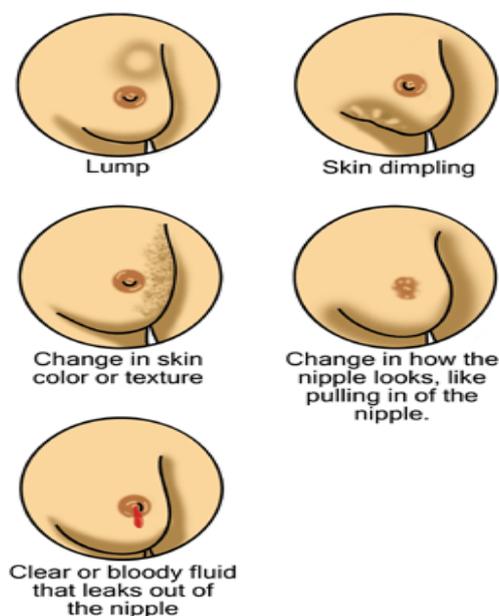


Breast Cancer

Breast cancer originates in mammary glands and is a significant concern in oncology. It is characterized by the development of malignant cells within the breast tissue, often detectable by screening or physical examination.

Signs and Symptoms

Most individuals with breast cancer are asymptomatic at diagnosis, detected through screening. When symptoms are present, they often include a new lump in the breast, swelling, pain, dimpling, redness, or dryness of the skin, and unusual nipple discharge. Less common forms, such as inflammatory breast cancer, cause significant swelling and redness, while Paget's disease presents with eczema-like changes around the nipple and areola.



Common symptoms of breast cancer

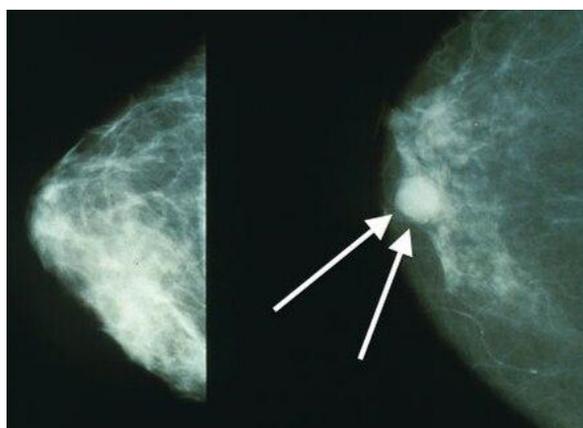
Advanced breast cancer can metastasize, affecting bones, liver, lungs, and brain, leading to symptoms like bone pain, fractures, abdominal pain, jaundice, chest pain, cough, persistent headaches, seizures, and cognitive disruptions.

Screening

Mammography is the primary screening tool, involving low-dose X-ray imaging of the breast. It aids in detecting dense tissues, distortions, and microcalcifications. For dense breasts, other modalities like ultrasound, MRI, or tomosynthesis are preferred. Regular screening significantly reduces breast cancer mortality. Medical guidelines recommend annual screening for women aged 50-70 years.



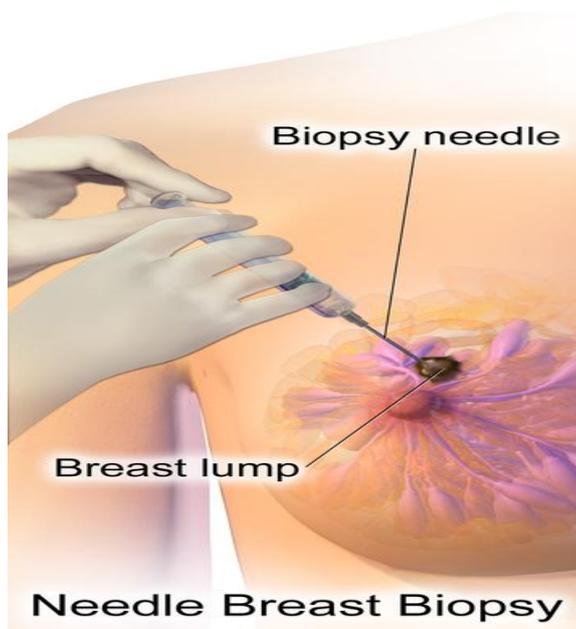
Cartoon of a mammogram, with the breast to be imaged pressed between two plates



Mammograms showing a normal breast (left) and a breast with cancer (right)

Diagnosis

Diagnosis involves imaging followed by a biopsy. Core needle biopsy is common, while fine-needle aspiration is used for fluid-filled masses. Post biopsy, breast cancers are classified by tissue origin, tumour grade, and receptor status (ER, PR, HER2). Tumours are staged using the TNM system, incorporating tumour size (T), lymph node involvement (N), and metastasis (M).



Needle breast biopsy

Treatment

Local Tumors

Surgery is the primary treatment for localized tumors, ranging from lumpectomy to mastectomy. Sentinel lymph node biopsy is often performed to assess spread. Post-surgery, radiotherapy reduces recurrence risk. External beam radiotherapy is standard, though brachytherapy is an option.



Chest after right breast mastectomy

Chemotherapy is used to lower recurrence risk, with drugs selected based on patient health and side effects profile. HER2-positive tumours benefit from trastuzumab, and hormone receptor-positive cancers are treated with endocrine therapies like tamoxifen or aromatase inhibitors.

Metastatic Disease

Metastatic breast cancer is managed with chemotherapy, endocrine therapy, HER2-targeted therapy, and other targeted treatments based on specific genetic mutations. Bone metastases are treated with bone-strengthening agents.

Supportive Care

Supportive care addresses side effects of treatment. Antiemetics manage nausea from chemotherapy, while antidepressants can alleviate hot flashes from endocrine therapy.

Cognitive behavioural therapy, physical activity, and other interventions improve quality of life.



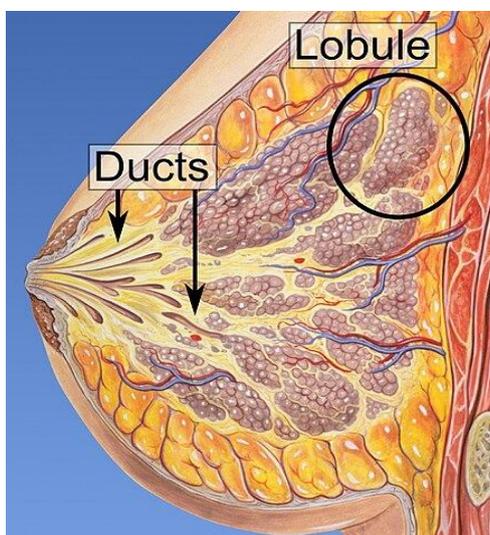
Breasts after double mastectomy followed by nipple-sparing reconstruction with implants

Risk Factors

Risk factors for breast cancer include hormonal influences, lifestyle choices, genetic predispositions, and certain medical conditions. Early menstruation, late menopause, late or no childbirth, and hormone replacement therapy increase risk. Lifestyle factors like alcohol consumption, obesity, and smoking also contribute. Genetic mutations, particularly in BRCA1 and BRCA2, significantly elevate risk.

Pathophysiology

Breast cancer arises from genetic mutations influenced by hormonal and environmental factors. Oestrogen promotes breast cell proliferation, and mutations in genes like PTEN and BRCA1/2 disrupt normal cell death pathways, leading to malignancy.



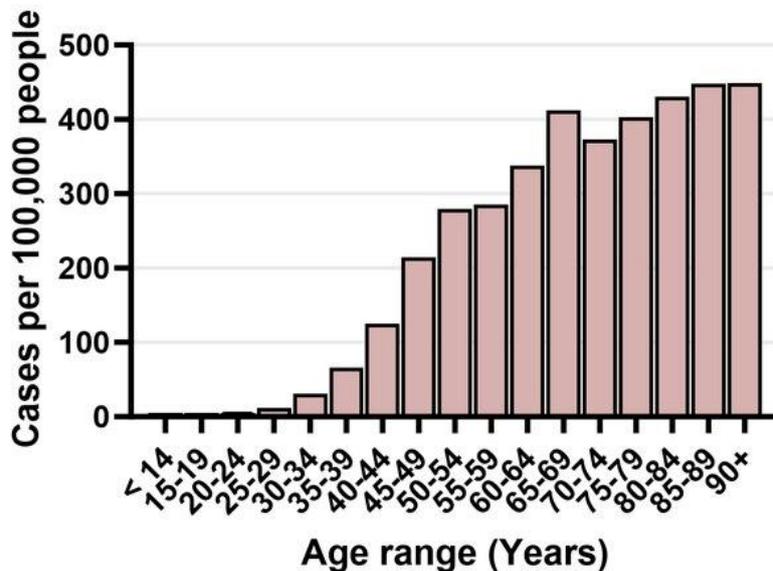
Ducts and lobules are the main locations of breast cancers

Prevention

Preventive measures include maintaining a healthy lifestyle, breastfeeding, and, for high-risk individuals, preventive mastectomy or medications like SERMs and aromatase inhibitors.

Epidemiology

Breast cancer is the most common invasive cancer in women, with incidence rising annually. It predominantly affects women over 50, though younger women and men can also develop the disease.



Breast cancer incidence in women by age group

Self-assessment MCQs (single best answer)

- 1. Which of the following is NOT a common symptom of breast cancer?**

 - New lump in the breast
 - Swelling of the breast
 - Persistent cough
 - Nipple discharge
 - Redness of the skin
- 2. What is the primary screening tool for breast cancer?**

 - Ultrasound
 - MRI
 - Mammography
 - CT scan
 - PET scan
- 3. Which of the following breast cancer types is known for significant swelling and redness?**

 - Paget's disease
 - Inflammatory breast cancer
 - Ductal carcinoma in situ
 - Lobular carcinoma in situ
 - Triple-negative breast cancer
- 4. What is the preferred biopsy method for diagnosing breast cancer?**

 - Excisional biopsy

- b. Fine-needle aspiration
 - c. Core needle biopsy
 - d. Shave biopsy
 - e. Punch biopsy
- 5. Which hormone receptor status is considered in breast cancer classification?**
- a. Oestrogen Receptor (ER)
 - b. Progesterone Receptor (PR)
 - c. HER2
 - d. All of the above
 - e. None of the above
- 6. Which drug is used specifically for HER2-positive breast cancer?**
- a. Tamoxifen
 - b. Trastuzumab
 - c. Letrozole
 - d. Paclitaxel
 - e. Doxorubicin
- 7. Which of the following factors does NOT increase the risk of breast cancer?**
- a. Early menstruation
 - b. Late menopause
 - c. High alcohol consumption
 - d. Regular physical activity
 - e. Genetic mutations in BRCA1/BRCA2
- 8. Which system is used to stage breast cancer?**
- a. ABC system
 - b. TNM system
 - c. XYZ system
 - d. GHI system
 - e. 123 system
- 9. For women aged 50-70 years, how often is regular screening for breast cancer recommended?**
- a. Every 3 months
 - b. Every 6 months
 - c. Annually
 - d. Every 2 years
 - e. Every 5 years
- 10. Which of the following is a preventive measure for high-risk individuals to reduce breast cancer risk?**
- a. Preventive mastectomy
 - b. Regular alcohol consumption
 - c. Late childbirth
 - d. Hormone replacement therapy
 - e. High-fat diet