



Cancer Reference Information

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Detailed Guide: Cervical Cancer

Can Cervical Cancer Be Prevented?

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

Things to do to prevent pre-cancers

Avoid being exposed to HPV: You can prevent most pre-cancers of the cervix by avoiding exposure to HPV. Certain types of sexual behavior increase a woman's risk of getting HPV infection, such as:

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

Delay sex: Waiting to have sex until you are older can help you avoid HPV. It also helps to limit your number of sexual partners and to avoid having sex with someone who has had many other sexual partners. Remember that someone can have HPV for years yet have no symptoms - it does not always cause warts or any other symptoms. Someone can have the virus and pass it on without knowing it.

Use condoms: Condoms provide some protection against HPV. One study found that when condoms are used correctly they can lower the HPV infection rate by about 70% - if they are used every time sex occurs. Condoms cannot protect completely because they don't cover every possible HPV-infected area of the body, such as skin of the genital or anal area. Still, condoms provide some protection against HPV, and they also protect against HIV and some other sexually transmitted diseases.

Don't smoke: Not smoking is another important way to reduce the risk of cervical precancer and cancer.

Get vaccinated: Vaccines have been developed that can protect women from HPV infections. So far, a vaccine that protects against HPV types 6, 11, 16 and 18 (Gardasil[®]) and one that protects against types 16 and 18 (Cervarix[®]) have been studied.

Gardasil[®] has been approved for use in this country by the FDA. It requires a series of 3 injections over a 6-month period. The second injection is given 2 months after the first one, and the third is given 4 months after the second. Side effects are said to be mild. The most common one is short-term redness, swelling, and soreness at the injection site. In clinical trials, Gardasil prevented genital warts caused by HPV types 6 and 11 and prevented pre-cancers and cancers of the cervix caused by HPV types 16 and 18. This vaccine only works to prevent HPV infection -- it will not treat an infection that is already there.

To be most effective, the HPV vaccine should be given before a person starts having sex. The Federal Advisory Committee on Immunization Practices (ACIP) has recommended that the vaccine be given routinely to females aged 11 to 12. It can be given to younger females (as young as age 9) at the discretion of doctors. ACIP also recommended women ages 13 to 26 who have not yet been vaccinated get "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 Society also agrees that "catch-up" vaccinations should be given to females aged 13 to 18. The independent panel making the Society recommendations found that there was not enough proof of benefit to recommend catch-up vaccination for every woman aged 19 to 26 years. As a result, the American Cancer Society recommends that women aged 19 to 26 talk with their health care provider about the risk of previous HPV exposure and potential benefit from vaccination before deciding to get vaccinated. Research is now being done on using Gardasil in older women and in males. The American Cancer Society guideline focuses on Gardasil at this time. As new information on Cervarix[®], Gardasil[®], and other new products becomes available, these guidelines will be updated.

Gardasil is expensive - the vaccine series costs around \$360 (not including any doctor's fee or the cost of giving the injections). It should be covered by most medical insurance plans (if given according to ACIP guidelines). It should also be covered by government programs that pay for vaccinations in children under 18. Because this vaccine costs so much, you may want to check your coverage with your insurance company first.

It is important to realize that the vaccine doesn't protect against all cancer-causing types of HPV, so routine Pap tests are still necessary. One other benefit of the vaccine is that it 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 pre-cancerous changes

One way to prevent cervix cancer is to have testing (screening) to find pre-cancers before they can turn into invasive cancer. The Pap test (or Pap smear) is the most common way to do this. If a precancer is found and treated, it can stop cervical cancer before it really starts. 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 start having sex (vaginal intercourse). A woman who waits until she is over 18 to have sex should start screening no later than age 21. A regular Pap test should be done every year. If the newer liquid-based Pap test is used, testing can be done every 2 years.
- Beginning at age 30, women who have had 3 normal Pap test results in a row may be tested less often- every 2 to 3 years. Either the conventional (regular) Pap test or the liquid-based Pap test can be used. Some women should continue getting tested yearly - such as women exposed to DES before birth and those with a weakened immune system (from HIV infection, organ transplant, chemotherapy, or chronic steroid use).
- 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) need to continue cervical cancer screening, and should continue to follow the guidelines above.

Some women believe that they can stop having Pap tests 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 the limitations of the Pap test is that it needs to be 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.

Making your Pap tests more accurate

You can do several things 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 medicines 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 do tests for sexually transmitted disease. Pap tests are often done during pelvic exams, but you can have a pelvic exam without having a Pap test. A pelvic exam without a Pap test will not help find cervical cancer at an early stage or abnormal cells of the cervix. The Pap test is often done at the start of the pelvic exam, after the speculum is placed. To do a Pap test, the doctor must remove 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 pre-cancers.

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 inside the vagina. The speculum is a metal or plastic instrument that keeps the vagina open so that the cervix can be seen clearly. Next, using a small spatula, a sample of cells and mucus is lightly scraped from the exocervix (the surface of the cervix that is closest to the vagina). A small brush or a cotton-tipped swab is then used to take a sample from the endocervix (the inside part of the cervix that is closest to the body of the uterus). There are 2 main ways to prepare the cell samples so that they can be examined under a microscope in the laboratory.

1. **Conventional cytology:** The first way is to smear the sample directly onto a glass microscope slide, which is then sent to the laboratory. For about 50 years, all cervical cytology samples were handled this way. This method works quite well and is relatively inexpensive, but it does have some drawbacks. One problem with this method is that the cells smeared onto the slide are sometimes piled up on each other, making it hard to see the cells at the bottom of the pile. Also, white blood cells (pus), increased mucus, yeast cells, or bacteria from infection or inflammation can hide the cervical cells. Another problem with direct smears is that if the slides are not treated (with a preservative) right away, the cells can dry out. This can make it difficult to tell if there is something wrong with the cells. If the cervical cells cannot be seen well (because of any of these problems), the Pap smear may need to be done again.
2. **Liquid based cytology:** Another method is to put the sample of cells from the cervix into a special preservative liquid (instead of putting them on a slide directly). Technicians use special lab instruments that spread the cells in the liquid onto glass slides to look at under the microscope. This method is called liquid-based cytology, or a liquid-based Pap test. The liquid helps remove some of the mucus, bacteria, yeast, and pus cells in a sample. It also allows the cervical cells to be spread more evenly on the slide and

keeps them from drying out and distorting. Cells kept in the liquid can also be tested for HPV. Using liquid-based testing reduces the chance that the Pap test will need to be repeated, but it does not seem to find more pre-cancers than a regular Pap test. This method, also known by brand names ThinPrep[®] or AutoCyte[®], is more expensive than a usual Pap test.

Another way to improve the Pap test is by using computerized instruments that can spot abnormal cells in Pap tests. The AutoPap[®] instrument has been approved by the FDA to read Pap tests first (instead of them being examined by a technologist). It is also approved by the FDA for rechecking Pap test results that were read as normal by technologists. Any smear identified as abnormal by the AutoPap[®] would then be reviewed by a doctor or a technologist.

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

For now, the best way to detect cervical cancer early 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, and
- other malignant neoplasms.

Negative for intraepithelial lesion or malignancy: This first category means that no signs of cancer, pre-cancerous changes, or other significant abnormalities were found. Some specimens in this category appear entirely normal. Others may have findings that are unrelated to cervical cancer, such as signs of infections (with yeast, herpes, or Trichomonas, for example). Some cases may also show "reactive cellular changes", which is the way cervical cells respond to infection or other irritation.

Epithelial cell abnormalities: The second category, epithelial cell abnormalities, means that the cells of the lining layer of the cervix show changes that might be cancer or a pre-cancerous 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 category includes atypical squamous cells of uncertain significance (ASC-US). This term is used when there are cells that look abnormal, but it is not possible to tell (by looking at the cells under a microscope) whether the cause is infection, irritation, or precancer. Most of the time, cells labeled ASC-US are not precancer.. Some doctors will recommend repeating the Pap test after several months. Some doctors use the HPV DNA test to help them decide the best treatment plan. If a woman with ASC-US is infected with a high-risk type of HPV, doctors are more inclined to do a colposcopy. If a high grade SIL is suspected, it is called ASC-H. and colposcopy is recommended.

Squamous intraepithelial lesions (SILs): These abnormalities are divided into low-grade SIL and high-grade SIL. High-grade SILs are less likely than low-grade SILs to go away without treatment. High-grade SILs are also more likely to eventually develop into cancer if they are not treated. Treatment can cure all SILs and prevent true cancer from developing. A Pap test cannot tell 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. Any patient with an SIL should have colposcopy. The need for treatment is based on the results of the colposcopy. Since most SILs are positive for HPV, HPV testing is not very helpful in deciding what to do for an SIL.

Squamous cell carcinoma: This result means that the woman is likely to have an invasive squamous cell cancer. Further testing will be done to be sure of the diagnosis before treatment can be planned.

The Bethesda System also describes epithelial cell abnormalities for glandular cells.

Adenocarcinoma: 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 uterus (endometrium), or elsewhere in the body.

Atypical glandular cells: When the glandular cells do not look normal, but 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 will have more testing if her cervical cytology result shows atypical glandular cells.

The HPV DNA test

As mentioned earlier, the most important risk factor for developing cervical cancer is infection with 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 similarly 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 is used in 2 different situations.

- The FDA has approved the HPV DNA test to be used in combination with the Pap test to screen for cervical cancer in women over 30 years old (see American Cancer Society screening guidelines above). It does NOT replace the Pap test. Women in their 20s who are sexually active are much more likely (than older women) to have an HPV infection that will go away on its own. For these younger women, results of this test are not as significant and may be more confusing. For this reason, the HPV DNA test is not recommended as a screening test in women under 30. 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 of any age who have slightly abnormal Pap test results to find out if they might need more testing or treatment (see next section).

Other tests for women with abnormal cervical cytology results

The Pap test is a screening test, not a diagnostic test. An abnormal Pap test result means that you will need to have other tests to find out if a cancer or a pre-cancerous change is actually present. The tests that are used include colposcopy (with biopsy) and endocervical scraping. These tests are commonly used when the results of a Pap test are SIL or atypical glandular cells. If a biopsy shows a precancer, doctors will take steps to keep an actual cancer from developing.

Doctors are less certain about what to do when the Pap test result shows atypical squamous cells. In deciding what to do, 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. For ASC-H, many doctors will recommend colposcopy and biopsy. For ASC-US some doctors will recommend colposcopy and biopsy if high-risk HPV DNA is detected, but others recommend repeating the Pap test after several months.

Colposcopy

If you have certain symptoms that suggest cancer or if your Pap test shows abnormal cells, you will need to have a test called colposcopy. In this procedure you will lie on the exam table as you do with a pelvic exam. A speculum will be placed in the vagina to help the doctor see the cervix. The doctor will use the colposcope to examine the cervix. The colposcope is an instrument with magnifying lenses (like binoculars), that lets the doctor see the surface of the cervix closely and clearly. The doctor may "treat" your cervix with a weak solution of acetic acid (similar to vinegar) to make any abnormal areas easier to see.

Colposcopy is not painful, has no side effects, and can be done safely even if you are pregnant. If an abnormal area is seen on the cervix, a biopsy will be done. For a biopsy, a small piece of tissue is removed from the area that looks abnormal. 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 pre-cancers and cancers. If the biopsy can completely remove all of the abnormal tissue, it may be the only treatment 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 bleed slightly afterward. A local anesthetic is sometimes used to numb the cervix before the biopsy.

Endocervical curettage (endocervical scraping): The colposcope does not help the doctor see into the endocervix. The endocervix will have to be scraped to see if it is affected by precancer or cancer. This procedure is usually done at the same time as the colposcopic biopsy. A local anesthetic may be used to numb the cervix. Then a narrow instrument (called a 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 that is lining the endocervical canal is removed by scraping with the curette. This tissue sample is sent to the laboratory for examination. After this procedure, patients may feel a cramping pain, and they may also have some light bleeding.

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 exocervix (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 exocervix and endocervix) is contained within the cone. This is the area of the cervix where pre-cancers and cancers are most likely to develop. The cone biopsy can also be used as a treatment to completely remove many pre-cancers and some very early cancers. Having a cone biopsy will not keep most women from getting pregnant, but if a large amount of tissue has been removed, women may have a higher risk of giving birth prematurely.

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):** In this method, 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:** This method uses a surgical scalpel or a laser instead of 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 last 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. Pre-cancerous changes are called cervical intraepithelial neoplasia (CIN) or, rarely, dysplasia, instead of squamous intraepithelial lesion (SIL). The terms for reporting cancers (squamous cell carcinoma and adenocarcinoma) are the same.

How women with abnormal Pap test results are treated to prevent cervical cancers from developing

If an abnormal area is seen during the colposcopy, your doctor can remove it with LEEP (LLETZ procedure) or a cold knife cone biopsy. Other options include 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 cryosurgery and laser surgery can be done in a doctor's office or clinic. After treatment, you may have a lot of watery brown discharge for a few weeks.

These treatments are almost always effective in destroying pre-cancers 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, the treatments can be repeated.

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