina next to the cervix, and lymph nodes (bean-shaped collections of immune system tissue) from the pelvis are also removed. The ovaries and fallopian tubes are not removed unless there is some other medical reason to do so.

Although this surgery is usually performed through an abdominal incision, it is also possible to use a vaginal approach, in combination with a laparoscopic pelvic node dissection. Laparoscopy is a method for viewing the inside of the abdomen and pelvis through a tube inserted into a very small surgical incision. Small instruments can be controlled through the tube, so the surgeon can remove lymph nodes through the tube without making a

large cut in the abdomen. The laparoscope can also help doctors remove the uterus, ovaries, and fallopian tubes through a vaginal incision, so that an abdominal incision is not needed. This approach is called laparoscopic-assisted radical vaginal hysterectomy.

Since more tissue is removed than in a simple hysterectomy, the hospital stay after a radical hysterectomy is longer -- about 5 to 7 days. The surgery results in infertility. Complications are unusual but could include excessive bleeding, wound infection, or damage to the urinary and intestinal systems. A radical hysterectomy and pelvic lymph node dissection are the usual treatment for stages IA2, IB, and IIA cervical cancer, especially in young people.

**Sexual impact of hysterectomy:** Radical hysterectomy does not change a woman's ability to feel sexual pleasure. Although the vagina is shortened, the area around the clitoris and the lining of the vagina remains as sensitive as before. A woman does not need a uterus or cervix to reach orgasm.

Some women feel less feminine after a hysterectomy. They may view themselves as "an empty shell." Such thoughts do not enhance sexual pleasure. However, when cancer has caused pain or bleeding with intercourse, the hysterectomy may actually improve a woman's sex life by stopping these symptoms.

**Trachelectomy:** Doctors are now attempting to cure some early stage cervical cancers while removing as little normal tissue as possible. A newer procedure, known as a radical trachelectomy, may allow certain young women with early stage cancer (Stage IA2 and IB) that can't be treated with conization to maintain their ability to have children. This procedure involves removing the cervix and the upper part of the vagina and placing a "purse-string" stitch to act as an artificial internal opening of the cervix (the opening of the cervix inside the uterine cavity). The nearby lymph nodes are also removed using laparoscopy. The operation is done either through the vagina or the abdomen.

Although more long-term studies are needed, early clinical trials so far have found few cancer recurrences after the procedure. And while the risk of miscarriage appears to be higher than normal, some women are able to carry pregnancy to term and deliver healthy babies via cesarean section. In one study, the pregnancy rate after 5 years was 50%.

While some cancer centers in the United States are performing radical trachelectomies on selected patients, most still consider the procedure to be experimental at this time.

**Pelvic exenteration:** In addition to removing all of the organs and tissues as in a radical hysterectomy and pelvic lymph node dissection, this operation may also remove the bladder, vagina, rectum, and part of the colon. This operation is used to treat recurrent cervical cancer.

If the bladder is removed, a new way to store and eliminate urine is needed. This usually means using a short segment of intestine to function as a new bladder. The new bladder may be connected to the abdominal wall so that urine is drained periodically when the patient places a catheter into a urostomy (a small opening). Or urine may drain continuously into a small plastic bag attached to the front of the abdomen.

If the rectum and part of the colon are removed, a new way to eliminate solid waste must be created. This is done by attaching the remaining intestine to the abdominal wall so that fecal material can pass through a colostomy (a small opening) into a small plastic bag worn on the front of the abdomen. It may be possible to remove the involved colon (next to the cervix) and reconnect the colon so that no bags or external appliances are needed. If the vagina is removed, a new vagina can be surgically created out of skin, intestinal tissue, or myocutaneous (muscle and skin) grafts.

**Sexual impact of pelvic exenteration:** Recovery from total pelvic exenteration takes a long time. Most women don't begin to feel like their normal selves again for 6 months after surgery. Some say it takes a year or two to adjust completely.

Nevertheless, these women can lead happy and productive lives. With practice and determination, they can also have sexual desire, pleasure, and orgasm.

### **Radiation Therapy**

Radiation therapy uses high energy x-rays to kill cancer cells. These x-rays may be given externally in a procedure that is much like having a diagnostic x-ray. This is called *external beam radiation therapy*. This treatment usually takes 6 to 7 weeks to complete. The second type of radiation therapy is called *brachytherapy*, or internal radiation therapy. It may be given as a capsule of radioactive material placed in the vagina near the tumor, or the radioactive material may be placed in thin needles that are inserted directly in the tumor.

Brachytherapy is completed in just a few days.

The skin in the treated area may look and feel sunburned, but this gradually fades to a tanned look, returning to a normal appearance in 6 to 12 months. Many women also notice tiredness, upset stomach, or loose bowels.

Pelvic radiation therapy may cause vaginal *stenosis* (narrowing of the vagina by scar tissue), which might make intercourse painful. A woman can keep tight scar tissue from forming, however, by stretching the walls of her vagina several times a week. This can be done by engaging in sexual intercourse 3 to 4 times per week or by using a vaginal dilator (a plastic or rubber tube used to stretch out the vagina). Premature menopause and problems with urination may also occur. Vaginal (local) estrogens may also be used to help with vaginal dryness and atrophy. Another side effect of radiation to the pelvis is fractures. Most of these are hip fractures. Bone density studies are recommended. The increased risk is seen 2 to 4 years after the treatment.

If you are having side effects from radiation, discuss them with your cancer care team.

*It is important to know that smoking increases the side effects from radiation. If you smoke, you should stop.*

## Chemotherapy

Systemic chemotherapy uses anticancer drugs that are injected into a vein or given by mouth. These drugs enter the bloodstream and reach all areas of the body, making this treatment potentially useful for cancers that have spread to distant organs (metastasized).

Drugs most often used in treating cervical cancer include cisplatin, paclitaxel, topotecan, ifosfamide, and fluorouracil. If chemotherapy is chosen, you may receive a combination of drugs. Chemotherapy drugs kill cancer cells but also damage some normal cells, which can lead to side effects.

Chemotherapy side effects depend on the type of drugs, the amount taken, and the length of time you are treated. Temporary side effects of chemotherapy might include:

- nausea and vomiting
- loss of appetite
- loss of hair
- mouth sores

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

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

Fatigue is also quite common and may be caused by low red blood cell counts, by other reasons related to the chemotherapy, or by the cancer itself.

Most side effects of chemotherapy (except premature menopause and infertility) disappear once treatment is stopped. Hair will grow back after treatment ends. Premature menopause can be treated with hormones.

If you have problems with side effects, talk with your cancer care team. There are remedies for many of the temporary side effects of chemotherapy. For example, anti-nausea drugs to prevent or reduce nausea and vomiting can be given. Other drugs can be given to boost blood cell production.

## Clinical Trials

**The purpose of clinical trials:** Studies of promising new or experimental treatments in patients are known as clinical trials. A clinical trial is only done when there is some reason to believe that the treatment being studied may be valuable to the patient. Treatments used in clinical trials are often found to have real benefits.

Researchers conduct studies of new treatments to answer the following questions:

- Is the treatment helpful?
- How does this new type of treatment work?
- Does it work better than other treatments already available?
- What side effects does the treatment cause?
- Are the side effects greater or less than the standard treatment?
- Do the benefits outweigh the side effects?
- In which patients is the treatment most likely to be helpful?

**Types of clinical trials:** There are 3 phases of clinical trials in which a treatment is studied before it is eligible for approval by the FDA (Food and Drug Administration).

**Phase I clinical trials:** The purpose of a phase I study is to find the best way to give a new treatment and how much of it can be given safely. The cancer care team watches patients carefully for any harmful side effects.

The treatment has been well tested in lab and animal studies, but the side effects in patients are not completely known. Doctors conducting the clinical trial start by giving very low doses of the drug to the first patients and

increasing the dose for later groups of patients until side effects appear. Although doctors are hoping to help patients, the main purpose of a phase I study is to test the safety of the drug.

**Phase II clinical trials:** These studies are designed to see if the drug works. Patients are given the highest dose that doesn't cause severe side effects (determined from the phase I study) and closely observed for an effect on the cancer. The cancer care team also looks for side effects.

**Phase III clinical trials:** Phase III studies involve large numbers of patients -- often several hundred. One group (the control group) receives the standard (most accepted) treatment. The other group receives the new treatment. All patients in phase III studies are closely watched. The study will be stopped if the side effects of the new treatment are too severe or if one group has had much better results than the others.

If you are in a clinical trial, you will have a team of experts taking care of you and monitoring your progress very carefully. The study is especially designed to pay close attention to you.

However, there are some risks. No one involved in the study knows in advance whether the treatment will work or exactly what side effects will occur. That is what the study is designed to find out. While most side effects disappear in time, some can be permanent or even life threatening. Keep in mind, though, that even standard treatments have side effects. Depending on many factors, you may decide to enroll in a clinical trial.

**Deciding to enter a clinical trial:** Enrollment in any clinical trial is completely up to you. Your doctors and nurses will explain the study to you in detail and will give you a form to read and sign indicating your desire to take part. This process is known as giving your informed consent. Even after signing the form and after the clinical trial begins, you are free to leave the study at any time, for any reason. Taking part in the study does not prevent you from getting other medical care you may need.

To find out more about clinical trials, ask your cancer care team. Among the questions you should ask are:

- Is there a clinical trial for which I would be eligible?
- What is the purpose of the study?
- What kinds of tests and treatments does the study involve?
- What does this treatment do? Has it been used before?
- Will I know which treatment I receive?
- What is likely to happen in my case with, or without, this new treatment?
- What are my other choices and their advantages and disadvantages?
- How could the study affect my daily life?
- What side effects can I expect from the study? Can the side effects be controlled?
- Will I have to be hospitalized? If so, how often and for how long?
- Will the study cost me anything? Will any of the treatment be free?
- If I am harmed as a result of the research, what treatment would I be entitled to?
- What type of long-term follow-up care is part of the study?
- Has the treatment been used to treat other types of cancers?

The American Cancer Society offers a clinical trials matching service for patients, their family, and friends.

You can reach this service at 1-800-303-5691 or on our Web site at <http://clinicaltrials.cancer.org>. Based on the information you provide about your cancer type, stage, and previous treatments, this service can compile a list of clinical trials that match your medical needs. In finding a center most convenient for you, the service can also take into account where you live and whether you are willing to travel.

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 or by visiting the NCI clinical trials Web site at [www.cancer.gov/clinical\\_trials/](http://www.cancer.gov/clinical_trials/).

## **Complementary and Alternative Therapies**

Complementary and alternative therapies are a diverse group of health care practices, systems, and products that are not part of usual medical treatment. They may include products such as vitamins, herbs, or dietary supplements, or procedures such as acupuncture, massage, and a host of other types of treatment. There is a

great deal of interest today in complementary and alternative treatments for cancer. Many are now being studied to find out if they are truly helpful to people with cancer.

You may hear about different treatments from family, friends, and others, which may be offered as a way to treat your cancer or to help you feel better. Some of these treatments are harmless in certain situations, while others have been shown to cause harm. Most of them are of unproven benefit.

The American Cancer Society defines *complementary* medicine or methods as those that are used along with your regular medical care. If these treatments are carefully managed, they may add to your comfort and well-being. *Alternative* medicines are defined as those that are used instead of your regular medical care. Some of them have been proven not to be useful or even to be harmful, but are still promoted as “cures.” If you choose to use these alternatives, they may reduce your chance of fighting your cancer by delaying, replacing, or interfering with regular cancer treatment.

Before changing your treatment or adding any of these methods, discuss this openly with your doctor or nurse. Some methods can be safely used along with standard medical treatment. Others, however, can interfere with standard treatment or cause serious side effects. That is why it's important to talk with your doctor. More information about specific complementary and alternative therapies used for cancer is available through our toll-free number or on our Web site.

### **Treatment Options for Cervical Cancer by Stage**

The stage of a cervical cancer is the most important factor in choosing treatment. However, other factors that affect this decision include the exact location of the cancer within the cervix, the type of cancer (squamous cell or adenocarcinoma), your age, your overall physical condition, and whether you want to have children.

**Stage 0 (carcinoma in situ):** Treatment options are the same as for pre-cancerous changes (dysplasia or cervical intraepithelial neoplasia [CIN]). Options include cryosurgery, laser surgery, loop electrosurgical excision procedure (LEEP/LEETZ), and cold knife conization. A simple hysterectomy may be done if the cancer returns and, if you are in the childbearing age, you do not want to have more children. All of these cancers can be cured with appropriate treatment. However, the pre-cancerous changes or the stage 0 cancer can recur (come back) in the cervix or vagina, so close follow-up is very important.

**Stage IA:** If you have stage IA1 cervical cancer, your treatment will most likely be a simple hysterectomy. However, if the amount of cancer is more than 3 mm (stage IA2) or the cancer has invaded the blood vessels or lymph vessels, you will need a radical hysterectomy along with removing lymph nodes in the pelvis.

If your tumor invasion is very superficial and you want to have additional children, treatment by cold knife conization is another option. This approach requires careful medical follow-up so that additional treatment can be given if the cancer comes back (recurs). You might want to consult with a gynecologic oncologist (a doctor who specializes in women's reproductive system cancers) to see if you qualify for this treatment. The 5-year survival rate for treatment at this stage is more than 95%.

If you have a hysterectomy, tissue removed by this procedure will be examined in the laboratory to see if the cancer has spread further than expected. If for some reason a patient cannot undergo surgery, radiation therapy, external beam and brachytherapy, or brachytherapy alone, may be given.

For women with stage IA2 who want to have children, trachelectomy is an option.

**Stage IB:** Either of 2 treatments may be used if you have stage IB cervical cancer. The first option is a radical hysterectomy with removal of lymph nodes in the pelvis and removing a few lymph nodes from higher up

(para-aortic) to see if the cancer has spread there. If cancer cells are found in the edges of the organs removed or if cancer cells are found in lymph nodes during this operation, you may be given radiation therapy, possibly with chemotherapy, after surgery. .

The second treatment option is high-dose internal and external radiation therapy. Cure rates (about 85% to 90%) are about the same for high-dose radiation therapy or radical hysterectomy with pelvic lymph node dissection. So how a woman feels about the side effects of the 2 treatments and the presence of any other medical conditions that might make surgery dangerous should be the basis for deciding between the 2 options.

Recent clinical trial results show that the combination of radiation therapy and chemotherapy with cisplatin is more effective than radiation alone for women with stage IB2 cervical cancer. This prompted the National Cancer Institute to recommend that chemotherapy be considered in all patients receiving radiation therapy for cervical cancer larger than 4 cm (about 1 3/5 inches).

For women with stage IB who want to have children, trachelectomy is an option.

**Stage IIA:** Just as in stage IB, either of 2 treatments may be used. The first is internal and external radiation therapy. This most often recommended. Chemotherapy with cisplatin will be given along with the radiation. A second option that is only used if the tumor has not grown far into the vagina is radical hysterectomy and partial radical vaginectomy with removal of lymph nodes in the pelvis and removing a few lymph nodes from higher up (para-aortic) to see if the cancer has spread there.

Cure rates (about 75% to 80%) are about the same for radiation therapy or radical hysterectomy and partial vaginectomy with lymph node dissection. Your treatment choice will depend on the size and other

characteristics of the tumor, your feelings about the side effects of the 2 treatments, and the presence of any other medical conditions that might make surgery or radiation therapy dangerous.

If you have a hysterectomy, tissue removed by this procedure will be examined in the laboratory to see if the cancer has spread further than expected. If the cancer has spread to the parametrium (tissue next to the uterus) or to lymph nodes or if it has not been completely removed by surgery, radiation therapy is usually recommended. As mentioned above, recent clinical trial results show that the combination of radiation therapy and chemotherapy with cisplatin, possibly combined with other drugs, is more effective than radiation alone.

**Stage IIB:** Combined internal and external radiation therapy is the usual treatment. Recent clinical trial results indicate that the combination of radiation therapy and chemotherapy with cisplatin, possibly combined with other drugs, is more effective than radiation alone.

**Stage III and IVA:** Most doctors combine these 2 groups in terms of treatment and predicting prognosis (outlook for chances of survival). Combined internal and external radiation therapy was once the recommended treatment.

New studies show that the combination of radiation therapy and chemotherapy with cisplatin, possibly along with other drugs, is more effective than radiation alone. This is now recommended as standard treatment for women with advanced stage cervical cancer. The 5-year survival rate in the clinical trials of radiotherapy and chemotherapy was about 50%. These studies of radiation and chemotherapy excluded women whose cancer had spread to para-aortic lymph nodes (high up in the back of the abdomen). They have a worse outlook.

**Stage IVB:** Cancer at this stage is not usually considered curable. Treatment options include radiation therapy to relieve the symptoms of local (near the cervix) spread or distant metastases. Chemotherapy is often

recommended. Most standard regimens use a platinum compound, either cisplatin or carboplatin along with another drug such as paclitaxel, gemcitabine, topotecan, or vinorelbine. A recent study found an advantage for the combination of cisplatin and topotecan. Clinical trials are in progress to test other combinations of chemotherapy drugs, as well as some other experimental treatments. The American Cancer Society encourages participation in a clinical trial of newer treatments.

**Recurrent cervical cancer:** This means that the disease has come back after treatment. Recurrence can be local (in the pelvic organs near the cervix) or distant (spread through the lymphatic system and/or the bloodstream to organs such as the lungs or bone).

If the cancer has recurred in the pelvis only, treatment by pelvic exenteration (extensive surgery) is an option for some patients. This operation may successfully treat 40% to 50% of patients. (See the discussion under Surgery in the section, "How Is Cervical Cancer Treated?") Or palliative treatment (treatment to relieve symptoms but not expected to cure) using radiation or chemotherapy may be chosen.

If your cancer has recurred in a distant area, palliation of specific symptoms using chemotherapy or radiation therapy is an option. If chemotherapy is used, you should understand the goals and limitations of this therapy. Sometimes chemotherapy can improve your quality of life, and other times it can diminish it. You need to discuss this with your doctors. Fifteen percent to 25% of patients may respond at least temporarily to chemotherapy.

New treatments that may benefit patients with distant recurrence of cervical cancer are being evaluated in clinical trials. You may want to think about participating in a clinical trial.

### Cervical Cancer in Pregnancy

A small number of cervical cancers are found in pregnant women. If your cancer is a very early cancer, such as stage IA, then most doctors believe that it is safe to continue the pregnancy to term. Several weeks after delivery, a hysterectomy or a cone biopsy is recommended (the cone biopsy is suggested only for substage IA1).

If the cancer is stage IB, then you and your doctor must decide whether to continue the pregnancy. If not, treatment would be radical hysterectomy and/or radiation. If you decide to continue the pregnancy, the baby should be delivered by cesarean section as soon as it is able to survive outside the womb. For more advanced cancers, immediate treatment is the safest option.

### **Financial Help**

In 2000, the Breast and Cervical Cancer Treatment Act was signed into law. This act can provide funds for treatment of breast and cervical cancer for some low-income women. States must adopt the program in order to receive matching federal funds. For more information, you can contact the CDC at 1-888-842-6355 or on the Internet at [www.cdc.gov/cancer](http://www.cdc.gov/cancer).

### **More Treatment Information**

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

The NCCN, made up of experts from 20 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](http://www.nccn.org)).

The NCI provides treatment information via telephone (1-800-4-CANCER) and its Web site ([www.cancer.gov](http://www.cancer.gov)).

Information for patients as well as more detailed information intended for use by cancer care professionals is also available on [www.cancer.gov](http://www.cancer.gov).

## What Should You Ask Your Doctor About Cervical Cancer?

It is important for you to have frank, open discussions with your cancer care team. They want to answer all of your questions, no matter how trivial you might think they are. Here are some questions to consider:

- What type of cervical cancer do I have?
- Has my cancer spread beyond the cervix?
- Can the stage of my cancer be determined and what does that mean?
- What treatment choices do I have?
- What treatment do you recommend and why?
- What risks or side effects are there to the treatment you suggest?
- Will I be able to have children after my treatment?
- What should I do to be ready for treatment?
- What are the chances my cancer will recur (come back) with the treatment programs we have discussed?
- Should I follow a special diet?
- Based on what you've learned about my cancer, what is my prognosis (outlook for chances of survival)?
- Where can I get a wig if I will receive chemotherapy drugs likely to cause temporary hair loss?
- What do I tell my children, husband, parents, and other family members?

In addition to these sample questions, be sure to write down some of your own. For instance, you might want specific information about anticipated recovery times so that you can plan your work schedule. Or you may want to ask about second opinions or about clinical trials for which you may qualify.

## What Happens After Treatment for Cervical Cancer?

Completing treatment can be both stressful and exciting. You will be relieved to finish treatment, yet it is hard not to worry about cancer coming back. (When cancer returns, it is called recurrence.) This is a very common concern among those who have had cancer.

It may take a while before your confidence in your own recovery begins to feel real and your fears are somewhat relieved. Even with no recurrences, people who have had cancer learn to live with uncertainty.

### **Follow-up Care**

After your treatment is over, it is very important to keep all follow-up appointments. During these visits, your doctors will ask about symptoms, do physical exams, and order blood tests or imaging studies such as CT scans or x-rays. Follow-up is needed to check for cancer recurrence or spread, as well as possible side effects of certain treatments. This is the time for you to ask your health care team any questions you need answered and to discuss any concerns you might have.

Almost any cancer treatment can have side effects. Some may last for a few weeks to several months, but others can be permanent. Don't hesitate to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them.

It is also important to keep medical insurance. Even though no one wants to think of their cancer coming back, it is always a possibility. If it happens, the last thing you want is to have to worry about paying for treatment. Many people have been bankrupted by cancer recurrence.

### **Seeing a New Doctor**

At some point after your cancer diagnosis and treatment, you may find yourself in the office of a new doctor. Your original doctor may have moved or retired, or you may have moved or changed doctors for some reason. It is important that you be able to give your new doctor the exact details of your diagnosis and treatment. Make sure you have the following information handy:

- a copy of your pathology report from any biopsy or surgery
- if you had surgery, a copy of your operative report

- if you were hospitalized, a copy of the discharge summary that every doctor must prepare when patients are sent home from the hospital
- finally, since some drugs can have long-term side effects, a list of your drugs, drug doses, and when you took them

### **Lifestyle Changes to Consider During and After Treatment**

Having cancer and dealing with treatment can be time-consuming and emotionally draining, but it can also 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 begin this process during cancer treatment.

### **Make Healthier Choices**

Think about your life before you learned you had cancer. Were there things you did that might have made you less healthy? Maybe you drank too much alcohol, or ate more than you needed, or smoked, or didn't exercise very often. Emotionally, maybe you kept your feelings bottled up, or maybe you let stressful situations go on too long.

Now is not the time to feel guilty or to blame yourself. However, you can start making changes today that can have positive effects for the rest of your life. Not only will you feel better but you will also be healthier. What better time than now to take advantage of the motivation you have as a result of going through a life-changing experience like having cancer?

You can start by working on those things that you feel most concerned about. 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's Quitline® tobacco cessation program at 1-800-ACS-2345.

### **Diet and Nutrition**

Eating right can be a challenge for anyone, but it can get even tougher during and after cancer treatment. For instance, treatment often may change your sense of taste. Nausea can be a problem. You may lose your appetite for a while and lose weight when you don't want to. On the other hand, some people gain weight even without eating more. This can be frustrating, too.

If you are losing weight or have taste problems during treatment, do the best you can with eating and remember that these problems usually improve over time. You may want to ask your cancer team for a referral to a dietitian, an expert in nutrition who can give you ideas on how to fight some of the side effects of your treatment. You may also find it helps to eat small portions every 2 to 3 hours until you feel better and can go back to a more normal schedule.

One of the best things you can do after treatment is to put healthy eating habits into place. You will be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Try to eat 5 or more servings of vegetables and fruits each day. Choose whole grain foods instead of white flour and sugars. Try to limit meats that are high in fat. Cut back on processed meats like hot dogs, bologna, and bacon. Get rid of them altogether if you can. If you drink alcohol, limit yourself to 1 or 2 drinks a day at the most. And don't forget to get some type of regular exercise. The combination of a good diet and regular exercise will help you maintain a healthy weight and keep you feeling more energetic.

### **Rest, Fatigue, Work, and Exercise**

Fatigue is a very common symptom in people being treated for cancer. This is often not an ordinary type of tiredness but a "bone-weary" exhaustion that doesn't get better with rest. For some, this fatigue lasts a long time after treatment, and can discourage them from physical activity.

However, exercise can actually help you reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel physically and emotionally improved and can cope better.

If you are ill and need to be on bed rest during treatment, it is normal to expect your fitness, endurance, and muscle strength to decline some. Physical therapy can help you maintain strength and range of motion in your muscles, which can help fight fatigue and the sense of depression that sometimes comes with feeling so tired.

Any program of 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 3 times a week. If you haven't exercised in a few years but can still get around, you may want to think about taking short walks.

Talk with your health care team before starting, and get their opinion about your exercise plans. Then, try to get an exercise buddy so that 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, though, you will need to balance activity with rest. It is okay to rest when you need to. It is really hard for some people to allow themselves to do that when they are used to working all day or taking care of a household. (For more information about fatigue, please see the publication, "Cancer Related Fatigue and Anemia Treatment Guidelines for Patients.")

Exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- It strengthens your muscles.
- It reduces fatigue.
- It lowers anxiety and depression.
- It makes you feel generally happier.
- It helps you feel better about yourself.

And long term, we know that exercise plays a role in preventing some cancers. The American Cancer Society, in its guidelines on physical activity for cancer prevention, recommends that adults take part in at least 1 physical activity for 30 minutes or more on 5 days or more of the week. Children and teens are encouraged to try for at least 60 minutes a day of energetic physical activity on at least 5 days a week.

### **How About Your Emotional Health?**

Once your treatment ends, you may find yourself overwhelmed by 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 your treatment.

Now you may find that you think about the potential of your own death, or the effect of your cancer on your family, friends, and career. You may also begin to re-evaluate your relationship with your spouse or partner. Unexpected issues may also cause concern -- for instance, as you become healthier and have fewer doctor visits, you will see your health care team less often. That can be a source of anxiety for some.

This is an ideal time to seek out emotional and social 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 individual counselors.

Almost everyone who has been through cancer can benefit from getting some type of support. 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 realistic to go it all by yourself. And your friends and family may feel shut out if you decide not to 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-ACS-2345 and we can put you in touch with an appropriate group or resource.

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 healthy choices and feeling as well as possible, physically and emotionally.

### **What Happens if Treatment Is No Longer Working?**

If cancer continues to grow after one kind of treatment, or if it returns, it is often possible to try another treatment plan that might still cure the cancer, or at least shrink the tumors enough to help you live longer and feel better. On the other hand, when a person has received several different medical treatments and the cancer has not been cured, over time the cancer tends to become resistant to all treatment. At this time it's important to weigh the possible limited benefit of a new treatment against the possible downsides, including continued doctor visits and treatment side effects.

Everyone has his or her own way of looking at this. Some people may want to focus on remaining comfortable during their limited time left.

This is likely to be the most difficult time in your battle with cancer -- when you have tried everything medically within reason and it's just not working anymore. Although your doctor may offer you new treatment, you need to consider that at some point, continuing treatment is not likely to improve your health or change your prognosis or survival.

If you want to continue treatment to fight your cancer as long as you can, you still need to consider the odds of more treatment having any benefit. In many cases, your doctor can estimate the response rate for the treatment you are considering. Some people are tempted to try more chemotherapy or radiation, for example, even when their doctors say that the odds of benefit are less than 1%. In this situation, you need to think about and understand your reasons for choosing this plan.

No matter what you decide to do, it is important that you be as comfortable as possible. Make sure you are asking for and getting treatment for any symptoms you might have, such as pain. This type of treatment is called “palliative” treatment.

Palliative treatment helps relieve these symptoms, but is not expected to cure the disease; its main purpose is to improve your quality of life. Sometimes, the treatments you get to control your symptoms are similar to the treatments used to treat cancer. For example, radiation therapy might be given to help relieve bone pain from bone metastasis. Or chemotherapy might be given to help shrink a tumor and keep it from causing a bowel obstruction. But this is not the same as receiving treatment to try to cure the cancer.

At some point, you may benefit from hospice care. Most of the time, this can be given at home. Your cancer may be causing symptoms or problems that need attention, and hospice focuses on your comfort. You should know that receiving hospice care doesn't mean you can't have treatment for the problems caused by your cancer or other health conditions. It just means that the focus of your care is on living life as fully as possible and feeling as well as you can at this difficult stage of your cancer.

Remember also that maintaining hope is important. 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. In a way, pausing at this time in your cancer treatment is an opportunity to refocus on the most important things in your

life. This 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.

## What's New in Cervical Cancer Research and Treatment?

Research is under way to find new ways to prevent and treat cancer of the cervix. Some of the promising new developments include the following:

**HPV vaccines:** Vaccines for preventing cervical cancer have been developed and one has been approved by the FDA. These vaccines are intended to produce immunity to HPV types 16 and 18, so that women who are exposed to these viruses will not develop infections. Vaccines are also being developed to prevent some of the other HPV types that also cause cancer and some genital warts.

Some experimental vaccines are also being studied for women with established HPV infections, to help their immune systems destroy the virus and cure the infection before a cancer develops. Still other vaccines are meant to help women who already have advanced cervical cancer that has recurred or metastasized. These vaccines attempt to produce an immune reaction to the parts of the virus (E6 and E7 proteins) that specifically contribute to the abnormal growth of cervical cancer cells. It is hoped that this immunity will kill the cancer cells or stop them from growing.

**Other clinical trials:** Many clinical trials are under way to test new chemotherapy drugs, new ways of giving radiation therapy, and new combinations of surgery and radiation therapy or chemotherapy.

## Additional Resources

### 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-ACS-2345 (1-800-227-2345).

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

Home Care for the Person With Cancer: A Guide for Patients and Families (also available in Spanish)

Human Papilloma Virus Vaccines: Frequently Asked Questions

Sexuality and Cancer: For the Woman Who Has Cancer and Her Partner (also available in Spanish)

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

*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:

Gynecologic Cancer Foundation

Telephone: 1-800-444-4441 or 1-312-578-1439

Internet Address: [www.thegcf.org](http://www.thegcf.org)

National Cancer Institute

Telephone: 1-800-4-CANCER (1-800-422-6237)

Internet Address: [www.cancer.gov](http://www.cancer.gov)

National Cervical Cancer Coalition

Telephone: 1-800- 685-5531 or 1-818-909-3849

Internet Address: [www.nccc-online.org](http://www.nccc-online.org)

National Coalition for Cancer Survivorship

Telephone: 1-877-NCCS-YES (1-877-622-7937)

Internet Address: [www.canceradvocacy.org](http://www.canceradvocacy.org)

Centers for Disease Control and Prevention (CDC)

DES Update

Telephone: 1-888-232-6789

Internet Address: [www.cdc.gov/des](http://www.cdc.gov/des)

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

The American Cancer Society is happy to address almost any cancer-related topic. If you have any more questions, please call us at 1-800-ACS-2345 at any time, 24 hours a day.

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**Last Review Date:** 8/3/2006

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For additional assistance please contact your American Cancer Society  
1 - 800 - ACS-2345 or [www.cancer.org](http://www.cancer.org)