

The Female Reproductive System

HEALTH TERMS

vulva
vagina
cervix
uterus
fallopian
ovaries
ovulation
menstruation

HEALTH CONCEPTS

- The female reproductive system functions to produce ova.
- The female reproductive system has external and internal organs.
- The health of the female reproduction system can be ensured through cleanliness, self-examinations, and regular visits to a doctor.

The reproductive system is the only system in the body that has different organs for the male and female. The female reproductive system functions to produce an ovum, or egg cell. The egg cell, when united with a sperm cell, forms a fertilized ovum.

External Female Reproductive Organs

The organs of the female reproductive system are primarily internal. The *external female reproductive organs* are called the **vulva**. They consist of the clitoris, mons pubis, labia majora (outer lips), labia minora (inner lips), and the vaginal opening.

The Mons Pubis and Labia

The mons pubis is a rounded fatty pad of tissue, covered with pubic hair. It is located in the front of the female body, directly on top of the pubic bone.

The labia majora is the outer fold of tissue on either side of the vaginal opening. These outer folds are also covered with pubic hair. The inner folds of skin are called the labia minora. They are just inside the labia majora. These inner folds extend forward, forming a hoodlike covering over the clitoris. Both the inner and outer labia are rich in nerve endings and blood vessels. The labia serve as a line of protection against pathogens entering the body and also have a function in sexual arousal.

The Vaginal Opening

The vaginal opening becomes visible when the labia are parted. Just inside the vaginal opening may be a thin membrane called the hymen. This membrane stretches across the opening of the vagina. It has no known function and is not present in all females. The hymen usually has several openings in it, thus allowing for the passage of the menstrual flow.

Throughout history, there have been many misconceptions about the hymen. It was thought that an intact hymen was the sign of a virgin—a person who has not had sexual intercourse. It was also thought that with first intercourse and the tearing of the hymen, a female experienced pain and bleeding. Neither of these beliefs is true for all females. Some females are born without a hymen. Others may tear the hymen through a variety of physical activities—often without even knowing it.

Some hymen tissue is very flexible and may stay intact during intercourse. Because there are usually openings in the hymen, sperm released at the vaginal opening can swim into the vagina and up to an ovum, resulting in fertilization and pregnancy. Thus, a female could become pregnant and still have an intact hymen.

NOTE. One-third of the vagina acts as a passageway through which menstrual blood leaves the body.

The female reproductive system

The Clitoris

The clitoris is a small knob of tissue in front of the vaginal opening. It has a rich supply of nerve endings and blood vessels. The clitoris has an important function in producing sexual arousal. Recent studies have found that the clitoris has an indirect role in reproduction as well.

Internal Female Reproductive Organs

The internal organs of the female reproductive system are the vagina, uterus, fallopian tubes, and ovaries.

The Vagina

The **vagina** is a very elastic, tubelike passageway, about four to five inches long. Also called the birth canal, the vagina is capable of stretching to allow for the birth of a baby. In its resting state, the walls of the vagina touch each other. During sexual arousal, these walls expand to allow for entrance of the penis.

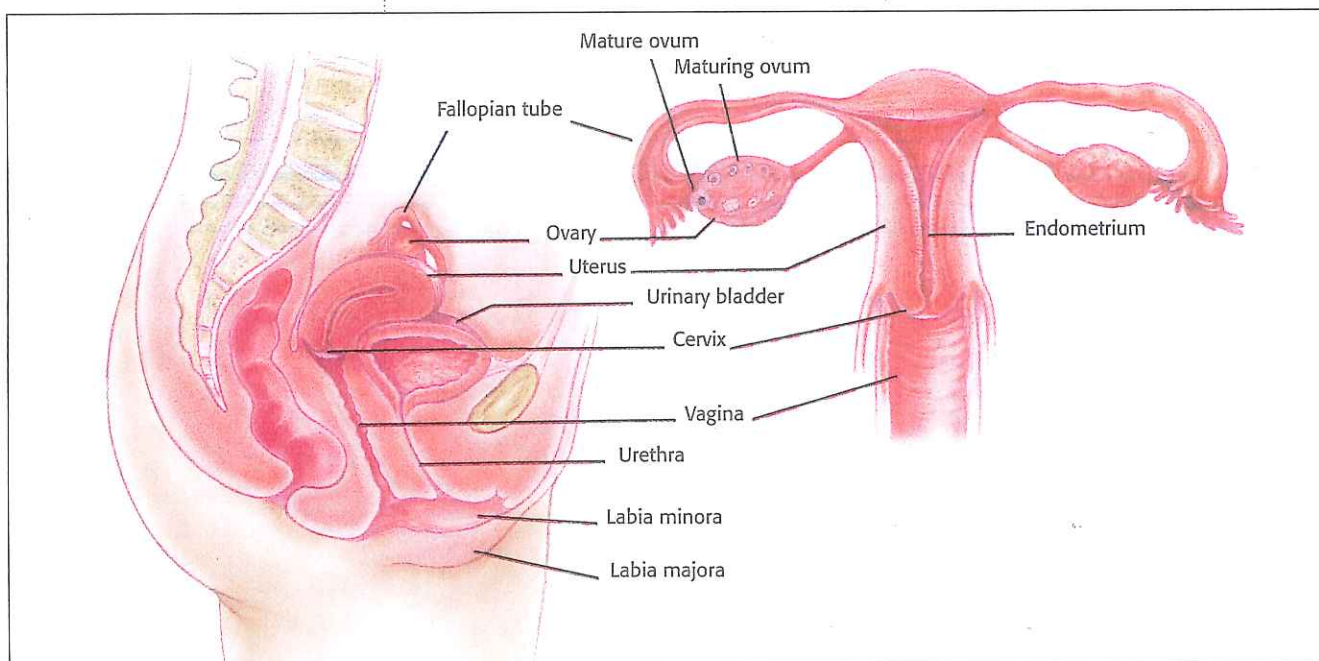
The vagina leads to the **cervix**, or *neck of the uterus*. The cervical opening is very small. During childbirth, the cervix dilates, or opens, to allow the passage of the baby.

The Uterus

The **uterus** is a very strong, elastic muscle about the size of a fist. The primary function of the uterus is to hold and nourish the developing embryo and fetus. The uterus has an inner lining called endometrium, which is richly supplied with blood vessels. It is this lining that builds up with blood tissue each month to prepare for a possible pregnancy.

The Fallopian Tubes

Fallopian (fuh-LOH-pee-uhn) **tubes** are tubes on each side of the uterus. They are extremely narrow and are lined with hairlike projections



called cilia. Fimbriae, fingerlike projections at the end of the fallopian tubes, surround the top part of the ovaries. The cilia in the fimbria gather a released ovum into the fallopian tube. Fertilization of the ovum usually occurs in the widest part of the fallopian tube, near the ovaries.

The Ovaries

The **ovaries** are the female sex glands situated on both sides of the uterus, at the ends of the fallopian tubes. Ovaries have two important functions. They house the ova and produce the female sex hormones estrogen and progesterone.

Ovulation. At birth, a female usually has about 200,000 to 300,000 immature ova in her ovaries. As she enters puberty, hormones from the pituitary gland cause the ovaries to begin producing the female sex hormones. The ova begin to mature. *The process of releasing one mature ovum each month into that ovary's fallopian tube* is called **ovulation**. The ovum can live about two days in the fallopian tube. If at any time during this period sperm are present, one sperm will enter the ovum. This process is called fertilization, or conception. Pregnancy begins at that point.

NOTE. During ovulation, usually one egg is released. Fraternal twins occur when an egg is released from both ovaries during the same ovulation period and both eggs become fertilized.

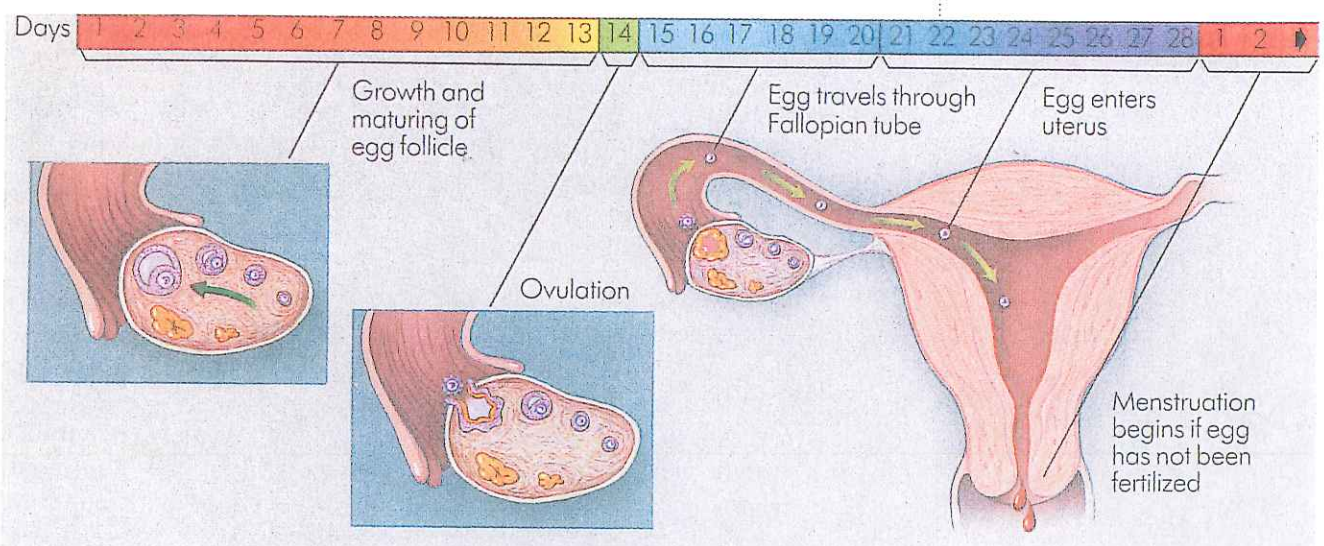
Menstruation

Each month, the uterus begins to prepare for a possible pregnancy by building up a rich, thick layer of blood and other tissue. Hormones produced in the ovaries cause this thickening of the uterine lining. If an ovum is fertilized, it moves into the uterus and may burrow into this lining. It is here the ovum will divide millions of times over the nine months of pregnancy and develop into a human being.

Menstrual Period

If an ovum is not fertilized, or if a fertilized ovum does not attach to the uterine walls, the uterine lining is not needed because there is no pregnancy. The muscles of the uterus contract, causing the lining to gradually break down. This lining passes through the cervix into the vagina and out of the vaginal opening. *The process of shedding the lining of the uterus* is called **menstruation**. The menstrual period usually lasts 4 to 7 days, but in some females it may last 3 days and in others 9 or

The menstrual period occurs when an ovum is not fertilized and the lining of the uterus breaks down.





Coping with PMS

Most females of reproductive age experience at least one or two of the symptoms of PMS to some degree. Doctors recommend a number of changes in diet and lifestyle that can be helpful.

- Find ways to reduce stress.
- Reduce the intake of sugar, salt, and caffeine.
- Do not smoke or drink alcohol.
- Increase the intake of B vitamins and magnesium.
- Eat more leafy green vegetables, whole grains, and fruit.
- Establish and follow a regular exercise program.
- Avoid over-the-counter remedies. They have been shown to have little or no effect on the syndrome. In fact, those high in caffeine may worsen the condition.
- In more serious cases of PMS, antidepressant medication that raises the level of serotonin in the brain can bring relief of many symptoms.
- Those females suffering from numerous or severe symptoms of PMS are urged to see doctor. Only doctors can prescribe the most effective medications.

10 days. The menstrual period is regulated by hormones and will vary from female to female. Because the uterus contracts to break down the lining, the female may experience abdominal cramps at the beginning of the menstrual period.

A female loses about two to three tablespoons of blood during the menstrual period. The rest of the menstrual flow is other tissue that makes up the lining of the uterus. This is blood and tissue that the body does not need, therefore the menstrual period does not make a person weak or ill.

After the period ends, the menstrual cycle begins again. An ovum matures and is released from an ovary. The lining of the uterus begins to build up blood and tissue again. If the ovum is fertilized, it attaches to the lining. If it is not fertilized, the lining breaks down and there is another menstrual period.

Most females begin menstruating between the ages of 10 and 15. It takes the body a couple of years to adjust to all of the changes it is experiencing. For this reason, the menstrual cycle is likely to be irregular during this time. The changes that lead to menopause (the ceasing of menstruation) begin between the ages of 45 and 50. Most women reach menopause at around 50 years old.

Hormones control the menstrual cycle. However, nutrition, stress, and illness can also influence the cycle.

Menstrual Health Care

Health care is important all the time, but it is especially important during the menstrual period. There should not be an odor from the vagina at any time. There is no odor to the menstrual flow until it mixes with air. Many females also perspire more during menstruation. Females should take a bath or shower every day, washing and rinsing thoroughly.

If a female uses sanitary napkins or panty shields to absorb the menstrual flow, she should change them every three to four hours, depending on how heavy her menstrual flow is. Some people use tampons to absorb the menstrual flow. These are cylinders of a cotton material and are placed inside the vagina. They must be changed frequently and should not be worn at night. Tampons left in for more than a four-hour period increase a person's risk of infection.

Concerns About the Female Reproductive System

As with any body system, there can be problems with the female reproductive system. It is important for a female to be familiar with her body and know when common problems might occur.

Premenstrual Syndrome (PMS)

Premenstrual syndrome (PMS) refers to a variety of symptoms that some females experience before their menstrual periods. Symptoms vary and may be experienced two weeks to several days before the menstrual period. Many females never experience PMS.

The symptoms of PMS include nervous tension, anxiety, irritability, bloating, weight gain, depression, mood swings, and fatigue. The causes of PMS are not completely understood, but it seems to be more common in women in their 30s. Some doctors believe that PMS is related to

a hormonal imbalance. Others attribute the cause to a nutritional deficiency. However, the most recent studies indicate that the chemicals in the brains of females with PMS may be disturbed by normal levels of ovarian hormones. A number of treatments exist, including changes in diet, exercise, and, in more serious cases, antidepressant medication.

Dysmenorrhea

Dysmenorrhea, or menstrual cramps, consists of painful contractions in the uterus during menstruation. Menstrual cramps are usually mild, lasting several hours. However, more painful cramping lasting for a day or two are also perfectly normal. Light exercise or over-the-counter pain reliever (except aspirin) can help relieve cramps. A warm bath or a heating pad might also help to relax muscles. However, severe or persistent cramping may be an indication that medical attention is necessary.

STRESS. Those suffering from dysmenorrhea should avoid aspirin during menstruation. Aspirin causes increased bleeding and cramping.

Amenorrhea

The lack of menstruation by age 16 or the stopping of the menstrual cycle in a female who previously menstruated is called amenorrhea. A female who is 16 years old and has never had a period, or a female whose periods have stopped for 3 months, should see a doctor. Amenorrhea can be the result of physical defects in the female sex organs, diseases such as diabetes, tumors, infections, or lack of maturation of the endocrine system. More commonly, amenorrhea is caused by excessive athletic activities, emotional distress, eating disorders, or starvation.

Toxic Shock Syndrome

Toxic shock syndrome (TSS) is a rare disease caused by a pathogen called *Staphylococcus aureus*. The bacterium is commonly found on the skin, in the mouth, and in the vagina. Under certain conditions, the bacterium can produce a toxin (poison) that affects the immune system and the liver.

Symptoms of TSS include a high fever, vomiting, diarrhea, low blood pressure, dizziness, fainting, and a rash resembling sunburn. It can result in liver and kidney damage and, in about 5 percent of cases, death. However, in most cases, the disease is treatable with antibiotics, fluids, and other supportive therapy.

More than half of all cases occur in women, but TSS has also been diagnosed in men and children. Among women, most cases of TSS have been traced to the use of super-absorbent tampons that absorb magnesium and provide an oxygen-rich atmosphere in the vagina. This environment enables the bacterium to easily produce its toxins. This cause of TSS can be avoided by using super-absorbent tampons only intermittently, or not at all.

Vaginitis

Vaginitis refers to vaginal infections and is a very common condition in females. It will affect most females at some point during their lives. There are several types of vaginal infections. The three most common are yeast infection, nonspecific vaginitis, and trichomoniasis. Most vaginitis is the result of an imbalance of the organisms normally present in the vagina. Some vaginitis is the result of sexual contact with an infected person.

NOTE. Some tampons have a deodorant chemical in them. This chemical can cause irritation to the lining of the vagina, leading to vaginitis.

Did You Know?

- The cause of endometriosis is unknown. It occurs equally in women of all economic classes and races. It is estimated that between 10 percent and 20 percent of American women of childbearing age have endometriosis.
- Endometriosis occurs when tissues surrounding the area of endometriosis become inflamed or swollen. The inflammation may produce scar tissue. This can lead to infertility.
- The most common symptoms of endometriosis is pain in the abdomen or lower back, especially dysmenorrhea.
- There are no permanent cures. However, some temporary treatments do exist including pain medication, hormone suppression medications, and surgery.

STRESS. Girls may be hesitant to seek care for vaginitis for fear that someone (doctor, parent, friend) will suspect they are sexually active. Emphasize that vaginitis is often a normal response of the body to an imbalance of the organisms that are normally present in the vagina. It is not an indication of sexual activity.

NOTE. Up to 60 percent of females have a condition in which small cysts or lumps are present in the breasts. These lumps are not serious and may be most noticeable during the premenstrual period. Though the lumps are not a sign of breast cancer, the female should be examined by a doctor. Caffeine should be avoided.

- **Yeast infection.** The signs of yeast infection, which is caused by a fungus, are a thick, white, odorous discharge and genital itching.
- **Nonspecific Vaginitis.** This infection is caused by bacteria. Symptoms include itching, an odorless discharge, and a burning sensation during urination.
- **Trichomoniasis.** This infection often occurs at the end of the menstrual period and is caused by a protozoan, a small living organism. The symptoms include an odorous discharge, genital itching, and occasionally a burning sensation during urination.
- **Treatment.** A female who notices the symptoms of vaginitis should contact a doctor or clinic for proper diagnosis and treatment. Treatments for yeast infections usually include a yeast-killing cream or suppository medication placed inside the vagina. While some yeast medications are available over-the-counter, it is always recommended that a person visit a doctor to be sure the diagnosis is correct. Trichomoniasis and nonspecific vaginitis are usually treated with an antibiotic that must be prescribed by a doctor.

Sterility

Sterility in the female takes a number of forms. One cause of female sterility is a blocking of one or both fallopian tubes. When this happens, ova cannot pass into the uterus. Another cause of sterility occurs when the female does not ovulate. A third cause of female sterility is endometriosis, a condition in which endometrial tissue grows outside the uterus in other areas of the pelvic cavity. Surgery can sometimes correct this condition. STDs that are left untreated can cause sterility. Untreated gonorrhea and chlamydia are the most common STDs that cause sterility.

Breast Cancer

Breast cancer is the most common form of cancer in females and the second leading cause of death in females after lung cancer. The American Cancer Society projected in 1998 that there would be 178,000 cases in women and 1,600 in men during the year with 43,500 women and 400 men dying from the disease. Two-thirds of cases occur in women more than 50 years old, but breast cancer does occur in younger women as well.

No one knows exactly what causes breast cancer, so there is little anyone can do to prevent it. However, it is recommended that a person maintain her ideal weight for her height and build and eat foods high in vitamins A and C. Also, like all cancers, breast cancer is most treatable and curable when detected early. Also, treatment may be more limited and less disfiguring if the cancer is found when it is confined to a small area of the breast. For these reasons, cancer research scientists have long looked for methods of detecting or finding breast cancer early in its growth, before it has had a chance to spread to other parts of the body. Studies show that females with a family history of breast cancer develop the disease at about twice the average rate.

Symptoms of breast cancer for both males and females include:

- change in breast or nipple appearance
- lump or swelling in the breast
- lump under the armpit

Breast Cancer: Prevention and Treatment

Years ago a diagnosis of cancer meant a person had almost no hope of survival. Today the cure rate, or no sign of cancer 5 years after treatment, is close to 50 percent.

Breast self-examination done a week or two after the menstrual cycle helps detect possible lumps or dimpling of the breasts or changes in the nipple.

Another method of early detection is mammography, when the breast is pressed between two plates, and an X-ray of the breast is taken. An annual mammogram is advised for females at age 40. The amount of radiation received during mammography is small. Mammography can reveal signs of cancer up to two years before more obvious symptoms appear.

If breast cancer is detected, several treatment options are available. These include:

Surgery—radical mastectomy involves surgical removal of the mammary nodes including underlying muscle.

Surgery—modified mastectomy involves removal of the cancerous part of the breast or tumor on the breast. This procedure is also called a lumpectomy.

Radiotherapy—radiation is used to remove tumors and axillary nodes. It is often used with a form of surgery, such as lumpectomy.

Hormonal treatment—some hormonal suppression and control can be used to treat cancer that has dispersed to other parts of the body.

Chemotherapy—chemicals are used that affect dividing cancerous cells more than normal tissues.

Adjuvant therapy—hormones or medicines are used after surgery to destroy any remaining cancer cells so no new growth can begin.

Ninety percent of all breast lumps in females are discovered by the females themselves—most of the lumps are benign, or harmless.

Cervical Cancer

Another common cancer in women is cervical cancer. A Pap smear is a test used by doctors to detect abnormal cells. A Pap smear is taken using a long instrument, similar to a cotton swab, to gather the cells from the cervix. These cells are placed on a slide for laboratory examination. It is from these cells that cancer or precancerous cells are detected.

If not caught early, cancer cells start to spread more deeply into the cervix and to surrounding areas. Cervical cancer can be treated with surgery to remove part or all of the cervix and other affected areas. Radiation or chemotherapy, which uses drugs to kill cancer cells, are also used.

STRESS. Pap smears do not test for sexually transmitted diseases.

There are no early symptoms of cervical cancer. However, there are several conditions, or risk factors, which make some females more likely to get cervical cancer than other females. Some of these risk factors include being between the ages of 20 and 30, never having a Pap smear or not having one for several years, having sexual intercourse at an early age, and having multiple sexual partners. Whether or not a female has any of these risk factors, she should have a Pap smear done every year from the time she is 18, or earlier if she is sexually active.

Ovarian Cancer

About 25,000 females in the United States are diagnosed with ovarian cancer each year. There are two types of ovarian cancer. One type occurs in the lining of the ovary. The other type occurs in the egg-making cells in the ovary and is called a germ cell tumor of the ovary. Ovarian germ cell tumors usually occur in teenage girls or young women. Although rare, early symptoms of either type of ovarian cancer are vague gastrointestinal discomfort, pelvic pressure, and pain. Later symptoms include a deepened voice; unusual hair growth, unexplained weight loss; an enlarged, hard and sometimes tender mass in the lower abdomen; painful intercourse, and anemia. Unfortunately, by the time any symptoms are noticed, the disease is quite advanced.

The only known risk factor for this disease is a family history of ovarian cancer. A female with two or more close relatives (mother, sister, or daughter) affected by ovarian cancer should be counseled by a cancer specialist about her own risk.

Female Reproductive Health

Washing the external female reproductive organs with soap and water is an important part of staying healthy. Recall that it is especially important to bathe during the menstrual period. The inside of the vagina is self-cleaning. In a mature female, the cells in the lining of the vagina are constantly being shed. This forms a slight vaginal discharge. Douches and feminine hygiene sprays are not necessary and may actually cause irritation.

The Breast Self-Examination

Doing a breast self-exam (BSE) is an important health habit. The diagram shows how to perform a BSE. The best time to perform a BSE is about one week after your menstrual period. Annual mammograms are recommended for women after the age of 40. A mammogram is a special type of X-ray used to get an image of the soft tissue inside a breast. Tumors, because they are a different kind of tissue, show up on images as white areas within the breast.

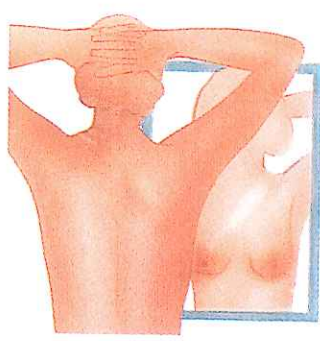
The Pelvic Examination

The American Cancer Society recommends that as soon as a female begins to have sexual intercourse, or when she turns 18, she should begin having a yearly pelvic examination. The pelvic examination is extremely important in the detection of cervical cancer. Early detection provides the greatest hope for a cure.

How to perform a monthly breast self-exam



(A) In the shower or during a bath—feel for a lump or thickening with the hand opposite to the breast;



(B) Before a mirror—inspect the breasts with arms at the sides then with arms raised; look for changes in the size and shape of each breast, look for dimpling, check again with palms at hips while flexing chest muscles;



(C) Lying down—place a pillow or folded towel under your shoulder and examine the breast;



(D) With fingers flat, begin at the outermost edge of the breast and press in small circles spiraling in toward the nipple; squeeze the nipple and look for any discharge.

The health professional will ask the female questions about her health history. The female also should ask any questions or share any concerns that she has about her health. A general exam may be done to check blood pressure, the heart, and the lungs. Urine and blood tests are usually done. The female's breasts and abdomen are checked for lumps.

The doctor then checks the external genital area to be sure that everything looks normal. Next, the doctor will do a digital exam of the vagina and other tissue. Then, to help the doctor see inside, a speculum is used to hold the walls of the vagina open. This instrument may be metal or plastic and comes in different sizes. When the doctor is careful and the patient is relaxed, insertion of the speculum should not be painful. However, there are some very strong muscles in the pelvic area. If the female is tense, the patient might experience some discomfort. Once the speculum is in place, the doctor can perform a Pap smear. This generally completes the exam.

NOTE. A doctor who cares for the health of the female's reproductive system is called a *gynecologist*. A gynecologist who specializes in the care of pregnant women and the delivery of babies is an *obstetrician*.

STRESS. While yearly exams are recommended, if a female experiences any unusual vaginal pain or bleeding, she should immediately see a gynecologist.

LESSON

2

Review

Reviewing Facts and Vocabulary

1. List the external and internal female reproductive organs.
2. What are two functions of the ovaries?
3. List two disorders of the female reproductive system and describe them.

Thinking Critically

4. **Evaluating.** A cousin of yours who is 22 years old tells you she has never had a Pap smear. She has been married for a couple of years. What can you tell her that might encourage her to see a doctor for a Pap smear?

LESSON 2 REVIEW ANSWERS ARE FOUND ON PAGE TM19.

5. **Synthesizing.** How might you respond if a friend told you she always experiences PMS the week after her menstrual period?

Applying Health Skills

6. **In Your School.** A mature ovum has just been released from an ovary. Write a short story about the ovum's journey over the next few weeks. Indicate whether or not the ovum becomes fertilized and what will occur after that point.