

## *Breast cancer facts*

Other than skin cancer, breast cancer is the most common form of cancer in women in the United States. More than 200,000 women are diagnosed with breast cancer each year. Incidence rates have increased every year since the 1980s, especially in women 50 years of age and older, although the rate of increase slowed starting in the 1990s. Much of this increase has been credited to changes in reproductive patterns, such as delayed childbearing and having fewer children, and to improved methods of detection. Improved methods of detection and increased awareness, however, have also increased the chances for successful treatment and survival.

### *Risk factors*

Certain factors have been shown to put people at greater risk for developing breast cancer. Make sure your physician is aware of any risk factors you may have, such as:

- *Advanced age (>65)*
- *Family history of breast cancer, especially if you have one or more first-degree relatives (mother, sister, or daughter) diagnosed at an early age*
- *First child at or after age 30 or no full-term pregnancies*
- *Early first period or menarche (<12 years of age)*
- *Late menopause (≥55 years of age)*
- *Alcohol consumption (≥ 2 drinks per day)*
- *Recent use of **estrogen replacement therapy (ERT)** or hormone replacement therapy (HRT)*
- *Obesity after menopause*

Recent research has shown that previous use of HRT—a combination of estrogen and progestin—is associated with an increased risk of invasive breast cancer. However, this increased risk was generally small and did not appear until after 4 years of HRT use.

## *What is breast cancer?*

Inside the breast are small sacs, or glands, that start producing milk late in pregnancy. The glands empty into small channels, or ducts, that carry the milk toward the nipple. For reasons that are still unknown, the cells lining the glands and ducts sometimes begin to grow and divide abnormally. This abnormal cell growth can form a mass or tumor and may lead to breast cancer.

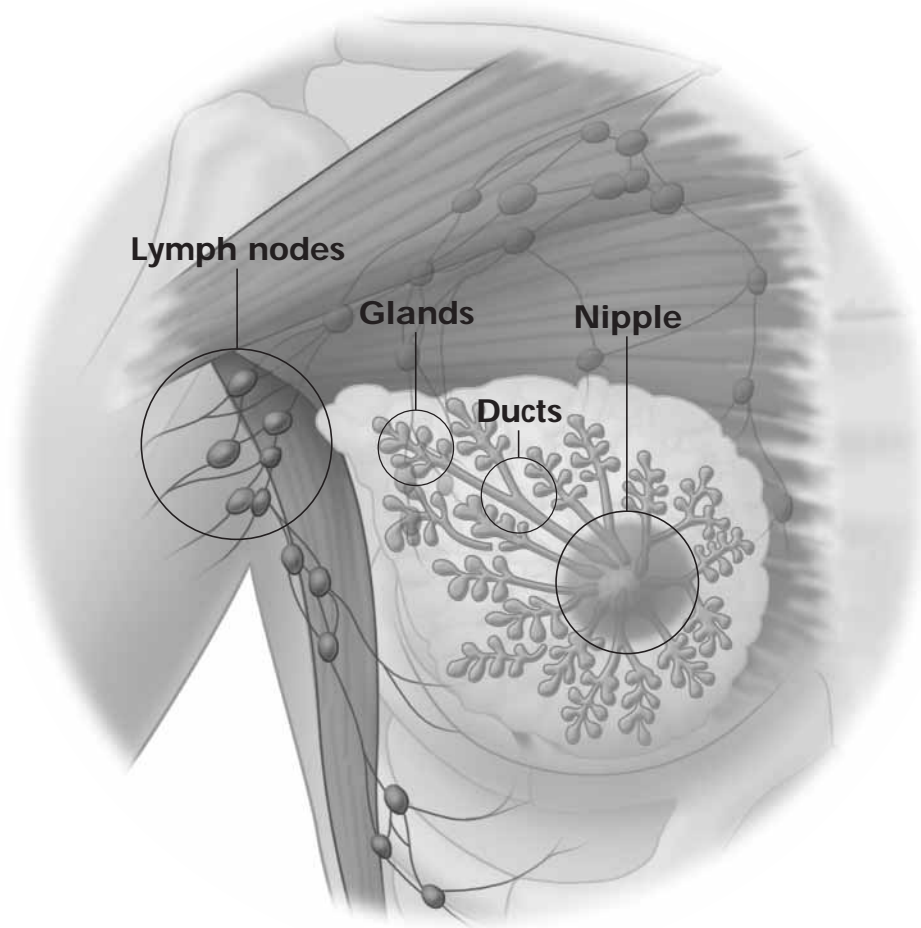
# *Types/stages of breast cancer*

## *Types of breast cancer*

Breast cancer is classified by where it originated and how far it has spread.

***In situ carcinoma (noninvasive):*** In situ means “in place.” Generally, this type of cancer is at an early stage and has not spread beyond where it started. Carcinomas that start in the milk ducts of the breast are called ductal carcinoma in situ (DCIS). Carcinomas that start in the milk glands are called lobular carcinoma in situ (LCIS).

***Invasive cancer:*** This type of cancer may be localized in the breast or *metastatic* (spread to other parts of the body).



## Classification of stages

Once breast cancer is detected, physicians can determine the stage by measuring tumor size, evaluating whether the cancer has spread to the *lymph nodes* (pea-sized collections of tissue) under the arm (*axillary lymph nodes*), and determining if the tumor has metastasized.

### In Situ Breast Cancer

- Stage 0** • Noninvasive breast cancer (for example, DCIS and LCIS) that has not spread to the lymph nodes under the arm or any other lymph nodes.

### Early-Stage Invasive Breast Cancer

- Stage I** • Tumor measures 2 cm (about 1 inch) or less, and has not spread to the lymph nodes under the arm or any other lymph nodes.

### Stage II

- Stage IIA** • No evidence of a tumor, but cancer has spread only to the lymph nodes under the arm; or
- The tumor is 2 cm or less and has spread to the lymph nodes under the arm but not to any other lymph nodes; or
  - The tumor is between 2 cm and 5 cm (about 2 inches) and has not spread to the lymph nodes under the arm or any other lymph nodes.
- Stage IIB** • The tumor is between 2 cm and 5 cm and has spread only to the lymph nodes under the arm on the same side as the breast cancer; or
- The tumor is more than 5 cm but has not spread to the lymph nodes under the arm or any other lymph nodes.

## Advanced-Stage Invasive Breast Cancer

### Stage III

- Stage IIIA** • The tumor may be any size. The cancer has spread to the lymph nodes under the arm and possibly to other lymph nodes.
- Stage IIIB** • The tumor may be any size and has spread to the breast skin or chest wall. The cancer may have spread to other lymph nodes.
- Stage IIIC** • The tumor may be any size and may have spread to any lymph nodes but not to other parts of the body.

## Metastatic Breast Cancer

- Stage IV** • The tumor is any size and has spread to other parts of the body (possibly the bones, lungs, liver, or brain); or
- The tumor has spread locally to the skin and lymph nodes inside the neck, near the collarbone.

Adapted from the American Joint Committee on Cancer (AJCC)  
*Cancer Staging Handbook*.

## *Treatment options*

There are various treatment options available for different types and stages of breast cancer. Your physician will determine the most appropriate therapy for you.

### *External therapy*

#### *Surgery*

Your physician will determine which surgical option is best for you depending on the size and stage of the tumor.

Types of surgery include:

- **Lumpectomy**—only cancerous tissue and a small amount of surrounding tissue are removed
- **Partial mastectomy** (wide excision)—more of the tissue surrounding the tumor is removed than in a lumpectomy

- *Quadrantectomy*—one fourth of the breast is removed
- *Mastectomy*—removal of the entire breast and some surrounding tissue
- *Lymph node surgery*—this surgery is the only way to determine if the cancer has spread to the lymph nodes and possibly to other parts of the body:
  - *Sentinel lymph node dissection (SLND)*—a dye is injected into the cancer site during surgery and traced to locate the first axillary lymph node that receives drainage from the breast. This lymph node is removed and examined for cancerous cells. If cancerous cells are not present, the cancer probably has not spread to other tissues
  - *Axillary lymph node dissection (ALND)*—if it is likely that the cancer has spread to the lymph nodes, an ALND will be performed to remove all or some of the lymph nodes in the armpit

After surgery, the surgery site will be bandaged, and you may have drainage tubes from the surgery site to remove any fluid that collects as you heal. Your doctor can give you specific instructions about caring for the wound and managing your pain following surgery.

### *Radiation therapy*

*Radiation therapy* utilizes radioactive energy to destroy or shrink tumor cells. Radiation may be used to shrink tumor size before surgery, but it is more commonly used following breast cancer surgery to eliminate any cancer cells that may have escaped removal. Radiation treatments are generally administered 5 days a week for about 6 weeks, depending on the area of the body being radiated and the goal of the radiation treatments.

Because advances in radiation therapy allow for more accurate targeting of the tumor site, the incidence of side effects has been greatly reduced. Over time, patients receiving radiation therapy sometimes feel more tired, particularly late in the day. Patients may also notice a darkening, thickening, or increased sensitivity of the skin in the area receiving therapeutic doses of radiation.

## *Systemic therapy*

*Systemic therapy*—including chemotherapy and hormone therapy—refers to any therapy that is taken orally or intravenously and travels through your entire body. Systemic therapy is generally given after surgery (adjuvant therapy) to help destroy any remaining cancer cells in the body.

### *Chemotherapy*

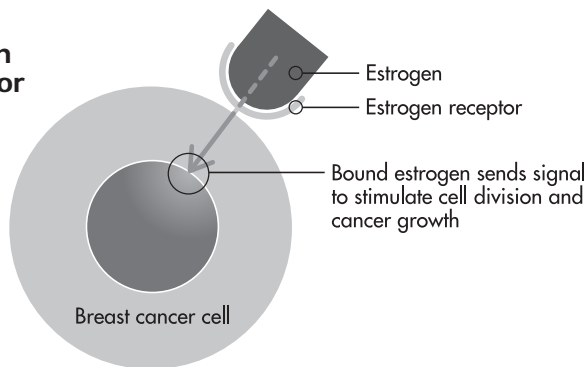
*Chemotherapy* refers to certain cancer drugs that may be given intravenously or orally and are carried throughout the body via the bloodstream. Chemotherapy drugs work by either preventing the cancer cell from dividing, or “starving” the cell to death. Because chemotherapy drugs work in different ways, physicians commonly use them in combination to help attack the cancer cells from different angles. Chemotherapy drugs are usually given for 1 or more days every 3 to 4 weeks with intervals for recovery. Generally, chemotherapy treatment may continue for 3 to 6 months.

Although chemotherapy drugs are very effective in killing cancer cells in the body, they may also damage normal cells. Certain cells in the body are more sensitive to the damaging effects of chemotherapy drugs. This may lead to some of the common side effects associated with chemotherapy, including nausea, vomiting, fatigue, mouth sores, and hair loss.

### *Hormone therapy*

The hormone *estrogen* can promote the growth of some breast cancers. Many types of breast cancer cells are dependent on estrogen to grow and divide and are referred to as estrogen-receptor positive (ER positive). Breast cancer cells that are not sensitive to estrogen are referred to as estrogen-receptor negative (ER negative). Once estrogen is bound to the estrogen receptor, a chemical signal is sent to the breast cancer cell telling the cell to divide, leading to growth of the cancer. (**Fig. 1**)

**Figure 1. Action of estrogen binding to estrogen receptor on cancer cell**

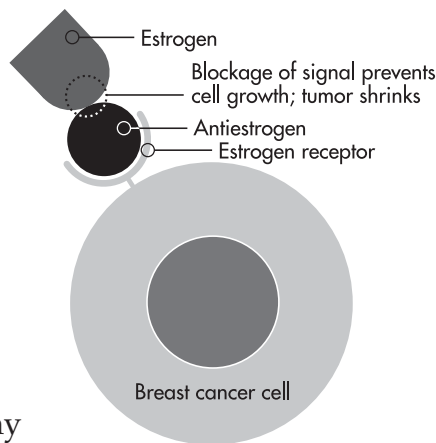


The goal of *hormone therapy* in breast cancer is to stop or slow down cancer growth by reducing the amount of estrogen in the blood or preventing it from binding to the cellular estrogen receptor.

## SERMs

*Selective estrogen receptor modulators (SERMs)*, such as *Nolvadex*<sup>®</sup> (*tamoxifen citrate*) and *FARESTON*<sup>®</sup> (*toremifene citrate*), are drugs that act as antiestrogens in the breast. Because they bind to the estrogen receptors, they effectively block estrogen from binding (**Fig 2**). This prevents cancer cells from growing and dividing and results in tumor shrinkage. Side effects of SERM therapy include hot flashes, vaginal discharge, and sweating.

**Figure 2. Action of antiestrogens blocking estrogen from binding to cancer cell**



Although tamoxifen has demonstrated benefits in treating women with breast cancer, it has been shown to increase the risk of endometrial cancer. For women who are currently taking or have previously taken tamoxifen, it is particularly important to report any unusual vaginal bleeding to your doctor.

## Oophorectomy

Because the ovaries are a woman's main source of estrogen, removal of the ovaries—or *oophorectomy*—reduces the overall amount of estrogen in the body. This treatment is limited to premenopausal women whose ovaries are still producing estrogen.

Please see full prescribing information for *FARESTON*<sup>®</sup>.

## *Aromatase inhibitors*

In postmenopausal women, androgens are produced by the **adrenal glands** and the ovaries. **Aromatase inhibitors** work by blocking the enzyme, aromatase, which is responsible for producing estrogen from androgens in peripheral tissues such as adipose tissue (fat). Currently, there are 3 aromatase inhibitors approved for marketing in the United States—*Femara*® (*letrozole*), *Arimidex*® (*anastrozole*), and *Aromasin*® (*exemestane*). Because aromatase inhibitors reduce estrogen production and levels in the body, this may lead to osteoporosis (loss of bone density) and bone fractures. Other side effects may include hot flashes, fatigue, nausea, and pain.

## *LH-RH agonists*

**Luteinizing hormone-releasing hormone (LH-RH) agonist** drugs are synthetic forms of a hormone. They turn off estrogen production by the ovaries in premenopausal women. LH-RH agonists are given in addition to surgery and other treatments, such as chemotherapy or radiotherapy, and may lower estrogen levels to those of postmenopausal women. *Zoladex*® (*goserelin acetate*) is an example of such a drug. The most commonly reported side effects with Zoladex include hot flashes, sweating, headache, mood changes, and loss of sex drive.

# *Ongoing Care*

## *Rehabilitation*

Following treatment for breast cancer, women are encouraged to return to their normal lifestyles as soon as possible. After surgery, some women may experience swelling in the arm caused by excess lymph fluid in the tissue (lymphedema). To help prevent or reduce this symptom, your doctor may recommend certain exercises, elevating the arm, or wearing an elastic sleeve to help improve lymph circulation. Regular exercise after breast surgery will improve motion and strength in the arm and shoulder.

A woman who has had a total mastectomy may choose to wear a breast form (prosthesis) or undergo breast reconstruction. Reconstructive surgery may be done at the time of the mastectomy or at a later time.

### *Medical follow-up*

Regular checkups with your healthcare provider and mammograms are crucial after breast cancer treatment. These examinations will check the breasts, chest, neck, and underarm areas. Be sure to report any changes in the treated breast or in the other breast to your healthcare provider. In addition, you should tell your healthcare provider about any other problems such as pain, blurred vision, changes in menstrual cycle, unusual vaginal bleeding, loss of appetite, or loss of weight.

### *Other potential complications*

Women who have had breast cancer in one breast may have an increased risk for other complications, including cancer in the other breast. Other factors, including obesity or advanced age, may also increase the risk of additional health problems, including cardiovascular disease, blood clots, and colorectal or endometrial cancer.

**Body mass index (BMI)** measurements are useful tools to determine if you are at a healthy weight or overweight.

**BMI can be calculated  
from pounds and inches  
using this formula:**

$$\frac{703 \times \text{weight (lb)}}{\text{height (in)}^2}$$

Body Mass Index (BMI) Values	
Underweight	≡ < 18.5
Healthy weight	≡ 18.5-24.9
Overweight	≡ 25.0-29.9
Obese	≡ 30.0-34.9
Severely obese	≡ ≥ 35.0

## *Emotional aspects*

*Treating the emotional effects of breast cancer is just as important as treating the physical aspects of the disease.*

*The following simple tips may help you deal with some of these feelings and concerns:*

- Be particularly open with your family so they can offer the support you need.
- Your physician is both your advocate and partner in your treatment, so don't be afraid to discuss your questions and concerns openly.
- Feelings of depression and psychological distress are natural in patients with breast cancer and should be discussed with your physician.
- Take advantage of the numerous support groups, either on a national or local level. (See the list of support groups.)
- Feelings of anxiety about breast cancer, treatment, and fatigue may dampen the libido (sex drive) of both you and your partner. Talk about your feelings, your fears, and listen to those of your partner. If treatment is interfering with your sex life, discuss possible solutions with your physician.

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## *Glossary of terms*

### *adrenal glands*

Glands located on top of each kidney that secrete hormones and are responsible for producing androgen, the precursor of estrogen, in postmenopausal women.

### *aromatase inhibitor*

A type of hormonal therapy that blocks the production of estrogen in peripheral tissue, such as adipose tissue (fat), thereby reducing overall circulating estrogen levels.

### *axillary lymph nodes*

Lymph nodes below the shoulder joint that are bounded by chest muscles. Many lymphatic vessels of the breast lead to lymph nodes under the arm.

### *axillary lymph node dissection (ALND)*

Removal of all or some of the lymph nodes in the armpit.

### *body mass index (BMI)*

A useful tool to determine whether a person is underweight, healthy weight, overweight, or obese. High BMI ( $\geq 25$ ) may be associated with serious health problems.

### *carcinoma*

A cancerous tumor.

### *chemotherapy*

The use of systemic medications to treat cancer.

### *estrogen*

A naturally occurring hormone produced by the ovaries of premenopausal women that controls the development and maintenance of female sex characteristics and the reproductive system. Estrogen may stimulate the growth of certain cancers.

### *estrogen replacement therapy (ERT)*

ERT is usually given to women to help alleviate symptoms of menopause, but has been linked to an increased risk of breast cancer and endometrial cancer.

***FARESTON® (toremifene citrate)***

An effective and well-tolerated selective estrogen receptor modulator (SERM) that binds to estrogen receptors to help prevent cancer cells from growing and dividing. Proven to extend survival in women in ER-positive or ER-unknown advanced breast cancer.

***hormone therapy***

A type of therapy that interferes with the actions of hormones, such as estrogen, that support cancer-cell growth.

***in situ carcinoma***

An abnormal growth of cells that has not spread from where it originated. This type of cancer may begin in the milk ducts (ductal) or the milk glands (lobular).

***invasive cancer***

Cancer that is localized in the breast or has spread to other parts of the body (metastatic).

***lumpectomy***

Breast-conserving surgery in which only cancerous tissue and a small amount of surrounding tissue are surgically removed.

***luteinizing hormone-releasing hormone (LH-RH) agonists***

A class of drugs that works by turning off the production of estrogen by the ovaries of premenopausal women.

***lymph nodes***

Small, pea-shaped collections of immune system tissue that remove cell waste and fluids from lymph. Lymph is a clear fluid that contains immune system cells and tissue waste products, and is carried in lymph vessels that lead to the lymph nodes. Lymph nodes help fight infections and also have a role in fighting cancer. Also called lymph glands.

***lymph node surgery***

Surgery to determine if the cancer has spread to the lymph nodes and to other parts of the body. See *axillary lymph node dissection* and *sentinel lymph node dissection*.

***mastectomy***

Surgical removal of the entire breast.

***metastatic***

A term meaning that the cancer has spread from its place of origination to other parts of the body.

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***oophorectomy***

Removal of the ovaries.

***partial mastectomy***

Breast-conserving surgery in which more of the tissue surrounding the tumor is removed (wide excision) than in a lumpectomy.

***quadrantectomy***

Surgical removal of one fourth of the breast.

***radiation therapy***

Cancer treatment that uses radioactive energy to destroy or shrink tumor cells.

***selective estrogen receptor modulator (SERM)***

A type of hormonal therapy that blocks the growth of tumors by binding to estrogen receptors in the breast cancer cell and preventing estrogen from binding.

***sentinel lymph node dissection (SLND)***

A surgical procedure used to determine if cancer has spread to the axillary lymph nodes.

***systemic therapy***

Any treatment given orally or intravenously that enters the bloodstream.

***tamoxifen***

A SERM that binds to estrogen receptors to help prevent cancer cells from growing and dividing. Proven to extend survival in women with breast cancer.