WHEN WE THINK ABOUT the female reproductive system, our thoughts often go to having a baby. Let’s say a woman is pregnant three times in her lifetime. There are many years in which she is not carrying a child. This unit explores diseases and disorders of the female reproductive system. These diseases and disorders typically occur while a woman is not pregnant.

Objective:

Describe diseases and disorders of the female breast, ovaries, uterus, and uterine cervix.

Key Terms:

- anesthesia
- axillary lymph nodes
- benign
- biopsy
- breast cancer
- breast-conserving surgery
- carcinomas
- cervical cancer
- cervix
- chemotherapy
- conization
- cryosurgery
- CT scan
- curettage
- cyst
- D&C
- dilated
- ductal carcinoma in situ (DCIS)
- edema
- endometrial ablation
- endometriosis
- endometrium
- estrogen
- excision
- female reproductive system
- fibrosis
- follicular cyst
- HER2
- human papillomavirus (HPV)
- hysteroscopy
- hysterectomy
- inflammatory breast cancer (IBC)
- in situ
The female reproductive system is a human body system of organs and accessory structures that produces an **ovum** (egg) and provides a place for the developing embryo or fetus to grow. The female reproductive system also provides the body with hormones that contribute to the secondary sex characteristics of the female: breast formation, body hair, and structural changes in bone and fat.

**DISEASES AND DISORDERS OF THE BREAST**

**Breast Cancer**

Breast cancer is the growth of **malignant** (cancerous) cells within the breast tissue that form a tumor. A **tumor** is an abnormal growth. There are different types of breast **carcinomas** (cancers).

**Types and Locations:**

- **Ductal carcinoma in situ (DCIS)** is a breast cancer that occurs in the milk ducts of the breast. In situ (in the original place) indicates that the cancer remains in the original location and has not yet spread anywhere else in the body.
- **Invasive ductal cancer (IDC)** is a breast cancer that begins in the milk ducts of the breast and then spreads to the surrounding breast tissue. IDC is the most common form of breast cancer: 80% of breast cancer diagnosed is IDC.
• **Inflammatory breast cancer (IBC)** is a rare and quickly spreading form of cancer. IBC comprises about 1% of all the diagnosed breast cancers.

• **Invasive lobular carcinoma (ILC)** is a breast cancer that begins in the milk duct lobules (areas at the end of the milk ducts). It is the second most diagnosed breast cancer. This cancer spreads to the surrounding breast tissue.

• **Lobular carcinoma in situ (LCIS)** is a breast cancer that begins in the lobules that contain abnormal cells. LCIS is categorized as a breast cancer, however it is not treated as a cancer. Although LCIS does not spread to any other areas, its presence does increase a woman’s risk of future breast cancer.

♦ **SIGNS AND SYMPTOMS:** The signs and symptoms of breast cancer vary somewhat based on which type of breast cancer is diagnosed. Any of the following signs or symptoms should be reported to a health care provider:
  - A thickening or lump in the breast or underarm
  - Discharge from the nipple other than breast milk
  - Change in the appearance or texture of the breast skin
  - A nipple that is turning inward
  - Pain in the breast
  - Swelling in part/all of the breast
  - Redness of breast skin

♦ **DIAGNOSIS:** As with most medical conditions, diagnosis has several different steps. A woman may come to the health care provider with a complaint of a change in her breast, such as a lump or nipple discharge, or the diagnosis may be made during routine screening.
  - Performing a monthly self-breast exam, to notice any difference in her breast appearance or feel from the previous month, helps with an early diagnosis and a potentially good **prognosis** (outcome).
  - Taking of a detailed health history and physical examination by a health care provider is very important in the early diagnosis of breast cancer.
  - Having a routine mammogram is key to an early diagnosis, as some breast cancers have no visible or tactile physical changes. Most breast cancer tumors are identified on routine mammograms. A **mammogram** is a radiological procedure specifically performed to examine the breast. It uses very low-dose radiation to take pictures of the tissue of both breasts and takes

![FIGURE 1. A physician is assessing films of a breast mammogram.](image)
about 20 minutes. During a mammogram, the breast is flattened between two x-ray plates and images are taken of the compressed breast tissue. Most mammograms are now digital and those images are stored on a computer and can be read with more detail by the physician.

- Having an ultrasound of any area of concern—a lump—in the breast tissue may be obtained to assess whether the lump is solid or fluid filled. In medical imaging, an **ultrasound** is the use of sound waves to take pictures of body structures. If the tumor or growth is fluid filled, as in a **cyst** (an abnormal, fluid filled sac within a tissue) that will scan black. If it is solid, as in a tumor, it scans grey.

- Ordering a **biopsy** (sample of the abnormal tissue) is an option. A tissue sample is sent to the lab for microscopic evaluation. The biopsy may be done with a needle that the physician guides while watching an ultrasound. Or, it may be obtained as part of a surgical procedure. If the biopsy is performed during surgery, the surgeon may wait for the pathology report results to decide how to proceed with any further surgery.

- Removing and examining lymph nodes is in important part of diagnosing breast cancer and in planning the treatment. Lymph nodes circulate lymph fluid throughout the body. Unfortunately, lymph nodes may also circulate cancer cells. **Axillary lymph nodes** are in the underarm and close to the breast. These lymph nodes and would be the ones most likely to contain breast cancer cells. Axillary nodes may be removed and examined in the laboratory. Lymph node examination tells the physician whether the cancer has spread, thus determining the breast cancer stage. There are two main types
of surgeries to remove lymph nodes: sentinel lymph node biopsy and axillary lymph node dissection.

– Sentinel lymph node biopsy is a procedure in which the surgeon removes only a few lymph nodes from under the arm. If the first several lymph nodes in the lymph node chain are negative for cancer, the remainder of the chain will also be negative. Taking only a few lymph nodes decreases the side effects of lymph node removal.

– Axillary lymph node dissection is a procedure in which the surgeon removes many nodes. With the removal of many lymph nodes there may be edema (swelling) to the arm in which the nodes were removed. This procedure is not performed as often as the sentinel node biopsy.

• Staging of the cancer is accomplished by examining the tumor and the results of the lymph node dissection. This is a very important tool for the healthcare team.

• Stage 0 is used for non-invasive cancer. There is no spread to any of the surrounding tissue.

• Stage 1 describes invasive breast cancer. The tumor is up to 2cm with no lymph node involvement or there is no breast tumor but small groups of cancer cells are found in the lymph nodes.

• Stage 2 describes a larger tumor. The tumor measures 2cm and has spread to 1 to 2 lymph nodes or the tumor is 2 to 5cm but has not spread to the lymph nodes.

• Stage 3 describes a larger tumor with more lymph node involvement. The tumor is larger than 5cm and the cancer has spread to 1 to 3 axillary lymph nodes or there is not a tumor in the breast but the cancer is found in 4 to 9 lymph nodes.

• Stage 4 describes invasive breast cancer that has spread beyond the breast and nearby lymph nodes to other organs of the body. Cancer that has spread to other body organs it is said to have metastasized. Breast cancer may spread, or metastasize, to the following organs and structures: lungs, skin, bones, liver, brain, and distant lymph nodes.

• Using a CT scan may be required to verify metastasis of breast cancer. A CT scan is a sophisticated x-ray device that uses a contrast material and computer-generated pictures...
to produce cross-sectional pictures of organs. The physician is then able to verify whether the cancer has spread to other organs or structures.

- Using a PET scan. A **PET scan** is a type of diagnostic x-ray that applies radioisotope material that is absorbed by areas of increased activity, such as those areas with cancer cells present. The areas of concern photograph as brightly colored areas of activity.

**TREATMENT:** There are several different treatment options for breast cancer. The treatment depends upon the type and stage of breast cancer and, as such, is individualized and may be a combination of the following treatment options.

- **Breast-conserving surgery** is removal of the lump and surrounding tissue. This surgery is also called a **lumpectomy** (a partial mastectomy) in which the tumor and the surrounding margin tissue are examined. The size and location of the tumor determines how much breast tissue is removed during the surgery. If the margins of the lumpectomy are free of any cancer cells, this may be the only treatment needed.

- **Mastectomy** is the surgical removal of the entire breast. The removal of both breasts is a double mastectomy.

- **Chemotherapy** is the therapeutic administration of chemical cancer fighting drugs often used in conjunction with surgery. Chemotherapy works to destroy cancer cells in the body and is typically given in cycles. Treatment periods are followed by recovery periods. Chemotherapy drugs are often delivered directly into the vein or via pill forms.

- **Radiation therapy** is the use of beams of radiation directed at the tumor to destroy any remaining cancer cells at the tumor site.

- After the immediate treatment is complete, additional treatment to prevent recurrence may be warranted. For example, the breast cancer is further tested for the presence of **receptor proteins** (similar to sensors embedded in the outer cell membrane). Breast cancer cells often have receptor proteins that hormones or other proteins attach to and encourage cancer to grow. These receptors respond to certain substances in the blood.

  - Approximately two-thirds of all breast cancers are estrogen receptive (ER) positive. The ER receptor proteins indicate that the tumor will respond to hormonal therapy. Drugs such as Tamoxifen are used to block the effects of **estrogen** (the female hormone) thereby killing the ER-positive breast cells.

  - **HER2** is a receptor protein whose presence signals a high risk of the tumor recurring. Herceptin is used in addition to chemotherapy to block HER2. The use of Herceptin...
has been effective in the treatment of advanced breast cancer when used with other drugs.

– **Triple negative breast tumors** are growths or lumps that lack estrogen, progesterone, and HER2 and are rapid growing. These breast tumors respond well to chemotherapy.

**Benign Breast Diseases**

Benign (non-cancerous) breast diseases and disorders that a woman may encounter in her life include cysts, fibrosis, and mastitis.

♦ **TYPES:**
  • Cysts (fluid filled lumps) are often benign and may be felt or found on a mammogram.
  • **Fibrosis** is the presence of large amounts of fibrous tissue that may present as thickened or hardened areas in the breast.
  • **Mastitis** is inflammation of the breast tissue usually caused by an infection. This disorder usually affects nursing mothers, due to a clogged milk duct, but can affect all women.

♦ **SIGNS AND SYMPTOMS:** Women may report a tender area or lump in the breast. In the case of mastitis, the woman may also have a fever.

♦ **DIAGNOSIS:** Diagnosis begins with a detailed history and physical examination. Some benign breast tumors are found on a routine mammogram as an incidental finding.

♦ **TREATMENT:** Treatment is individualized to the patient and condition. For example:
  • Mastitis that presents with a fever may require fever reducing medications and antibiotics.
  • The presence of a cyst that is causing no pain or problems may require no treatment and the cyst is left in place. A large and painful cyst may require draining the fluid to decompress the cyst.
DISEASES AND DISORDERS OF THE OVARIES

Ovarian Cancer

Ovarian cancer is a malignancy of the ovaries. The ovary is the female sex gland and produces the ovum or egg that is the female sex cell. The ovaries are made of three different types of cells and any of those cells can develop a carcinoma.

♦ TYPES AND LOCATIONS:
- Epithelial tumors begin forming from the epithelial cells covering the surface of the ovary. This is the most common type of ovarian cancer.
- Germ cell tumors begin in the cells that produce the eggs within the ovaries.
- Stromal cell tumors begin forming within the cells that hold the ovarian structures together and produce the female sex hormones of estrogen and progesterone.

♦ SIGNS AND SYMPTOMS: Signs and symptoms of ovarian cancer may be vague and can be mistaken for other problems. Most ovarian cancer symptoms occur due to the spread of metastasis of the cancer. Some symptoms that may be felt include:
- Bloating or a noticeably larger and fuller feeling abdomen
- Pelvic or lower abdominal pain
- Feeling of having to urinate frequently or urgently
- Pain with sexual intercourse

♦ DIAGNOSIS: As a part of a gynecological exam, the physician will perform an internal examination of the ovaries. This exam may discover the abnormality even if the woman does not present with any physical symptoms or complaints. As with other diseases, tests are performed to confirm a positive diagnosis. In addition to the physical exam:
- An ultrasound of the ovaries may be ordered.
- CT and PET scans are used to check for any spread to other organs.
- A biopsy is the only way to be certain the growth is cancer.
  – Laparoscopy is a procedure in which a long tube with a light on the end is inserted through a small incision in the abdomen to obtain the biopsy sample that will be evaluated in the laboratory.
  – A biopsy sample may also be obtained as part of the surgical procedure to remove the abnormal growth. The tumor is removed, sent to the lab for analysis, and then surgery proceeds as needed.

♦ TREATMENT: Once diagnosis is confirmed the treatment choice will depend upon the cancer type and any metastasis. Ovarian cancer tumor types are:
- Type I tumors grow slowly, normally do not spread, but do not respond well to chemotherapy.
- Type II tumors grow quickly and spread to other body parts but have a positive response to chemotherapy.
- Radiation therapy is the use of radiation beams directed at the area where the tumor was removed.
Surgical removal of the tumor can also be performed before chemotherapy begins or, if chemotherapy is used, to shrink the tumor. Then, the excision (removal) of the tumor is delayed.

GENETIC FACTORS: There is a genetic factor with both breast and ovarian cancer that must be considered. As these cancers may run in families, it is important that all immediate female relatives are informed of the diagnosis. This is an important risk factor. A risk factor is something that may make one more likely to get a disease, such as genetics.

Hereditary breast and ovarian cancer syndromes are linked to a mutation in the BRACA1 and BRACA2 genes. [NOTE: BRACA1 and BRACA2 are abbreviations for breast cancer 1 and breast cancer 2.] Mutation in these two genes is linked to a high risk of breast and ovarian cancers.

A woman with a BRACA1 mutation has a 35 to 70% risk of developing ovarian cancer in her lifetime. In contrast, a woman in the general population, with no gene mutation, has a 10% risk of developing ovarian cancer in her lifetime.

Benign Ovarian Diseases and Disorders

Ovarian cysts are a benign ovarian disorder.

- TYPES: A cyst is a fluid fill sac within the ovary. Ovarian cysts are very common and, in many cases, the cyst will disappear without treatment.
- A follicular cyst develops on or in the ovary and commonly occurs in women of childbearing years as a result of ovulation. Instead of the follicle rupturing and releasing
an egg, it fills with fluid and forms a cyst. This is the most common type of ovarian cyst.

- Luteal cysts occur in follicles that have ruptured and released an egg and then immediately seal shut.

**SIGNS AND SYMPTOMS:** The signs and symptoms of an ovarian cyst vary according to their location in the ovary.

- Pain on the left or right side of the lower abdomen, as women have an ovary on each side. Women may also experience sharp and sudden pain abdominal pain.
- Fever
- Pain with sexual intercourse
- Menstrual abnormalities such as heavy bleeding or absence of bleeding

**DIAGNOSIS:** Diagnosis includes a history and a physical examination, including an internal examination of the ovaries. An ultrasound confirms the diagnosis.

**TREATMENT:** An ovarian cyst usually disappears without treatment. If the pain or other symptoms persist, a surgical procedure to drain the cyst or remove the ovary may be necessary.

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**DISEASES AND DISORDERS OF THE UTERUS AND UTERINE CERVIX**

**Uterine Cancer**

*Uterine cancer* is a malignancy that forms in the tissues of the uterus. The *uterus* is a small, hollow, muscular organ in the woman's pelvis. It is approximately the size of a pear. There are two main types of uterine cancer: endometrial uterine cancer and uterine sarcoma.

**TYPES AND LOCATIONS:**
- Endometrial uterine cancer is the most common type of uterine cancer and affects the *endometrium* (inner lining) of the uterus.
- Uterine sarcoma is a very rare type of uterine cancer that begins in the muscle or supporting structures of the uterus.
**SIGNS AND SYMPTOMS:**

- Irregular vaginal bleeding is the most common symptom. This could mean heavier than normal bleeding or bleeding noted by a woman who is postmenopausal. **Menopause** is the point at which no menstrual periods occur.
- The presence of vaginal discharge or drainage that does not appear bloody. This could mean the presence of **occult blood** (present but visible only under a microscope).
- Abdominal pain and weight loss.

**DIAGNOSIS:** Early diagnosis is important for the best prognosis.

- A detailed history and physical examination by a healthcare provider determines which further tests need to be conducted.
- Radiographic procedures, such as an ultrasound, are obtained to take pictures of the internal organs.
- An endometrial biopsy, or sample of the endometrial tissue, may be obtained in the physician’s office. This is the most common diagnostic procedure. In this procedure a thin tube is inserted into the vagina and through the **cervix** (the opening to the uterus) to obtain a small sample of the uterus lining. Then, the sample is sent to the lab for examination.
- A surgical procedure is also used for diagnosis. A is **D&C** (dilatation and curettage) is performed. In the procedure, the cervix is **dilated** (widened) and **curettage** (scraping of the inner lining of the uterus) is performed. Then, the uterine tissue is examined for diagnosis.
- **Hysteroscopy** is an invasive diagnostic procedure in which tiny telescope with a small light at the end is inserted into the uterus through the cervix. This procedure allows the doctor to see the lining of the uterus directly.
- With a diagnosis of uterine cancer, a chest x-ray, CT, and PET scan may be ordered to assess for metastases.

**TREATMENT:** Treatment varies depending upon length of time the cancer has been in the uterus (Stage 1 or 2) or if the cancer has spread to other organs and lymph nodes, (Stage 3 or 4). Treatment options include:

- **Hysterectomy** is the removal of the uterus. This is the main form of treatment when the cancer has not penetrated the walls of the uterus.
- If there is a question, or a confirmed diagnosis of metastases, then chemotherapy is often added to the treatment regime.
- Radiation therapy is an option if the cancer was found outside of the uterus in the surrounding structures.

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**Endometriosis**

**Endometriosis** (often referred to as “endo”) is a benign condition that occurs when endometrium tissue (normally the lining of the uterus) grows outside of the uterus. This tissue is most often found on the ovaries, fallopian tubes, and the outer surface of the uterus.
SIGNS AND SYMPTOMS: The signs and symptoms can vary but pain is the most common symptom experienced.

- Pain can be severe and debilitating and becomes worse over time. A woman may describe the pain as:
  - Very painful menstrual cramps
  - Long-term lower back or pelvic pain
  - Pain experienced after sexual intercourse
  - Bleeding or spotting between menstrual periods
- Infertility (inability to become pregnant)
- Stomach and digestive problems, such as diarrhea, constipation, and nausea, occurring especially during menstrual periods.

DIAGNOSIS: Diagnosis begins with a history of the woman’s complaints and a complete physical examination. Once that is complete, the physician determines if other procedures or tests are needed. For example:

- An ultrasound may provide information regarding the location of the endometriosis.
- A laparoscopy would enable the physician to look directly at the internal structures. In this procedure a biopsy may be obtained to confirm the endometriosis diagnosis.

TREATMENT: Treatment depends upon the symptoms.

- Pain relief medication can be prescribed to help the patient be more comfortable
- Some women respond very well to hormonal therapy, similar to birth control pills.
- As a last measure, the surgeon may attempt to remove areas of endometriosis via a surgical procedure.

Uterine Fibroids

**Uterine fibroids** are a benign disorder in which muscular tissue (fibroids) grows into the wall of the uterus. The fibroid can range in size from tiny as an apple seed to as large as a grapefruit. A woman may have one fibroid or there can be many of them.
SIGNS AND SYMPTOMS: The signs and symptoms of uterine fibroids are similar to other gynecological disorders. It is important that a woman report anything unusual as it could signal a serious condition. Symptoms that may be reported include:

- Heavy bleeding or painful periods
- Pain during sexual intercourse
- Lower back pain
- Enlargement of the lower abdomen (caused by the growing fibroid)
- Frequent urination (pressure of the fibroid on the bladder)

TREATMENT: The treatment of fibroids depends upon the severity of the symptoms of the patient and may include:

- Over-the-counter (OTC) medication for discomfort
- **Myomectomy** is the surgical removal of the fibroids often via laparoscopy.
- In severe cases, removal of the uterus or a hysterectomy may be necessary.
- **Endometrial ablation** is the destruction of the endometrium (inner lining of the uterus). This procedure is performed by use of laser, electric current, freezing, and other methods. Following this procedure a woman can no longer become pregnant.

### Cervical Cancer

**Cervical cancer** is a malignancy that occurs in the cells of the cervix. Cervical cancer starts in the uterine cervix or lower narrow opening of the uterus.

SIGNS AND SYMPTOMS: There are very few signs and symptoms associated with cervical cancer. Abnormal vaginal bleeding or discharge may be reported.

DIAGNOSIS: Screening for cervical cancer is quick and painless.

- The **Pap test** (e.g., Papanicolaou test) is a screening test that identifies changes in the cervix cells. Cell changes can be potentially precancerous or cancerous in nature. A small amount of cervical tissue is obtained during a physical examination and sent to a lab for evaluation. [NOTE: The test was invented by two physicians: Dr. Georgios Papanikolaou and Dr. Aurel Babes.]
- The **human papillomavirus (HPV)** causes most cervical cancers. It is important that the Pap test include a HPV test.

TREATMENT: Treatment for cervical cancer depends on whether the cervix is the only organ involved or whether the cancer has spread into the uterus.

- If the cancer is contained within the cervix, then local treatment to remove the cancerous cells can be performed.
  - **Cryosurgery** is the placement of a very cold metal probe directly on the cervix to kill the abnormal cells. This procedure can be done in the physician’s office.
  - **Laser surgery** is a light beam directed at the cervix to burn off cancerous cells. The procedure is conducted under local anesthesia (numbing medication).
Conization is a procedure that uses a surgical knife to remove a cone-shaped piece of the cervix. The tissue is examined to be certain there are no cancer cells on the edges. If cancer cells are identified on the edge of the sample, more tissue is removed.

- A surgical option of removing the uterus and cervix or hysterectomy is discussed when the above procedures are unsuccessful in removing the cancer.
- Chemotherapy and radiation therapy may be necessary if the cancer has spread beyond the uterus and cervix.

Summary:
The female reproductive system is a system with many structures and functions. Through a woman’s life there are diseases and disorders that can occur to the reproductive system. It is very important that a woman is aware of the symptoms of diseases and disorders of the breast, ovaries, and uterus to help ensure a treatment has a positive outcome.

There are different types of breast cancer. Breast cancer in situ remains in the breast; invasive breast cancer travels to other parts of the body. Treatment depends upon the stage and type of breast cancer. Benign breast disease, such as cysts or inflammation of the breast tissue, may require only minor treatment to resolve.

Ovarian cancer has very few symptoms until the cancer has spread outside of the ovary. Treatment depends upon the area involved. Benign ovarian diseases, such as cysts, often resolve without any treatment.

Cancers of the uterus and cervix are treated with surgery and medication depending upon the staging of the cancer. Endometriosis, a benign disease in which the endometrial tissue grows outside of the lining of the uterus, causes pain, abnormal bleeding, and other symptoms. It’s treated according to the woman’s signs and symptoms.

Checking Your Knowledge:
1. Differentiate between the different types of breast cancer.
2. Explain the importance of a complete health history and physical examination to positively resolving female reproductive system diseases and disorders.
3. Compare the treatments for endometriosis. What determines the course of treatment?
4. Play Female Reproductive Disorders and Treatment Quizlet at this link https://quizlet.com/_6e5td9.
5. Compare and contrast the treatment options for cervical cancer. How does the doctor choose one treatment over the other?
Expanding Your Knowledge:

A woman usually begins having mammograms in her 30’s, sometimes a younger age if warranted. Mammograms save countless lives with the early detection of breast cancer. Research the most current protocol for mammogram screenings. Use the information you learn to encourage women in your life to have this life saving procedure.

Web Links:

Endometriosis
https://www.speakendo.com/about-endometriosis/what-is-endometriosis?cid=ppc_ppd_msft_endo_da_2018_endometriosis_of_Broad_206-1931324&msclkid=6d87fd8013211220e218a120c6caeb9a

Mammograms
https://www.cancer.gov/types/breast/mammograms-fact-sheet/

Metastatic Breast Cancer
https://www.nationalbreastcancer.org/metastatic-breast-cancer