



BREAST CANCER

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ABSTRACT

Globally, breast cancer is the most common cancer among women, and the most likely cause of female cancer deaths. High-income countries (HICs) have made the most progress in improving breast cancer outcomes. Between 1990 and 2014, breast cancer death rates dropped by 34% in the US attributable to the combination of improved earlier detection and effective adjuvant therapies. By contrast, breast cancer is an increasingly urgent problem in low- and middle-income countries (LMICs), where historically low incidence rates have been rising by up to 5% per year. The strides seen in HICs have not been mirrored in LMICs where optimal management strategies from wealthy countries cannot be fully implemented due to significant resource constraints related to limited personal resources, underdeveloped health care infrastructure, lack of pharmaceuticals and cultural barriers. The Breast Health Global Initiative (BHGI) created and validated resource-stratified guidelines (RSGs) as a comprehensive tool set whereby health care systems can be evaluated for their capacity to deliver breast cancer care with existing resources. These RSGs define a prioritization scheme for resource allocation that illustrates a framework for gap analysis to identify when critical resources are missing in a given system. RSGs can provide a platform for policy makers to prepare for breast cancer's rising tide. Paired with assessments to identify key barriers that prevent patients from receiving necessary services, resource-stratified guidelines provide a framework for analyzing healthcare delivery systems as a basis for improving patient outcomes. Once a comprehensive plan is devised, phased implementation is needed to build systems that are functional and sustainable. BHGI is now collaborating with other organizations to support the global campaign Breast Cancer Initiative 2.5 (BCI2.5), a collaborative framework to engage policy makers, governments, non-governmental organizations, clinicians and patient advocates to build breast healthcare capacity in LMICs.

KEYWORDS: Breast cancer, stages I, II, and III.

INTRODUCTION

Cancer begins when healthy cells in the breast change and grow out of control, forming a mass or sheet of cells called a tumor. A tumor can be cancerous or benign. A cancerous tumor is malignant, meaning it can grow and spread to other parts of the body. A benign tumor means the tumor can grow but will not spread.

Breast cancer spreads when the cancer grows into other parts of the body or when breast cancer cells move to other parts of the body through the blood vessels and/or lymph vessels. This is called a metastasis.

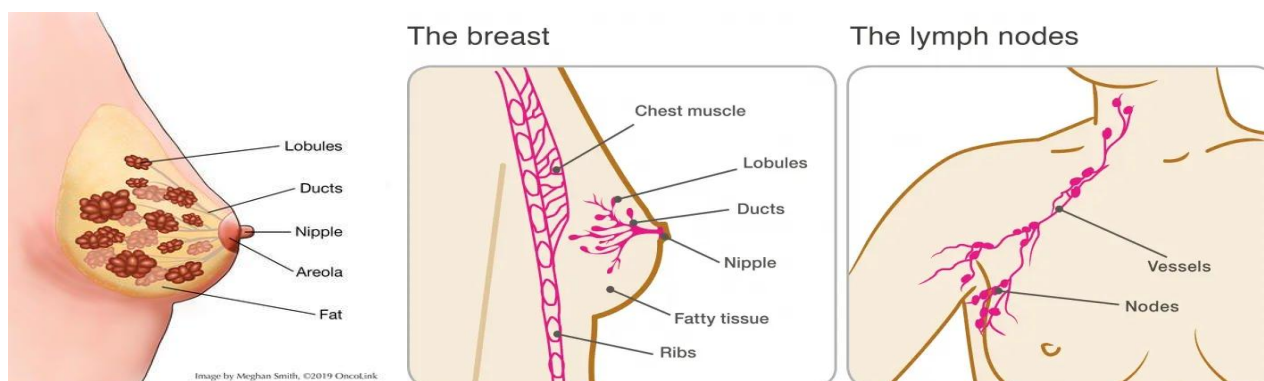


Figure-1: Breast morphology.

This guide covers early-stage and locally advanced breast cancer, which includes stages I, II, and III. The stage of breast cancer describes where the cancer is located, how much the cancer has grown, and if or where it has spread.^[1]

Although breast cancer most commonly spreads to nearby lymph nodes, it can also spread further through the body to areas such as the bones, lungs, liver, and brain. This is called metastatic or stage IV breast cancer. Learn more about metastatic breast cancer in a separate section on this website.

If breast cancer comes back after initial treatment, it can recur locally, meaning in the breast and/or regional lymph nodes. The regional lymph nodes are those nearby the breast, such as the lymph nodes under the arm. It can also recur elsewhere in the body, called a distant recurrence or metastatic recurrence.

Breast cancer is cancer that forms in the cells of the breasts. After skin cancer, breast cancer is the most common cancer diagnosed in women in the United States. Breast cancer can occur in both men and women, but it's far more common in women.



Figure-2: Breast cancer remedy.

Types of breast cancer

Breast cancer can be invasive or noninvasive. Invasive breast cancer is cancer that spreads into surrounding tissues. Noninvasive breast cancer does not go beyond the milk ducts or lobules in the breast. Most breast cancers start in the ducts or lobes and are called ductal carcinoma or lobular carcinoma:

- **Ductal carcinoma.** These cancers start in the cells lining the milk ducts and make up the majority of breast cancers.
- **Ductal carcinoma in situ (DCIS).** This is cancer that is located only in the duct.
- **Invasive or infiltrating ductal carcinoma.** This is cancer that has spread outside of the duct.
- **Invasive lobular carcinoma.** This is cancer that starts in the lobules.

Less common types of breast cancer include:

- Medullary
- Mucinous
- Tubular
- Metaplastic
- Papillary
- Inflammatory breast cancer is a faster-growing type of cancer that accounts for about 1% to 5% of all breast cancers.
- Paget's disease is a type of cancer that begins in the ducts of the nipple. Although it is usually in situ, it can also be an invasive cancer.

Breast cancer subtypes

There are 3 main subtypes of breast cancer that are determined by doing specific tests on a sample of the

tumor. These tests will help your doctor learn more about your cancer and recommend the most effective treatment plan.^[2]

Testing the tumor sample can find out if the cancer is:

- **Hormone receptor positive.** Breast cancers expressing estrogen receptors (ER) and/or progesterone receptors (PR) are called "hormone receptor positive." These receptors are proteins found in cells. Tumors that have estrogen receptors are called "ER positive." Tumors that have progesterone receptors are called "PR positive." Only 1 of these receptors needs to be positive for a cancer to be called hormone receptor positive. This type of cancer may depend on the hormones estrogen and/or progesterone to grow. Hormone receptor-positive cancers can occur at any age, but are more common in women who have gone through menopause. About 60% to 75% of breast cancers have estrogen and/or progesterone receptors. Cancers without these receptors are called "hormone receptor negative."
- **HER2 positive.** About 10% to 20% of breast cancers depend on the gene called *human epidermal growth factor receptor 2 (HER2)* to grow. These cancers are called "HER2 positive" and have many copies of the *HER2* gene or high levels of the HER2 protein. These proteins are also called "receptors." The *HER2* gene makes the HER2 protein, which is found on the cancer cells and is important for tumor cell growth. HER2-positive breast cancers grow more quickly. They can also be either hormone receptor positive or hormone receptor negative. Cancers that have no or low levels of the HER2

protein and/or few copies of the *HER2* gene are called “HER2 negative.”

- **Triple negative.** If a tumor does not express ER, PR, or HER2, the tumor is called “triple negative.” Triple-negative breast cancer makes up about 15% to 20% of invasive breast cancers. Triple-negative breast cancer seems to be more common among younger women, particularly younger black and Hispanic women. Triple-negative cancer is also more common in women with a mutation in the *BRCA1* or *BRCA2* genes. Experts recommend that all people with triple-negative breast cancer younger than 60 be tested for *BRCA* gene mutations.^[3]

Breast cancer symptoms

In its early stages, breast cancer may not cause any symptoms. In many cases, a tumor may be too small to be felt, but an abnormality can still be seen on a mammogram. If a tumor can be felt, the first sign is usually a new lump in the breast that was not there before. However, not all lumps are cancer.

- a breast lump or tissue thickening that feels different than surrounding tissue and has developed recently
- breast pain
- red, pitted skin over your entire breast
- swelling in all or part of your breast
- a nipple discharge other than breast milk
- a sudden, unexplained change in the shape or size of your breast
- inverted nipple

Breast cancer stages

Breast cancer can be divided into stages based on how large the tumor or tumors are and how much it has spread. Cancers that are large and/or have invaded nearby tissues or organs are at a higher stage than cancers that are small and/or still contained in the breast. In order to stage a breast cancer, doctors need to know:

- if the cancer is invasive or noninvasive
- whether the lymph nodes are involved
- if the cancer has spread to nearby tissue or organs

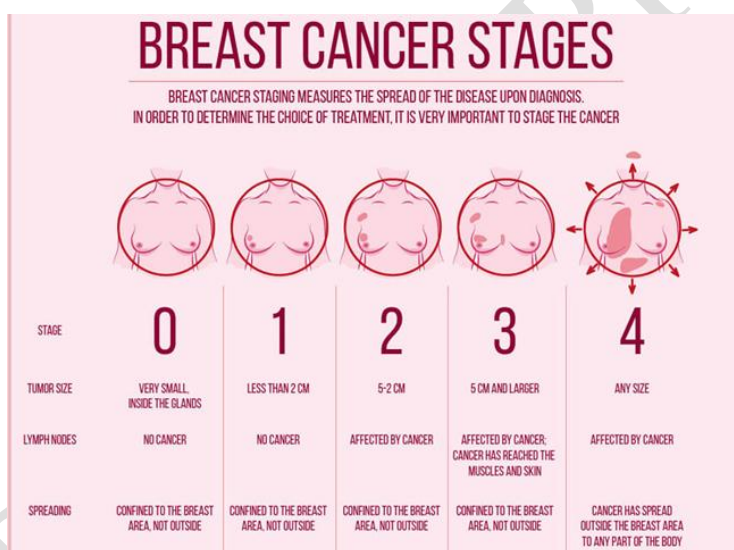


Figure-3: Stages of breast cancer.

Stage 0 breast cancer

Stage 0 is DCIS. Cancer cells in DCIS remain confined to the ducts in the breast and have not spread into nearby tissue.

Stage 1 breast cancer

- **Stage 1A:** The primary tumor is 2 centimeters wide or less and the lymph nodes are not affected.
- **Stage 1B:** Cancer is found in nearby lymph nodes, and either there is no tumor in the breast, or the tumor is smaller than 2 cm.

Stage 2 breast cancer

- **Stage 2A:** The tumor is smaller than 2 cm and has spread to 1–3 nearby lymph nodes, or it's between 2 and 5 cm and hasn't spread to any lymph nodes.

- **Stage 2B:** The tumor is between 2 and 5 cm and has spread to 1–3 axillary (armpit) lymph nodes, or it's larger than 5 cm and hasn't spread to any lymph nodes.

Stage 3 breast cancer

Stage 3A

- The cancer has spread to 4–9 axillary lymph nodes or has enlarged the internal mammary lymph nodes, and the primary tumor can be any size.
 - Tumors are greater than 5 cm and the cancer has spread to 1–3 axillary lymph nodes or any breastbone nodes.

- **Stage 3B:** A tumor has invaded the chest wall or skin and may or may not have invaded up to 9 lymph nodes.

- **Stage 3C:** Cancer is found in 10 or more axillary lymph nodes, lymph nodes near the collarbone, or internal mammary nodes.

Stage 4 breast cancer

Stage 4 breast cancer can have a tumor of any size, and its cancer cells have spread to nearby and distant lymph nodes as well as distant organs.

Diagnosis of breast cancer

Tests that can help diagnose breast cancer include:

- **Mammogram.** The most common way to see below the surface of your breast is with an imaging test called a mammogram. Many women aged 40 and older get annual mammograms to check for breast cancer. If your doctor suspects you may have a tumor or suspicious spot, they will also request a mammogram. If an abnormal area is seen on your mammogram, your doctor may request additional tests.
- **Ultrasound.** A breast ultrasound uses sound waves to create a picture of the tissues deep in your breast. An ultrasound can help your doctor distinguish between a solid mass, such as a tumor, and a benign cyst.

Breast biopsy

A breast biopsy is a simple medical procedure in which a sample of breast tissue is removed and sent to a laboratory for testing. A breast biopsy is the best way to evaluate if a suspicious lump or portion of your breast is cancerous.

It's important to remember that breast lumps aren't always cancerous. There are several conditions that can cause lumps or growths in the breast. A breast biopsy can help determine if a lump in your breast is cancerous or benign, which means noncancerous.^[4]

Breast cancer treatment

Several types of surgery may be used to remove breast cancer, including:

- **Lumpectomy.** This procedure removes the tumor and some surrounding tissue, leaving the rest of the breast intact.
- **Mastectomy.** In this procedure, a surgeon removes an entire breast. In a double mastectomy, both breasts are removed.
- **Sentinel node biopsy.** This surgery removes a few of the lymph nodes that receive drainage from the tumor. These lymph nodes will be tested. If they don't have cancer, you may not need additional surgery to remove more lymph nodes.
- **Axillary lymph node dissection.** If lymph nodes removed during a sentinel node biopsy contain cancer cells, your doctor may remove additional lymph nodes.
- **Contralateral prophylactic mastectomy.** Even though breast cancer may be present in only one breast, some women elect to have a contralateral prophylactic mastectomy. This surgery removes your healthy breast to reduce your risk of developing breast cancer again.

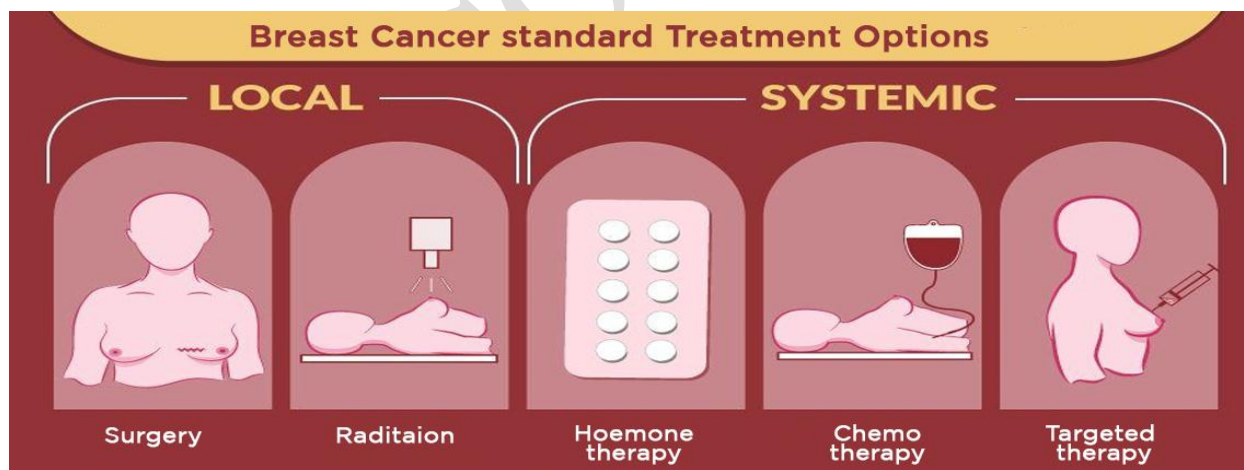


Figure-4: Treatment options of breast cancer.

Radiation therapy: With radiation therapy, high-powered beams of radiation are used to target and kill cancer cells. Most radiation treatments use external beam radiation. This technique uses a large machine on the outside of the body.

Advances in cancer treatment have also enabled doctors to irradiate cancer from inside the body. This type of radiation treatment is called brachytherapy. To conduct brachytherapy, surgeons place radioactive seeds, or

pellets, inside the body near the tumor site. The seeds stay there for a short period of time and work to destroy cancer cells.

Chemotherapy: Chemotherapy is a drug treatment used to destroy cancer cells. Some people may undergo chemotherapy on its own, but this type of treatment is often used along with other treatments, especially surgery.

Hormone therapy: Estrogen and progesterone, two female hormones, can stimulate the growth of breast cancer tumors. Hormone therapy works by blocking your body's production of these hormones, or by blocking the hormone receptors on the cancer cells. This action can help slow and possibly stop the growth of cancer.

Medications: Certain treatments are designed to attack specific abnormalities or mutations within cancer cells. For example, Herceptin (trastuzumab) can block the body's production of the HER2 protein. HER2 helps breast cancer cells grow, so taking a medication to slow the production of this protein may help slow cancer growth.

Risk factors for breast cancer: Age. Your risk for developing breast cancer increases as you age. Most invasive breast cancers are found in women over age 55.

- **Drinking alcohol:** Drinking excessive amounts of alcohol raises your risk.
- **Having dense breast tissue:** Dense breast tissue makes mammograms hard to read. It also increases your risk of breast cancer.
- **Gender:** White women are 100 times more likely to develop breast cancer than white men, and black women are 70 times more likely to develop breast cancer than black men.
- **Giving birth at an older age:** Women who don't have their first child until after age 35 have an increased risk of breast cancer.
- **Hormone therapy:** Women who took or are taking postmenopausal estrogen and progesterone medications to reduce their signs of menopause symptoms have a higher risk of breast cancer.^[5]

Breast cancer prevention

Lifestyle factors: Lifestyle factors can affect the risk of breast cancer. For instance, women who are obese have a higher risk of developing breast cancer. Maintaining a healthy diet and getting more exercise could help you lose weight and lower the risk.

Breast cancer screening

Having regular mammograms may not prevent breast cancer, but it can help reduce the odds that it will go undetected. The American College of Physicians (ACP) provides the following general recommendations for women at average risk for breast cancer:

- **Women ages 40 to 49:** An annual mammogram isn't recommended, but women should discuss their preferences with their doctors.
- **Women ages 50 to 74:** A mammogram every other year is recommended.
- **Women 75 and older:** Mammograms are no longer recommended.

CONCLUSION

A plan for the diagnosis and treatment of cancer is a key component of any overall cancer control plan. Its main goal is to cure cancer patients or prolong their life

considerably, ensuring a good quality of life. In order for a diagnosis and treatment programme to be effective, it must never be developed in isolation. It needs to be linked to an early detection programme so that cases are detected at an early stage, when treatment is more effective and there is a greater chance of cure. It also needs to be integrated with a palliative care programme, so that patients with advanced cancers, who can no longer benefit from treatment, will get adequate relief from their physical, psychosocial and spiritual suffering. Furthermore, programmes should include a awareness-raising component, to educate patients, family and community members about the cancer risk factors and the need for taking preventive measures to avoid developing cancer.

Where resources are limited, diagnosis and treatment services should initially target all patients presenting with curable cancers, such as breast, cervical and oral cancers that can be detected early. They could also include childhood acute lymphatic leukaemia, which has a high potential for cure although it cannot be detected early. Above all, services need to be provided in an equitable and sustainable manner. As and when more resources become available, the programme can be extended to include other curable cancers as well as cancers for which treatment can prolong survival considerably.

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