ALL ABOUT

Breast Cancer

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FOREWORD

Dear Friend,

Patients who have just been advised by their doctor of a new diagnosis of cancer often feel that they have just received a death sentence. We want to change this perception. Many survivors have also shared with us that they felt like their whole world came crashing down on them after their doctor has confirmed the diagnosis. You became confused and lost. At Onco Life Centre, we recognize and validate your experience and feelings of shock. Onco Life Centre, together with our Industry Partners, would like to help you make your cancer treatment journey less painful and difficult by equipping you with tools in this Resource Guide. A map to direct you, so you can make informed decisions along the way, whether to turn left or right, move forward or staying put….

Our wish is that by providing you with important medical information, you can be empowered and become sufficiently equipped to navigate through the challenges ahead. There is no doubt this may be one of the most challenging and arduous journey that you and your loved ones will ever be embarking on. But we **CHOOSE** to believe that there are always glimmers of hope for cure and if not cure, a sustained quality of life living with cancer.

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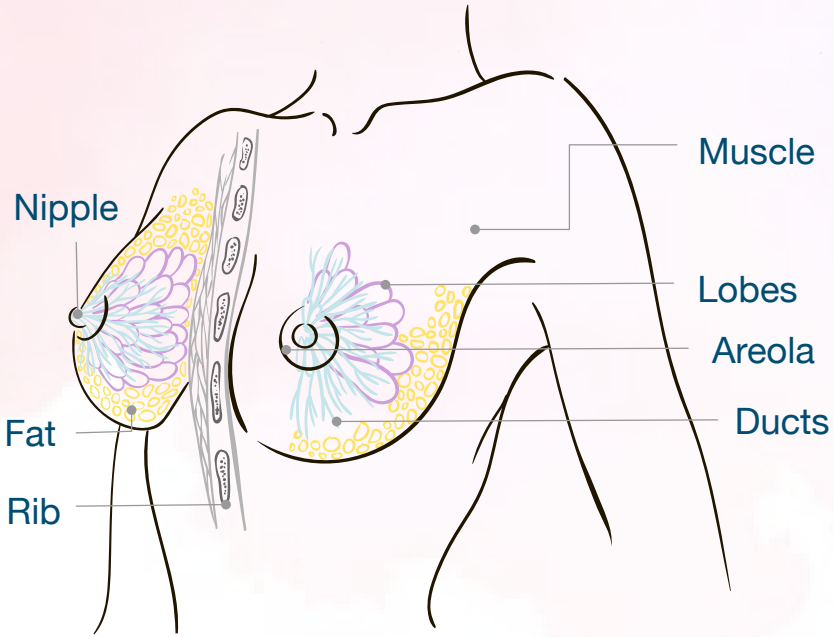
Understanding Breast Cancer



Breast cancer is a disease in which cells in the breast grow out of control and form tumors. In most instances, these tumors can be felt as a lump.

It is the most common cancer among women worldwide and in Malaysia. It can begin in various parts of the organ, including the ducts, the lobules (which make milk), or the tissue in between.

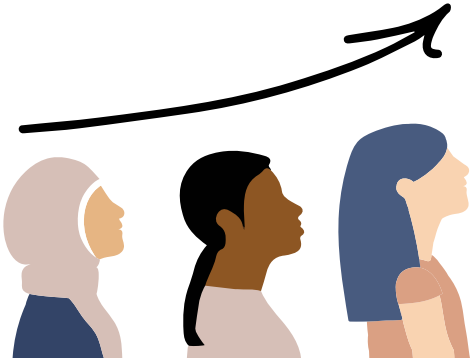
Type, stage, grade, and hormone receptor status are some of the ways to classify breast cancer.

References: 1. Globolcan 2018 Malaysia https://gco.iarc.fr/today/data/factsheets/populations/458-malaysia-fact-sheets.pdf 2. Malaysian National Cancer Registry Report (2012 - 2016)

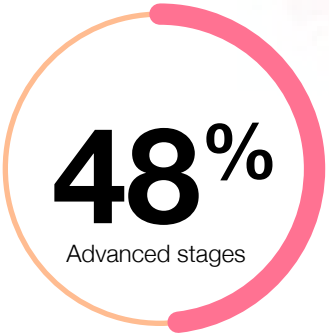
Facts about Breast Cancer in Malaysia

Approximately 7600 new cases are diagnosed each year

The most common cancer and accounted for 34.1% of all cancer among females in Malaysia



Incidence is highest among Chinese, followed by Indian and Malay



48% of breast cancers are diagnosed in advanced stages

References: 1. Globolcan 2018 Malaysia https://gco.iarc.fr/today/data/factsheets/populations/458-malaysia-fact-sheets.pdf 2. Malaysian National Cancer Registry Report (2012 - 2016)

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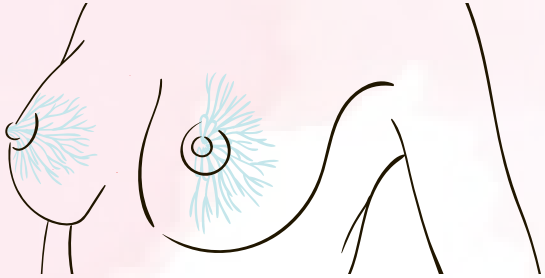
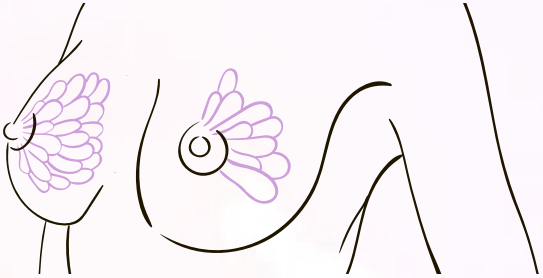
Types of Breast Cancer and How it spreads

Breast cancer can start from different parts of the breast, most commonly in the ducts that carry milk to the nipple. Almost all breast cancers are carcinomas. Carcinomas are cancers that start in the cells that line the inner or outer surfaces of the body.

There is more than one type of breast carcinoma:



Ductal breast cancer starts in the cells that line the milk ducts. Milk ducts are thin tubes that carry milk from the lobules of the breast to the nipple. It is the most common type of breast cancer.



Lobular breast cancer starts in the lobules (milk glands) of the breast.

Cancer in the ducts is called ductal carcinoma, and in the lobules, called lobular carcinoma. Both ductal and lobular breast cancer can be invasive or non-invasive. Invasive breast cancer is cancer that spreads into surrounding tissues while non-invasive breast cancer is cancer that does not go beyond the mammary glands or lobules in the breast. If the disease has spread outside the duct or lobule and into the surrounding tissue, it is called invasive ductal or lobular carcinoma.

References: 1. American Cancer Society (ACS). About Breast Cancer: What is Breast Cancer. Last updated September 21, 2017. Available at: https://www.cancer.org/content/dam/CRC/PDF/Public/8577.00.pdf. Accessed August 6, 2018. 2.ASCO Answers, American Society of Clinical Oncology. Breast Cancer. 2018. Available at: https://www.cancer.net/sites/cancer.net/files/asco_answers_guide_breast.pdf. Accessed August 6, 2018. 3. NCCN Guidelines for Patients. Breast Cancer :Invasive & Metastatic , 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

Types of Breast Cancer and How it spreads

Primary tumor

Over time, cancer cells form a mass called a primary tumor. The primary tumor determine what type of cancer it is. For example, when a primary tumor was formed in the breast area, it is known as breast cancer.

Invasive

Cancer cells can then grow into surrounding tissues. Invasive breast cancer is breast cancer that has spread from the milk ducts or lobules into the breast tissue or nearby lymph nodes.

Metastasis

Unlike normal cells, cancer cells can spread and form tumors in other parts of the body. Cancer that has spread is called a metastasis. In this process, cancer cells break away from the first (primary) tumor and travel through blood or lymph vessels to distant sites. Once in other sites, cancer cells may form secondary tumors.

- Cancer that has spread to a nearby body part such as the axillary lymph nodes is called a local metastasis. It might be referred to as local/regional disease or locally advanced.
- Cancer that has spread to a body part far from the primary tumor is called a distant metastasis.

Breast cancer can metastasize to the bones, lungs, liver, spine, or brain. Breast cancer that has metastasized to other parts of the body is still called breast cancer.

References: 1. American Cancer Society (ACS). About Breast Cancer: What is Breast Cancer. Last updated September 21, 2017. Available at: https://www.cancer.org/content/dam/CRC/PDF/Public/8577.00.pdf. Accessed August 6, 2018. 2.ASCO Answers, American Society of Clinical Oncology. Breast Cancer. 2018. Available at: https://www.cancer.net/sites/cancer.net/files/asco_answers_guide_breast.pdf. Accessed August 6, 2018. 3. NCCN Guidelines for Patients. Breast Cancer :Invasive & Metastatic , 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

Signs and Symptoms of Breast Cancer

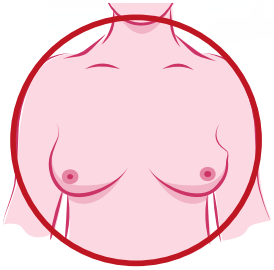
What Do Lumps in My Breast Mean?

Many conditions can cause lumps in the breast, including cancer. But most breast lumps are caused by other medical conditions. The two most common causes of breast lumps are fibrocystic breast condition and cysts. Fibrocystic condition causes noncancerous changes in the breast that can make them lumpy, tender, and sore. Cysts are small fluid-filled sacs that can develop in the breast.

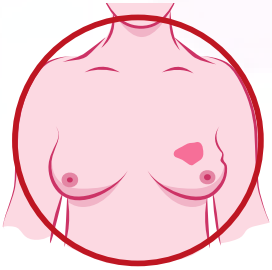
Different people have different symptoms of breast cancer. Some people do not have any signs or symptoms at all.

Some warning signs of breast cancer are:

New lump in the breast or underarm (armpit)



Thickening or swelling of part of the breast



Irritation or dimpling of breast skin

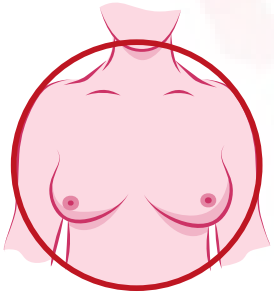
References: 1. Division of Cancer Prevention and Control, Centers for Disease Control and Prevention. Available at https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm

Signs and Symptoms of Breast Cancer

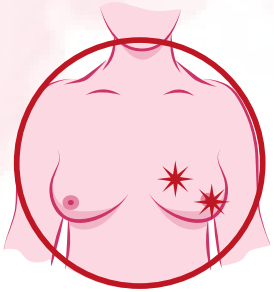
Redness or flaky skin in the nipple area or the breast

Pulling in of the nipple or pain in the nipple area

Nipple discharge other than breast milk, including blood



Any change in the size or the shape of the breast



Pain in any area of the breast

Keep in mind that these symptoms can happen with other conditions that are not cancer.

If you have any signs or symptoms that worry you, be sure to see your doctor right away.

References: 1. Division of Cancer Prevention and Control, Centers for Disease Control and Prevention. Available at https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm

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Breast Cancer Risk Factors

Risk Factors You Cannot Change

Age

Incidence increases with age, particularly after 50 years old

Genetic Mutations

Inherited changes (mutations) to certain genes, such as BRCA1 and BRCA2

Early Menstrual

Before age of 12

Late Menopause

After age of 55

Medical History

Personal history of breast cancer or certain non-cancerous breast diseases

Family History

Any family members had history of any type of cancer

Exposure to Radiation

Radiation therapy to the chest or breasts before age 30

Breast Density

Dense breasts have more connective tissue than fatty tissue, which are more likely to get breast cancer

Reference: 1. Division of Cancer Prevention and Control, Centers for Disease Control and Prevention. Available at https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm

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Breast Cancer Risk Factors

Risk Factors You Can Change

Lack of Exercise

Not physically active

Obesity

Overweight or obese after menopause

Diet

Eating processed and fatty foods and excessive alcohol intake

Taking Hormones

Hormone replacement therapy taken during menopause especially taken for more than five years

Reproductive History

First pregnancy after age 30, not breastfeeding, and never having a full-term pregnancy

Research suggests that other factors such as smoking, being exposed to chemicals that can cause cancer, and changes in other hormones due to night shift working also may increase breast cancer risk.

Reference: 1. Division of Cancer Prevention and Control, Centers for Disease Control and Prevention. Available at https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm

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Diagnosing Breast Cancer

Your doctor may suspect breast cancer if you have certain symptoms as discussed earlier. To confirm whether you have breast cancer, there are few tests that your doctor will run through with you. These includes physical examination, blood test, imaging test and laboratory test(biopsy). Some tests are done at the initial visit while other tests are done soon after a diagnosis is made.

Your doctor will also need to understand on your health and medical history, your family medical history and whether you are pregnant or planning to.

1. **Blood tests >**
2. **Pregnancy test >**
3. **Complete blood count >**
4. **Comprehensive metabolic panel >**
5. **Liver function tests >**
6. **Imaging tests >**
7. **Tumour and genetic testing >**

References: 1. Cancer.net, ASCO Available at: https://www.cancer.net/cancer-types/breast-cancer/diagnosis
2. NCCN Guidelines for Patients. Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Diagnosing Breast Cancer

Blood tests

1

Blood tests check for signs of disease and how well organs are working. They require a sample of your blood, which is removed through a needle placed into your vein.

Pregnancy test

2

Those who can become pregnant will be given a pregnancy test before treatment begins.

Complete blood count

3

A complete blood count (CBC) measures the levels of red blood cells, white blood cells, and platelets in your blood. Your doctor will want to know if you have enough red blood cells to carry oxygen throughout your body, white blood cells to fight infection, and platelets to control bleeding.

References: 1. Cancer.net, ASCO Available at: https://www.cancer.net/cancer-types/breast-cancer/diagnosis 2. NCCN Guidelines for Patients. Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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Comprehensive metabolic panel

A comprehensive metabolic panel (CMP) is a test that measures 14 different substances in your blood. A CMP provides important information about how well your kidneys and liver are working, among other things. Creatinine is often part of a CMP. This test measures the health of your kidneys.

Liver function tests

Liver function tests (LFTs) look at the health of your liver by measuring chemicals that are made or processed by the liver. Levels that are too high or low signal that the liver is not working well.

References: 1. Cancer.net, ASCO Available at: https://www.cancer.net/cancer-types/breast-cancer/diagnosis
2. NCCN Guidelines for Patients. Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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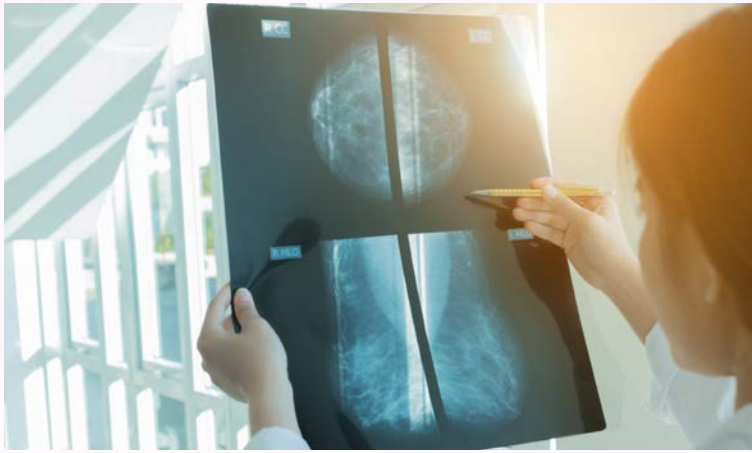
Imaging tests

Imaging tests show pictures of the inside of the body. The following imaging tests of the breast may be done to learn more about a suspicious area found in the breast during screening. In addition to these, there are other newer types of tests that are being studied.



Diagnostic mammography >

Ultrasound >

MRI >

Biopsy >

References: 1. Cancer.net, ASCO Available at: https://www.cancer.net/cancer-types/breast-cancer/diagnosis
2. NCCN Guidelines for Patients. Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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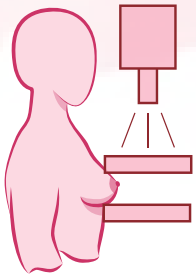
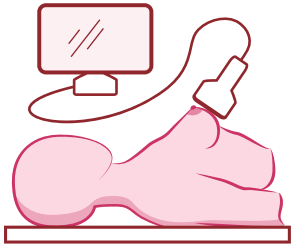
< Imaging tests



Diagnostic mammography

Diagnostic mammography is similar to screening mammography except that more pictures of the breast are taken. It is often used when a woman is experiencing signs, such as a new lump or nipple discharge. Diagnostic mammography may also be used if something suspicious is found on a screening mammogram.



Ultrasound

An ultrasound uses sound waves to create a picture of the breast tissue. An ultrasound can distinguish between a solid mass, which may be cancer, and a fluid-filled cyst, which is usually not cancer.

References: 1. Cancer.net, ASCO Available at: https://www.cancer.net/cancer-types/breast-cancer/diagnosis
2. NCCN Guidelines for Patients. Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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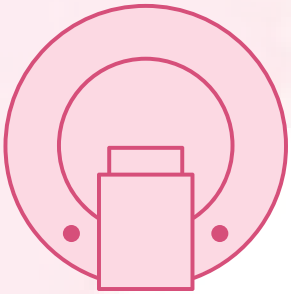
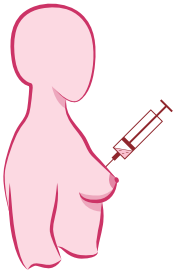
< Imaging tests



MRI

An MRI uses magnetic fields, not x-rays, to produce detailed images of the body. A special dye called a contrast medium is given before the scan to help create a clear picture of the possible cancer. This dye is injected into a patient's vein. A breast MRI may be used after a woman has been diagnosed with cancer to check the other breast for cancer or to find out how much the disease has grown throughout the breast. Breast MRI is also a screening option, along with mammography, for some women with a very high risk of developing breast cancer



Biopsy

A biopsy is the removal of a small amount of tissue for examination under a microscope. Other tests can suggest that cancer is present, but only a biopsy can make a definite diagnosis. A pathologist then analyzes the sample(s). A pathologist is a doctor who specializes in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease. There are different types of biopsies, classified by the technique and/or size of needle used to collect the tissue sample.

References: 1. Cancer.net, ASCO Available at: https://www.cancer.net/cancer-types/breast-cancer/diagnosis
2. NCCN Guidelines for Patients. Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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Tumour and genetic testing

Tumour and genetic testing will also be carried out to help determined the type of breast cancer and with this your doctors can discuss the treatment options available. These tests includes but not limiting to hormone receptor test, HER2 test, BRCA test, PIK3CA mutation test and PD-L1 test.

It is recommended to test for BRCA mutation based on the following risk factors:

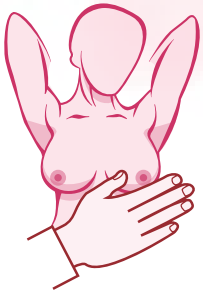
- Ovarian cancer (epithelial non-mucinous ovarian cancer)
- Breast cancer in patient diagnosed ≤ 45 years old
- Two primary breast cancers, both diagnosed ≤ 60 years old
- Triple-negative breast cancer, diagnosed ≤ 60 years old
- Male breast cancer
- Breast cancer plus parent, sibling or child with any of the above criteria

References: 1. Cancer.net, ASCO Available at: https://www.cancer.net/cancer-types/breast-cancer/diagnosis 2. NCCN Guidelines for Patients. Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx 3. Clinical practice guidelines 2019 Management of Breast Cancer Third Edition MOH/P/PAK/432.19(GU)-e.

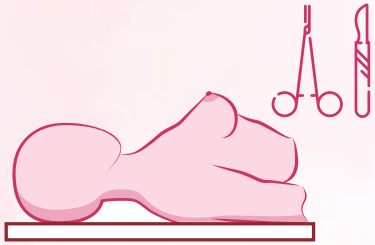
Stages of Breast Cancer

A cancer stage is a rating of the cancer based on test results. The American Joint Committee on Cancer (AJCC) created a way to determine how much cancer is in your body, where it is located, and what subtype you have. This is called staging.

Based on testing, your cancer will be assigned a stage. Staging is needed to make treatment decisions. Cancer staging is often done twice.



- Clinical stage (c) is the rating given before any treatment. It is based on a physical exam, biopsy, and imaging tests.



- Pathologic stage (p) or surgical stage is determined by examining tissue removed during an operation.

References: 1. NCCN Guidelines for Patients. Breast Cancer , 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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Stages of Breast Cancer

Numbered stages

Number stages range from stage 1 to stage 4, with 4 being the most advanced. Doctors write these stages as stage I, stage II, stage III, and stage IV.

Stage 0 is noninvasive

Noninvasive breast cancer is rated stage 0. This cancer is found only inside the ducts or lobules. It has not spread to surrounding breast tissue, lymph nodes (N0), or distant sites (M0).

Stages 1, 2, and 3 are invasive

Invasive breast cancer is rated stage 1, 2, or 3. It has grown outside the ducts, lobules, or breast skin. Cancer might be in the axillary lymph nodes.

Stage 4 is metastatic

In stage 4 breast cancer, cancer has spread to distant sites, but can also be found in the axillary lymph nodes. Your first diagnosis can be stage 4 metastatic breast cancer or it can develop from earlier stages.

Breast cancer staging measures the spread of the disease upon diagnosis. In order to determine the choice of treatment, it is very important to stage the cancer.

0 **Stage 0 >**

1 **Stage 1 >**

2 **Stage 2 >**

3 **Stage 3 >**

4 **Stage 4 >**

References: 1. NCCN Guidelines for Patients. Breast Cancer , 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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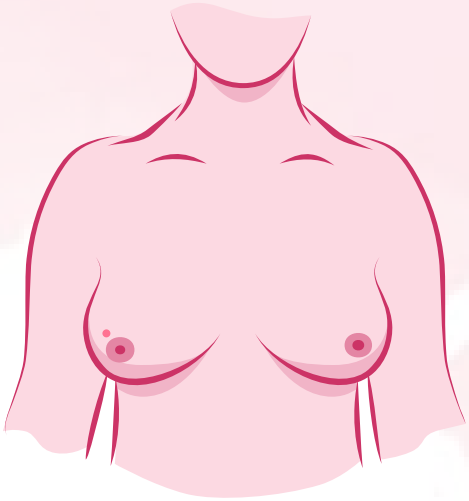
< Stages of Breast Cancer

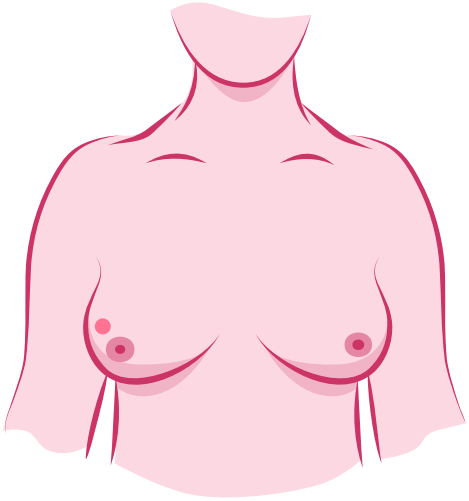


STAGE 0

Tumour size
Very small inside the glands

Lymph nodes
No cancer

Spreading
Confined to the breast area, not outside



STAGE 1

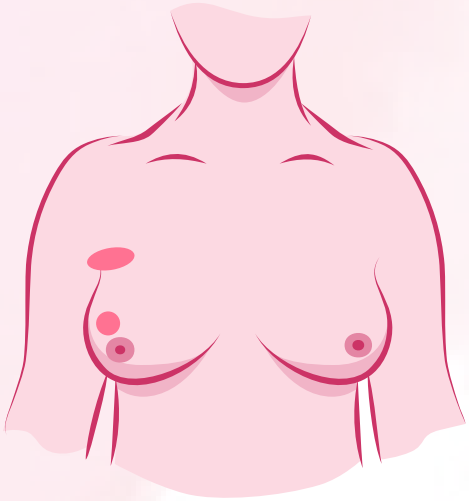
Tumour size
Less than 2 cm

Lymph nodes
No cancer

Spreading
Confined to the breast area, not outside

References: 1. NCCN Guidelines for Patients. Breast Cancer , 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Stages of Breast Cancer

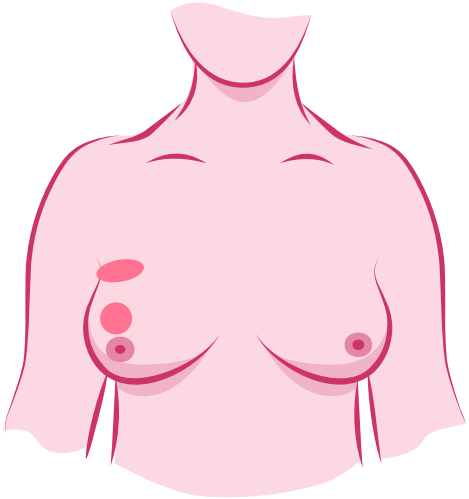


STAGE 2

Tumour size
2 - 5 cm

Lymph nodes
Affected by cancer

Spreading
Confined to the breast area, not outside



STAGE 3

Tumour size
5 cm and larger

Lymph nodes
Affected by cancer; cancer has reached the muscle and skin

Spreading
Confined to the breast area, not outside

References: 1. NCCN Guidelines for Patients. Breast Cancer , 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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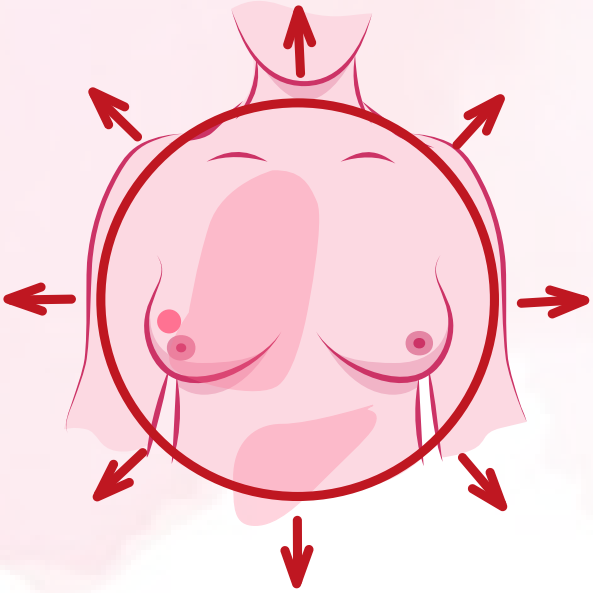
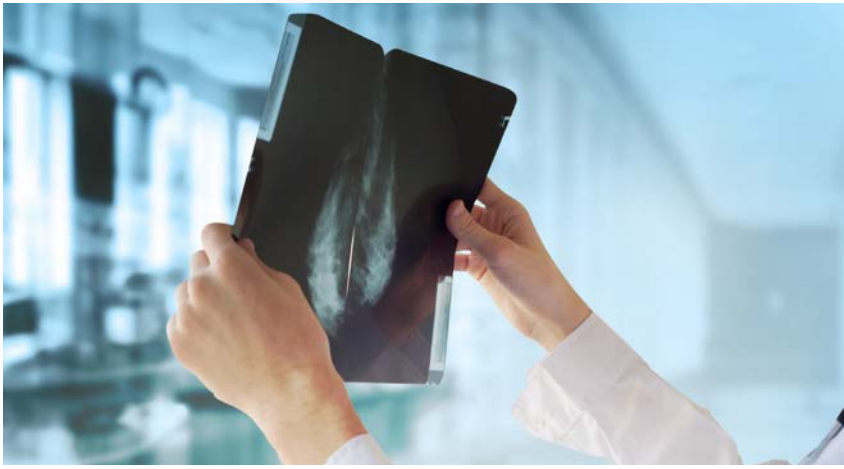


STAGE 4

Tumour size
Any size

Lymph nodes
Affected by cancer

Spreading
Cancer has spread outside the breast area to any part of the body



References: 1. NCCN Guidelines for Patients. Breast Cancer , 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

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How we classify breast cancer today

There are **3** main subtypes of breast cancer:

Hormone-Receptor positive (HR+)

1

Luminal A breast cancer is hormone-receptor positive, HER2 negative, and has low levels of the protein Ki-67, which helps control how fast cancer cells grow. Luminal A cancers are low-grade, tend to grow slowly and have the best prognosis.

Luminal B breast cancer is hormone-receptor positive, and either HER2 positive or HER2 negative with high levels of Ki-67. Luminal B cancers generally grow slightly faster than luminal A cancers and their prognosis is slightly worse.

HER2-enriched (HER2+)

2

HER2-enriched (HER2+) breast cancer is hormone-receptor negative (estrogen-receptor and progesterone-receptor negative) and HER2 positive. HER2-enriched cancers tend to grow faster than luminal cancers and can have a worse prognosis, but they are often successfully treated with targeted therapies aimed at the HER2 protein.

Triple-negative/basal-like

3

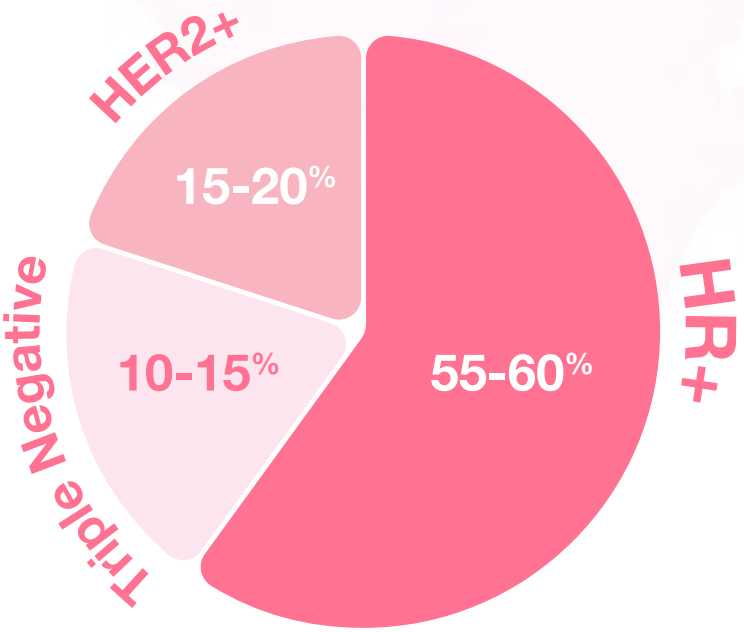
Triple-negative/basal-like breast cancer is hormone-receptor negative (estrogen-receptor and progesterone-receptor negative) and HER2 negative. This type of cancer is more common in younger women.

References: 1. Molecular Subtypes of Breast Cancer, BreastCancer.Org. .Available at: https://www.breastcancer.org/symptoms/types/molecular-subtypes 2. Paul et al. (2014). The breast cancer susceptibility genes (BRCA) in breast and ovarian cancers. Frontiers in bioscience (Landmark edition), 19, pp.605–618. 3. National Cancer Institute. (2020). BRCA Mutations: Cancer Risk And Genetic Testing. Available at: https://www.cancer.gov/about-cancer/causes-prevention/genetics/brca-fact-sheet [Accessed May 2020]. 4. American Cancer Society. (2019). Breast Cancer Risk Factors You Cannot Change. Available at: https://www.cancer.org/cancer/breast-cancer/risk-and-prevention/breast-cancer-risk-factors-you-cannot-change.html [Accessed May 2020].

How we classify breast cancer today

Developments within genomics identified further biomarkers which can be actioned to target breast cancer, specifically, the two BReast CAncer susceptibility (BRCA) genes – BRCA1 and BRCA2.The two BRCA genes are considered 'tumour suppressors' and repair damage caused to our DNA. When the BRCA genes are mutated, they cannot perform their function and the risk of developing cancer increases. On average, a woman with a BRCA1 or BRCA2 gene mutation has up to a 7 in 10 chance of acquiring breast cancer by age 80.[1-4]

Percentage of breast cancer subtypes



References: 1. Molecular Subtypes of Breast Cancer, BreastCancer.Org. .Available at: https://www.breastcancer.org/symptoms/types/molecular-subtypes 2. Paul et al. (2014). The breast cancer susceptibility genes (BRCA) in breast and ovarian cancers. Frontiers in bioscience (Landmark edition), 19, pp.605–618. 3. National Cancer Institute. (2020). BRCA Mutations: Cancer Risk And Genetic Testing. Available at: https://www.cancer.gov/about-cancer/causes-prevention/genetics/brca-fact-sheet [Accessed May 2020]. 4. American Cancer Society. (2019). Breast Cancer Risk Factors You Cannot Change. Available at: https://www.cancer.org/cancer/breast-cancer/risk-and-prevention/breast-cancer-risk-factors-you-cannot-change.html [Accessed May 2020].

Treatment

The goal of treatment is to prevent or slow the spread of cancer cells while at the same time relieve symptoms-related discomfort. There are plenty of ways to treat breast cancer and the consideration is done depending on several factors which include cancer stage, characteristic of cancer cell, past treatment, medical history and health condition. Therefore, not everyone will receive the same form of treatment and respond to treatment in the same way. It is important to discuss with your doctor your treatment goal and decide which treatment will suits you the best.

Generally, there are 2 types of treatment:

- **Local therapy** focuses on a certain area. It includes surgery, ablation, and radiation therapy.
- **Systemic therapy** works throughout the body. It includes endocrine therapy, targeted therapy and chemotherapy.

Combination of both local and systemic therapy is very common in order to control the cancer.

1 **Surgery >**

2 **Lumpectomy >**

3 **Mastectomy >**

4 **Radiation therapy >**

5 **Endocrine therapy >**

6 **Menopause >**

7 **HER2-targeted therapy >**

8 **Chemotherapy >**

9 **Bone-targeted therapy >**

10 **Other targeted herapies >**

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Surgery

In early or invasive breast cancer, surgery is the main treatment. Systemic theraphy or radiation therapy might be used before surgery to shrink the tumor or reduce the amount of cancer (also known as cancer burden)

Preoperative
is treatment before surgery. It is also called neoadjuvant therapy.

Postoperative
is treatment after surgery. It is also called adjuvant therapy.

In late or metastatic breast cancer however, surgery is not the primary treatment. It might be considered as a supportive care option after systemic drug therapy to reduce the pain or discomfort caused by primary tumor.

In Malaysia, breast cancer surgery is often performed by a breast surgeon or general surgeon with the collaboration from a reconstructive (plastic) surgeon.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Lumpectomy

Lumpectomy is the removal of abnormal cells or tumor. It is also called breast-conserving therapy. In a lumpectomy, only the tumor area along with a rim of tissue will be removed. The rest of your breast is left alone. Extra tissue is removed around the tumor to create a cancer-free area. This cancer-free area is called a surgical margin. Having a surgical margin will decrease the chance that cancer may return in that area of the breast. You may have more than one surgery to ensure all of the cancer was removed.

For invasive cancers, a lumpectomy is often done with a sentinel lymph node biopsy (SLNB). A lumpectomy might be followed by radiation therapy to part of or the whole breast. A boost is extra radiation to the tumor area.

The breast might not look the same after a lumpectomy. Speak to your doctor about how a lumpectomy might affect the look and shape of your breast and what reconstruction options are available.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Mastectomy

A total mastectomy is a surgery that removes the whole breast. Chest muscle is not removed. This operation is also called a simple mastectomy. A skin-sparing mastectomy removes the breast but not all of the skin, in order to have reconstruction.

Nipple-sparing mastectomy preserves the nipple-areola complex as well. Not everyone is a candidate for nipple-sparing mastectomy. Before removing the breast, the surgeon may do a sentinel lymph node biopsy (SLNB). Sentinel lymph nodes are the first place cancer cells are likely to have spread.

Breast reconstruction is an option after a mastectomy. It might be done at the same time as mastectomy (“immediate”) or at some time following the completion of cancer treatment (“delayed”). Breast reconstruction is often done in stages.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Radiation therapy

Radiation therapy (RT) uses high-energy radiation from x-rays, gamma rays, protons, and other sources to kill cancer cells and shrink tumors. It is given over a certain period of time. Radiation therapy can be given alone or before or after surgery to treat or slow the growth of cancer. Sometimes, radiation is given with certain systemic therapies. It may be used as supportive care to help ease pain or discomfort caused by cancer.

Types of radiation therapy:

Whole breast radiation therapy (WBRT)
is radiation of the whole breast.

Accelerated partial breast irradiation (APBI)
is radiation to the area where the tumor was removed.

Lymph node radiation therapy
is radiation of the lymph nodes. It is also called regional nodal radiation.

Radiation may be given to the chest wall, infraclavicular region (below the collarbone), supraclavicular area (above the collarbone), lymph nodes found inside the breast (internal mammary), or axillary bed (armpit).

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Endocrine therapy

The endocrine system is made up of organs and tissues that produce hormones. Hormones are natural chemicals released into the bloodstream. There are 4 hormones that might be targeted in endocrine therapy:

Estrogen
is made mainly by the ovaries.

Progesterone
is made mainly by the ovaries.

Luteinizing hormone-releasing hormone (LHRH)
is made by a part of the brain called the hypothalamus. It tells the ovaries to make estrogen and progesterone.

Androgen
is made by the adrenal glands, testicles, and ovaries.

Hormones can cause breast cancer to grow. Endocrine therapy will stop your body from making hormones or it will block what hormones do in the body. This can slow tumor growth or shrink the tumor for a period of time. Endocrine therapy can be local (surgery or ablation) or systemic (drug therapy). It is sometimes called hormone therapy. It is not the same as hormone replacement therapy used for menopause.

The goal of endocrine therapy is to reduce the amount of estrogen or progesterone in your body.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Endocrine therapy

There is one type of surgical endocrine therapy that is used for premenopausal women:

Bilateral oophorectomy
is surgery to remove both ovaries.

There are 5 main types of endocrine therapy:

Ovarian ablation >

Ovarian suppression >

Aromatase inhibitors >

Anti-estrogens >

Hormones >

Those who want to have children in the future should be referred to a fertility specialist before starting chemotherapy and/or endocrine therapy to discuss the options.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Ovarian ablation

Ovarian ablation permanently stops the ovaries from making hormones. Ablation uses extreme hot or cold to stop ovaries from working.

Ovarian suppression

Ovarian suppression temporarily stops the ovaries from making hormones. It is achieved with drugs called LHRH agonists. These drugs stop LHRH from being made, which stops the ovaries from making hormones. LHRH agonists include goserelin and leuprolide.

Aromatase inhibitors

Aromatase inhibitors stop a hormone called androgen from changing into estrogen by an enzyme called aromatase. They do not affect estrogen made by the ovaries. Non-steroidal aromatase inhibitors include anastrozole and letrozole. Exemestane is a steroidal aromatase inhibitor.

Anti-estrogens

Anti-estrogens prevent hormones from binding to receptors. Selective estrogen receptor modulators (SERMs) block estrogen from attaching to hormone receptors. They include tamoxifen and toremifene. Selective estrogen receptor degraders (SERDs) block and destroy estrogen receptors. Fulvestrant is a SERD.

Hormones

Hormones may treat breast cancer when taken in high doses. It is not known how hormones stop breast cancer from growing. They include ethinyl estradiol, fluoxymesterone, and megestrol acetate

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Menopause

Options for endocrine therapy are partly based on if you started or are in menopause. In menopause, the ovaries stop producing hormones and menstrual periods stop. After menopause, estrogen and progesterone levels continue to stay low.

When menstrual periods stop for 12 months or more, it is called postmenopause. If you don't get periods, a test using a blood sample may be needed to confirm your status. If you have menstrual periods, you are in premenopause.

Premenopause

In premenopause, your ovaries are the main source of estrogen and progesterone. Ovarian ablation or suppression help reduce hormone levels. For premenopause, ovarian ablation or suppression will be used with systemic therapy and/or an aromatase inhibitor.

Postmenopause

In postmenopause, your adrenal glands, liver, and body fat make small amounts of estrogen. Often in postmenopause, an aromatase inhibitor and a targeted therapy are used together.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

HER2-targeted therapy

HER2 is a protein involved in normal cell growth. There might be higher amounts of HER2 in your breast cancer. If this is the case, it is called HER2-positive breast cancer (HER2+). HER2-targeted therapy is drug therapy that treats HER2+ breast cancer.

HER2-targeted therapies include:

- Pertuzumab
- Trastuzumab
- Trastuzumab substitutes
- Ado-trastuzumab emtansine (T-DM1)
- Fam-trastuzumab deruxtecan-nxki
- Lapatinib
- Neratinib

Most often, HER2-targeted therapy is given with chemotherapy. However, it might be used alone or in combination with endocrine therapy. HER2-targeted therapies include:

HER2 antibodies
prevent growth signals from HER2 from outside the cell. They also increase the attack of immune cells on cancer cells. These drugs include trastuzumab and pertuzumab.

HER2 inhibitors
stop growth signals from HER2 from within the cell. Lapatinib and neratinib are examples of these drugs.

HER2 conjugates
deliver cell-specific chemotherapy. They attach to HER2s then enter the cell. Once inside, chemotherapy is released. Ado-trastuzumab emtansine and fam-trastuzumab deruxtecan-nxki are included in this class.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Chemotherapy

Chemotherapy is a type of drug therapy used to treat cancer. Chemotherapy kills fast-growing cells throughout the body, including cancer cells and normal cells. All chemotherapy drugs affect the information inside genes called DNA (deoxyribonucleic acid). Genes tell cancer cells how and when to grow and divide. Chemotherapy disrupts the life cycle of cancer cells.

There are different types of chemotherapy used to treat metastatic breast cancer:

Alkylating agents
damage DNA by adding a chemical to it. This group of drugs includes cyclophosphamide. Platinum-based alkylating agents contain a heavy metal that prevents cancer cells from dividing. These drugs include carboplatin and cisplatin.

Anthracyclines
damage and disrupt the making of DNA causing cell death of both cancerous and non-cancerous cells. These drugs include doxorubicin, doxorubicin liposomal injection, and epirubicin.

Anti-metabolites
prevent the “building blocks” of DNA from being used. These drugs include capecitabine, fluorouracil, gemcitabine, and methotrexate.

Microtubule inhibitors
stop a cell from dividing into two cells. These drugs include docetaxel), eribulin, ixabepilone, paclitaxel, and vinorelbine. Docetaxel, paclitaxel, and albumin-bound paclitaxel are also called taxanes.

More than one drug may be used to treat metastatic breast cancer. When only one drug is used, it’s called a single agent. A combination regimen is the use of two or more chemotherapy drugs.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Bone-targeted therapy

Medicines that target the bones may be given to help relieve bone pain or reduce the risk of bone problems. Some medicines work by slowing or stopping bone breakdown, while others help increase bone thickness. When breast cancer spreads to distant sites, it may metastasize in your bones. This puts your bones at risk for injury and disease. Such problems include bone loss (osteoporosis), fractures, bone pain, and squeezing (compression) of the spinal cord. Some treatments for breast cancer, like endocrine therapy, can cause bone loss, which put you at increased risk for fractures.

There are 3 drugs used to prevent bone loss and fractures:

- Zoledronic acid
- Pamidronate
- Denosumab

There are 3 drugs used to treat bone metastases:

- Zoledronic acid
- Pamidronate
- Denosumab

You will be screened for osteoporosis using a bone mineral density test. This measures how much calcium and other minerals are in your bones. It is also called a dual-energy x-ray absorptiometry (DEXA) scan and is painless. Bone mineral density tests look for osteoporosis and help predict your risk for bone fractures. If you are at an increased risk for fracture, a baseline DEXA scan is recommended before starting endocrine therapy.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Bone-targeted therapy

Zoledronic acid, pamidronate, and denosumab

Denosumab, pamidronate, and zoledronic acid are used to prevent bone loss (osteoporosis) and fractures caused by endocrine therapy. Denosumab and zoledronic acid are also used in those with metastatic breast cancer who have bone metastases to help prevent fractures or spinal cord compression. You might have blood tests to monitor kidney function, calcium levels, and magnesium levels. A calcium and vitamin D supplement will be recommended by your doctor.

Let your dentist know if you are taking any of these medicines. Also, ask your doctor how these medicines might affect your teeth and jaw. Osteonecrosis, or bone tissue death of the jaw, is a rare, but serious side effect. Tell your doctor about any planned trips to the dentist. It will be important to take care of your teeth and to see a dentist before starting treatment with any of these drugs.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Other targeted therapies

CDK4/6 inhibitors

Cyclin-dependent kinase (CDK) is a cell protein that helps cells grow and divide. For hormonepositive, HER2- cancer, taking a CDK4/6 inhibitor combining with endocrine therapy such as letrozole or fulvestrant may help control cancer longer. CDK4/6 inhibitors include Palbociclib, Ribociclib, and Abemaciclib. With all CDK4/6 regimens, premenopausal women must also receive ovarian ablation or suppression.

mTOR inhibitors

mTOR is a cell protein that helps cells grow and divide. Endocrine therapy may stop working if mTOR becomes overactive. mTOR inhibitors are used to get endocrine therapy working again. Everolimus is an mTOR inhibitor. Most often, it is taken with exemestane. For some, it may be taken with fulvestrant or tamoxifen.

PARP inhibitors

Cancer cells often become damaged. PARP is a cell protein that repairs cancer cells and allows them to survive. Blocking PARP can cause cancer cells to die. Olaparib is a type of PARP inhibitor. You must have the BRCA1 or BRCA2 mutation and your breast cancer must be HER2-.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

< Treatment

Other targeted therapies

PIK3CA inhibitor

The PIK3CA gene is one of the most frequently mutated genes in breast cancers. A mutation in this gene can lead to increased growth of cancer cells and resistance to various treatments. Apelisib specifically blocks estrogen-positive (ER+) breast cancer cells that have a mutation in the PIK3CA gene. It is given in combination with the anti-estrogen drug fulvestrant to help delay tumor growth for a longer period of time compared to fulvestrant alone.

Immunotherapy

Immunotherapy is a type of systemic treatment that increases the activity of your immune system. By doing so, it improves your body's ability to find and destroy cancer cells. Immunotherapy can be given alone or with other types of treatment. Atezolizumab is an immunotherapy.

There are many treatments for metastatic breast cancer. Which ones are right for you are based on many factors. Thus, it is important for you to discuss with your doctor which type of treatment suits you the best depending on your goal of treatment.

References: 1. NCCN Guidelines for Patients. Invasive Breast Cancer, 2020 Available at https://www.nccn.org/patients/guidelines/cancers.aspx

Diet and Nutrition

Consuming the appropriate nutrition is especially important in cancer patients for healing, fighting infection, maintaining body weight, rebuilding tissue, preventing body tissue from breaking down and for providing energy. Nutrition is an essential, ongoing and active part of your lifestyle that we will help you plan during cancer treatment, through recovery and beyond.

- Eat a minimum of five servings of fruits and vegetables a day. A serving can be a cup of dark leafy greens or berries, a medium fruit, or a half cup of other colorful choices; use plant-based seasonings like parsley and turmeric;
- Go for whole grains. Opt for high-fiber breads and cereals, including brown rice, barley, bulgur, and oats; avoid refined foods, such as donuts and white bread, and those high in sugar;
- Choose lean protein. Stick to fish, poultry, and tofu, limiting red meat and processed meats;
- Keep dairy low fat. Select skim milk, low-fat yogurt, and reduced-fat cheeses.
- Eat more high protein foods to keep your body strong and help you deal with side effects.

There will be days when you feel like eating and days when you don't. Sometimes only certain food will taste good to you. Try eating five to six small meals throughout the day, instead of three bigger ones. This will provide you with enough energy during the day.

References: 1. NCCN Patient and Caregiver Resources – Nutrition for Cancer Survivors https://www.nccn.org/patients/resources/life_after_cancer/nutrition.aspx 2. Cancer Care Manitoba: My Cancer Handbook.

Diet and Nutrition

Other tips to maximize nutrition:

- Aim for a variety of food. Create a balanced plate that is one-half cooked or raw vegetables, one-fourth lean protein (chicken, fish, lean meat, or dairy) and one-fourth whole grains
- Eat fatty fish, such as salmon, sardines, and canned tuna at least twice a week. The fats in these fish are the “good” heart-healthy omega-3 fats; other sources of these fats include walnuts, canola oil, and flaxseeds
- Limit alcohol consumption. Alcohol has been linked to cancer risk. Women should have no more than one drink
- Eat food high in vitamin D. These include salmon, sardines, fortified orange juice, milk, and fortified cereal. Research suggests that vitamin D, which also comes from sun exposure, prevents cancer and may decrease the risk of recurrence and improve survival
- Food – not supplements – are the best source of vitamins and minerals. There is no evidence that dietary supplements provide the same anti-cancer benefits as fruits and vegetables, and some high-dose supplements may actually increase cancer risk
- Be “mindful” when eating. Research suggests that we tend to eat more calories and food with fewer nutrients when we are watching TV, driving, or doing other activities

References: 1. NCCN Patient and Caregiver Resources – Nutrition for Cancer Survivors https://www.nccn.org/patients/resources/life_after_cancer/nutrition.aspx 2. Cancer Care Manitoba: My Cancer Handbook.

Exercise

Research has found no harmful effects on patients with cancer from moderate exercise and, in fact, has demonstrated that those who exercised regularly had 40% to 50% less fatigue, the primary complaint during treatment. Exercise is known to improve cardiovascular function and to protect bones. It also elevates mood, offering drug-free relief for the feelings of depression that may accompany a cancer diagnosis.

Here is some simple exercise which you can do,

Brisk walking

Jogging

Cycling

Yoga

Tai chi

Always proceed with care.

It is important to discuss with your Oncologists the type of exercise you are considering to ensure it will be safe and suitable for you. Listen to your body; don't exercise if you're not feeling well or running a fever.

Reference: 1. NCCN Patient and Caregiver Resources – Exercising During Cancer Treatment https://www.nccn.org/patients/resources/life_with_cancer/exercise.aspx

No matter how tough
and scary the storms get,

Together we will
make it through.

Onco Life Centre
Personalized Oncology. Healing Touch.

AstraZeneca

Onco Life Centre Psychosocial Oncology Program

Cancer can bring significant changes in the lives of those affected by cancer and their families. Cancer treatment can be challenging, and it is natural that some cancer patients may feel insecure, unattractive or discouraged. Their challenges may also extend into personal areas relating to their relationships and career. And in some cases, their caregivers or partners may experience more distress than the patients themselves. The Psychosocial Oncology Program at Onco Life Centre is part of our multi-dimensional approach to address these crucial issues. We impart education, support and evidence-based coping strategies to our patients in a secure environment with systematic monitoring by our professional team. We believe that together, we can empower our patients to face their challenges and walk their journey positively.

Sometimes, just talking to someone about your situation can give you the strength that you need to spur recovery. Psycho-oncology is considered to be an oncology sub-specialty which acts in two psychological dimensions. The patients and their families psychological reactions to cancer throughout all the stages of the disease.

Here are some aspects which the Onco Life Centre Psychosocial Oncology Program covers

- Educational sessions
- Cancer Support Group
- Counseling
- Emotional Support
- Mindfulness Meditation
- Nutritional Counseling
- Physiotherapy and Exercise Programs
- Grooming workshops

By addressing the whole person rather than just the cancer, our oncologists and allied health team focus on creating wellness in patients and their families. Our psycho-oncology team consists of highly qualified clinical psychologists and counselors who will be providing this service free-of-charge to our patients and their families.

Our patients discover that mindfulness meditation help them regain energy and a feeling of control and calmness. Mindfulness relaxation uses breathing methods, guided imagery, and other practices to relax the body and mind and help reduce stress.

Disclaimer:
This material is intended for patient education and to be provided by a heatlhcare professional as deemed relevant for educational purposes.

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Onco Life Centre
Personalized Oncology. Healing Touch.

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