What is Cervical Cancer?

Cervical cancer starts in a woman's cervix, the lower narrow part of the uterus. The uterus holds the growing fetus during pregnancy. The cervix connects the lower part of the uterus to the vagina and, with the vagina, forms the birth canal. Cervical cancer is also called "cancer of the cervix."

Cervical cancer usually grows very slowly. Over a period of several years, cells on the surface of the cervix change from normal to abnormal. At first, the change is simply abnormal, not cancerous. Researchers believe, however, that some of these abnormal changes mark the first step in a series of slow changes that can lead to cancer.

Some of the abnormal changes go away without treatment, but others are pre-cancerous and need attention to keep cancer from developing. This phase of the disease is called "**dysplasia.**" Often, the pre-cancerous tissue can be removed or destroyed without harming healthy tissue, but in some cases, a hysterectomy (removal of the uterus) is needed to prevent **cervical cancer.** How a pre-cancerous area (called a "lesion") is treated depends on how big the lesion is and what type of changes have occurred in the cells, whether the woman wants to have children in the future, the woman's age, the woman's general health and the preference of the woman and her doctor.

If the pre-cancerous cells change into true cancer cells and spread deeper into the cervix or to other tissues and organs, the disease is then called cervical cancer.

Cervical cancers are divided into two main types, named for the type of cell within the cervix where the cancer started:

- **Squamous cell carcinomas** make up about 85%-90% of all cervical cancers
- Another 10%-15% are **adenocarcinomas**

As we well know, there are many kinds of cancer; unfortunately they all come about because of the out-of-control growth of abnormal cells.

Healthy Cells vs. Cancer Cells

Healthy cells are like a cat. They need structure to determine the size of bones and shape of the body, tail and whiskers. The DNA in genes and chromosomes determine this. They need energy to play and prowl and sustain life. This is derived from chemicals in food. Cats need a system to deliver chemicals (food nutrients like amino acids, carbohydrates, fats, vitamins and minerals) to all parts of their body. These are the blood

vessels. Growth factors take a kitten into a lazy old cat, all the while helping it to function normally.

The body and its cells are mostly made up of protein. The building blocks of proteins are substances called amino acids that in the form of enzymes and hormones literally control every chemical reaction within the cells. When these are modified, different messages are sent to a complex control system that can alter their function. There are twenty different kinds of amino acids that are essential to life. Twelve of these can be synthesized within the body however; eight must be supplied by the daily diet.

Structure	
Normal Cells	**Cancer Cells**
DNA in genes and chromosomes go about their business in a normal way.	Cancer cells develop a different DNA or gene structure or acquire abnormal numbers of chromosomes.
Cells divide in an orderly way to produce more cells only when the body needs them.	Cells continue to be created without control or order. If not needed, a mass of tissue is formed which is called a tumor.
Energy	
Normal Cells	**Cancer Cells**
Cells derive 70% of their energy from a system called the “Krebs Cycle.”	Cells have a defective “Krebs Cycle” and derive little or no energy from it.
Cells derive only 20% of their energy from a system called “Glycolosis.”	Cancer cells derive almost all their energy from “Glycolosis.”
Cells derive most of their energy with the use of oxygen.	Cells derive most of their energy in the absence of oxygen.
Blood Vessels	
Normal Cells	**Cancer Cells**
Cells have a built-in blood vessel system.	Cells do not have a built-in blood vessel system. They require more of certain amino acids to grow.

Growth Factors	
Normal Cells	**Cancer Cells**
While similar to cancer cells, the amount of them is more in balance to produce a more normal level of activity.	These cells have over produced, require more chemicals (food) and are over active.
Functions	
Normal Cells	**Cancer Cells**
The enzymes and hormones go about business in a normal balanced manner.	The enzymes and hormones are either over active or under active.
Tumors are Different	
Benign	**Malignant**
Benign tumors are not cancerous. They do not invade nearby tissues nor spread to other parts of the body. They can be removed and are not a threat to life.	Malignant tumors are cancerous. They can invade and damage nearby tissues and organs and they can break away and enter the blood stream to form new tumors

	in other parts of the body. The spread of cancer is called metastasis.

What causes, and are there ways to prevent cancer of the cervix?

By studying large numbers of women all over the world, researchers have identified certain risk factors that increase the chance that cells in the cervix will become abnormal or cancerous. They believe that, in many cases, cervical cancer develops when two or more risk factors act together.

Research has shown that women who began having sexual intercourse before age 18 and women who have had many sexual partners have an increased risk of developing cervical cancer. Women also are at increased risk if their partners began having sexual intercourse at a young age, have had many sexual partners, or were previously married to women who had cervical cancer.

Scientists do not know exactly why the sexual practices of women and their partners affect the risk of developing cervical cancer. However, research suggests that some sexually transmitted viruses can cause cells in the cervix to begin the series of changes that can lead to cancer. Women who have had many sexual partners or whose partners have had many sexual partners may have an increased risk for cervical cancer at least in part because they are more likely to get a sexually transmitted virus.

Scientists are studying the effects of sexually transmitted human papillomaviruses (HPVs). Some sexually transmitted HPVs cause genital warts (condylomata acuminata). In addition, scientists believe that some of these viruses may cause the growth of abnormal cells in the cervix and may play a role in cancer development. They have found that women who have HPV or whose partners have HPV have a higher-than-average risk of developing cervical cancer. However, most women who are infected with HPV do not develop cervical cancer, and the virus is not present in all women who have this disease. For these reasons, scientists believe that other factors act together with HPVs. For example, the GENITAL HERPES virus also may play a role. Further research is needed to learn the exact role of these viruses and how they act together with other factors in the development of cervical cancer.

Smoking also increases the risk of cancer of the cervix, although it is not clear exactly how or why. The risk appears to increase with the number of cigarettes a woman smokes each day and with the number of years she has smoked.

Women whose mothers were given the drug diethylstilbestrol (DES) during pregnancy to prevent miscarriage also are at increased risk. (This drug was used for this purpose from about 1940 to 1970). A rare type of vaginal and cervical cancer has been found in a small number of women whose mothers used DES.

Several reports suggest that women whose immune systems are weakened are more likely than others to develop cervical cancer. For example, women who have the (HIV) virus, which causes AIDS, are at increased risk. Also, organ transplant patients, who receive drugs that suppress the immune system to prevent rejection of the new organ, are more likely than others to develop precancerous lesions.

Some researchers believe that there is an increased risk of cervical cancer in women who use oral contraceptives (the pill). However, scientists have not found that the pill directly causes cancer of the cervix. This relationship is hard to prove because the two main risk factors for cervical cancer, intercourse at an early age and multiple sex partners, may be more common among women who use the pill than among those who do not. Still, oral contraceptive labels warn of this possible risk and advise women who use them to have yearly Pap tests.

Some research has shown that vitamin A may play a role in stopping or preventing cancerous changes in cells like those on the surface of the cervix. Further research with forms of vitamin A may help scientists learn more about preventing cancer of the cervix.

At present, early detection and treatment of precancerous tissue remain the most effective ways of preventing cervical cancer. Women should talk with their doctor about an appropriate schedule of checkups. The doctor's advice will be based on such factors as the women's age, medical history, and risk factors.

PREPARING FOR TREATMENT

Most women with cervical cancer want to learn all they can about their disease and treatment choices so they can take an active part in decisions about their medical care. Doctors and others on the medical team can help women learn what they need to know.

When a person is diagnosed with cancer, shock and stress are natural reactions. These feelings may make it difficult for patients to think of everything they want to ask the doctor. Often it helps to make a list of questions. Also, to help remember what the doctor says, patients may take notes or ask whether they can use a tape recorder. Some people also want to have a family member or friend with them when they talk to the doctor, to take part in the discussion, to take notes, or just to listen.

Patients should not feel they need to ask all their questions or remember all the answers at one time. They will have other chances to ask the doctor to explain things and to get more information.

There are usually no noticeable signs of early cervical cancer but it can be detected early with yearly check-ups.

Early cervical cancer may not cause noticeable signs or symptoms. Women should have yearly check-ups, including a Pap smear to check for abnormal cells in the cervix. The prognosis (chance of recovery) is better when the cancer is found early.

Possible signs of cervical cancer include vaginal bleeding and pelvic pain.

These and other symptoms may be caused by cervical cancer or by other conditions. A doctor should be consulted if any of the following problems occur:

- Vaginal bleeding.
- Unusual vaginal discharge.

- Pelvic pain.
- Pain during sexual intercourse.

Tests that examine the cervix are used to detect (find) and diagnose cervical cancer.

The following procedures may be used:

- **Pap smear:** A procedure to collect cells from the surface of the cervix and vagina. A piece of cotton, a brush, or a small wooden stick is used to gently scrape cells from the cervix and vagina. The cells are viewed under a microscope to find out if they are abnormal. This procedure is also called a Pap test.
- **Colposcopy:** A procedure to look inside the vagina and cervix for abnormal areas. A colposcope (a thin, lighted tube) is inserted through the vagina into the cervix. Tissue samples may be taken for biopsy.
- **Biopsy:** If abnormal cells are found in a Pap smear, the doctor may do a biopsy. A sample of tissue is cut from the cervix and viewed under a microscope. A biopsy that removes only a small amount of tissue is usually done in the doctor's office. A woman may need to go to a hospital for a cervical cone biopsy (removal of a larger, cone-shaped sample of cervical tissue).
- **Pelvic exam:** An exam of the vagina, cervix, uterus, fallopian tubes, ovaries, and rectum. The doctor or nurse inserts one or two lubricated, gloved fingers of one hand into the vagina and the other hand is placed over the lower abdomen to feel the size, shape, and position of the uterus and ovaries. A speculum is also inserted into the vagina and the doctor or nurse looks at the vagina and cervix for signs of disease. A Pap test or Pap smear of the cervix is usually done. The doctor or nurse also inserts a lubricated, gloved finger into the rectum to feel for lumps or abnormal areas.
- **Endocervical curettage:** A procedure to collect cells or tissue from the cervical canal using a curette (spoon-shaped instrument). Tissue samples may be taken for biopsy. This procedure is sometimes done at the same time as a colposcopy.

Certain factors affect prognosis (chance of recovery) and treatment options.

The prognosis (chance of recovery) depends on the following:

- The stage of the cancer (whether it affects part of the cervix, involves the whole cervix, or has spread to the lymph nodes or other places in the body).
- The type of cervical cancer.
- The size of the tumor.

Treatment options depend on the following:

- The stage of the cancer.
- The size of the tumor.
- The patient's desire to have children.
- The patient's age.

Treatment of cervical cancer during pregnancy depends on the stage of the cancer and the stage of the pregnancy. For cervical cancer found early or for cancer found during the last trimester of pregnancy, treatment may be delayed until after the baby is born.

After cervical cancer has been diagnosed, tests are done to find out if cancer cells have spread within the cervix or to other parts of the body.

The process used to find out if cancer has spread within the cervix or to other parts of the body is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment. The following tests and procedures may be used in the staging process:

- **Chest x-ray:** An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- **CT scan (CAT scan):** A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.
- **Lymphangiogram:** A procedure used to x-ray the lymph system. A dye is injected into the lymph vessels in the feet. The dye travels upward through the lymph nodes and lymph vessels, and x-rays are taken to see if there are any blockages. This test helps find out whether cancer has spread to the lymph nodes.
- **Surgery:** Pretreatment surgical staging: Surgery (an operation) is done to find out if the cancer has spread within the cervix or to other parts of the body. In some cases, the cervical cancer can be removed at the same time. Pretreatment surgical staging is usually done only as part of a clinical trial.
- **Ultrasound:** A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram.
- **MRI (magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body. This procedure is also called nuclear magnetic resonance imaging (NMRI).

The results of these tests are viewed together with the results of the original tumor biopsy to determine the cervical cancer stage.

The following stages are used for cervical cancer:

Stage 0 (Carcinoma in Situ)

In stage 0, cancer is found in the first layer of cells lining the cervix only and has not invaded the deeper tissues of the cervix. Stage 0 is also called carcinoma in situ.

Stage 0 Cervical Cancer (Carcinoma in Situ)

Treatment of stage 0 cervical cancer may include the following:

- Loop electrosurgical excision procedure (LEEP).
- Laser surgery.
- Conization.
- Cryosurgery.
- Total hysterectomy for women who cannot or no longer want to have children.
- Internal radiation therapy for women who cannot have surgery.

Stage I

In stage I, cancer is found in the cervix only. Stage I is divided into stages IA and IB, based on the amount of cancer that is found.

- Stage IA: A very small amount of cancer that can only be seen with a microscope is found in the tissues of the cervix. The cancer is not deeper than 5 millimeters and not wider than 7 millimeters.
- Stage IB: In stage IB, cancer is still within the cervix and either:
    - can only be seen with a microscope and is deeper than 5 millimeters or wider than 7 millimeters; or
    - can be seen without a microscope and may be larger than 4 centimeters.

Stage IA Cervical Cancer

Treatment of stage IA cervical cancer may include the following:

- Total hysterectomy with or without bilateral salpingo-oophorectomy.
- Conization.
- Radical hysterectomy and removal of lymph nodes.
- Internal radiation therapy.

Stage IB Cervical Cancer

Treatment of stage IB cervical cancer may include the following:

- A combination of internal radiation therapy and external radiation therapy.
- Radical hysterectomy and removal of lymph nodes.
- Radical hysterectomy and removal of lymph nodes followed by radiation therapy plus chemotherapy.
- Radiation therapy plus chemotherapy.
- A clinical trial of high-dose internal radiation therapy combined with external radiation therapy.

Stage II

In stage II, cancer has spread beyond the cervix but not to the pelvic wall (the tissues that line the part of the body between the hips). Stage II is divided into stages IIA and IIB, based on how far the cancer has spread.

- Stage IIA: Cancer has spread beyond the cervix to the upper two thirds of the vagina but not to tissues around the uterus.
- Stage IIB: Cancer has spread beyond the cervix to the upper two thirds of the vagina and to the tissues around the uterus.

Stage IIA Cervical Cancer

Treatment of stage IIA cervical cancer may include the following:

- A combination of internal radiation therapy and external radiation therapy.
- Radical hysterectomy and removal of lymph nodes.
- Radical hysterectomy and removal of lymph nodes followed by radiation therapy plus chemotherapy.
- Radiation therapy plus chemotherapy.
- A clinical trial of high-dose internal radiation therapy combined with external radiation therapy.

Stage IIB Cervical Cancer

Treatment of stage IIB cervical cancer may include internal and external radiation therapy combined with chemotherapy.

Stage III

In stage III, cancer has spread to the lower third of the vagina and may have spread to the pelvic wall and nearby lymph nodes. Stage III is divided into stages IIIA and IIIB, based on how far the cancer has spread.

- Stage IIIA: Cancer has spread to the lower third of the vagina but not to the pelvic wall.
- Stage IIIB: Cancer has spread to the pelvic wall and/or the tumor has become large enough to block the ureters (the tubes that connect the kidneys to the bladder). This blockage can cause the kidneys to enlarge or stop working. Cancer cells may also have spread to lymph nodes in the pelvis.

Stage III Cervical Cancer

Treatment of stage III cervical cancer may include internal and external radiation therapy combined with chemotherapy.

Stage IV

In stage IV, cancer has spread to the bladder, rectum, or other parts of the body. Stage IV is divided into stages IVA and IVB, based on where the cancer is found.

- Stage IVA: Cancer has spread to the bladder or rectal wall and may have spread to lymph nodes in the pelvis.
- Stage IVB: Cancer has spread beyond the pelvis and pelvic lymph nodes to other places in the body, such as the abdomen, liver, intestinal tract, or lungs.

Stage IVA Cervical Cancer

Treatment of stage IVA cervical cancer may include internal and external radiation therapy combined with chemotherapy.

Stage IVB Cervical Cancer

Treatment of stage IVB cervical cancer may include the following:

- Radiation therapy as palliative therapy to relieve symptoms caused by the cancer and improve quality of life.
- Chemotherapy.
- Clinical trials of new anticancer drugs or drug combinations.

There are different types of treatment for patients with cervical cancer.

Different types of treatment are available for patients with cervical cancer. Some treatments are standard (the currently used treatment), and some are being tested in clinical trials. Before starting treatment, patients may want to think about taking part in a clinical trial. A treatment clinical trial is a research study meant to help improve current treatments or obtain information on new treatments for patients with cancer. When clinical trials show that a new treatment is better than the standard treatment, the new treatment may become the standard treatment.

Three types of standard treatment are used:

1. Surgery

Surgery (removing the cancer in an operation) is sometimes used to treat cervical cancer. The following surgical procedures may be used:

- **Conization:** A procedure to remove a cone-shaped piece of tissue from the cervix and cervical canal. A pathologist views the tissue under a microscope to look for cancer cells. Conization may be used to diagnose or treat a cervical condition. This procedure is also called a cone biopsy.
- **Total hysterectomy:** A surgical procedure to remove the uterus, including the cervix. If the uterus and cervix are taken out through the vagina, the operation is called a vaginal hysterectomy. If the uterus and cervix are taken out through a large incision (cut) in the abdomen, the operation is called a total abdominal hysterectomy. If the uterus and cervix are taken out through a small incision in the abdomen using a laparoscope, the operation is called a total laparoscopic hysterectomy.
- **Bilateral salpingo-oophorectomy:** A surgical procedure to remove both ovaries and both fallopian tubes.
- **Radical hysterectomy:** A surgical procedure to remove the uterus, cervix, and part of the vagina. The ovaries, fallopian tubes, or nearby lymph nodes may also be removed.
- **Pelvic exenteration:** A surgical procedure to remove the lower colon, rectum, and bladder. In women, the cervix, vagina, ovaries, and nearby lymph nodes are also removed. Artificial openings (stoma) are made for urine and stool to flow

from the body to a collection bag. Plastic surgery may be needed to make an artificial vagina after this operation.

- **Cryosurgery:** A treatment that uses an instrument to freeze and destroy abnormal tissue, such as carcinoma in situ. This type of treatment is also called cryotherapy.
- **Laser surgery:** A surgical procedure that uses a laser beam (a narrow beam of intense light) as a knife to make bloodless cuts in tissue or to remove a surface lesion such as a tumor.
- **Loop electrosurgical excision procedure (LEEP):** A treatment that uses electrical current passed through a thin wire loop as a knife to remove abnormal tissue or cancer.

2. Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells. There are two types of radiation therapy. External radiation therapy uses a machine outside the body to send radiation toward the cancer. Internal radiation therapy uses a radioactive substance sealed in needles, seeds, wires, or catheters that are placed directly into or near the cancer. The way the radiation therapy is given depends on the type and stage of the cancer being treated.

3. Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping the cells from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy). When chemotherapy is placed directly into the spinal column, an organ, or a body cavity such as the abdomen, the drugs mainly affect cancer cells in those areas (regional chemotherapy). The way the chemotherapy is given depends on the type and stage of the cancer being treated.

What are the side effects of treatment for cancer of the cervix?

It is hard to limit the effects of therapy so that only cancer cells are removed or destroyed. Because treatment also damages healthy cells and tissues, it often causes unpleasant side effects.

The side effects of cancer treatment depend mainly on the type and extent of the treatment. Also, each patient reacts differently. Patients who eat well often feel better and have more energy. In addition, they may be better able to handle the side effects of treatment. Eating well during cancer treatment means getting enough calories and protein to prevent weight loss and regain strength. Doctors and nurses can explain the possible side effects of treatment, and they can help relieve symptoms that may occur during and after treatment. It is important to let the doctor know if any side effects occur.

What happens after treatment for cancer of the cervix?

Regular follow-up exams; including a pelvic exam, a Pap test, and other laboratory tests, are very important for any woman who has been treated for precancerous changes or for

cancer of the cervix. The woman should have frequent tests and exams for several years so that the doctor can check for any signs that the condition has returned.

Cancer treatment can cause side effects many years later. For this reason, patients should continue to have regular checkups and should report any health problems that appear.

Living with a serious disease is not easy. Cancer patients and those who care about them face many problems and challenges. Coping with these problems is often easier when people have helpful information and support services. Several useful booklets, including the National Cancer Institute booklet, Taking Time, are available from the Cancer Information Service.

Cancer patients may worry about holding their job, caring for their family, or keeping up with daily activities. Worries about tests, treatments, hospital stays, and medical bills are common. Doctors, nurses, and other members of the health care team can answer questions about treatment, working, or other activities. Also, meeting with a social worker, counselor, or a member of the clergy can be helpful to patients who want to talk about their feelings or discuss their concerns.

Friends and relatives can be very supportive. Also, it helps many patients to discuss their concerns with others who have cancer. Cancer patients often get together in support groups, where they can share what they have learned about coping with cancer and the effects of treatment. It is important to keep in mind, however, that each patient is different. Treatments and ways of dealing with cancer that work for one person may not be right for another, even if they both have the same kind of cancer. It is a good idea to discuss the advice of friends and family members with the doctor.

Often, a social worker at the hospital or clinic can suggest groups that can help with rehabilitation, emotional support, financial aid, transportation, or home care. For example, the American Cancer Society has many services for patients and their families. They also offer many free booklets, including one on sexuality and cancer. Local offices of the American Cancer Society are listed in the white pages of the telephone directory.

Source: A.P. John Institute for Cancer Research

When considering any type of complementary cancer treatment or alternative cancer treatment, always consult with your physician first, as possible interactions could reduce your treatment protocol's efficacy.