Breast Cancer - Treatment Options [1]

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ON THIS PAGE: You will learn about the different ways doctors use to treat people with this type of cancer. To see other pages, use the menu on the side of your screen.

This section outlines treatments that are the standard of care (the best proven treatments available) for this specific type of cancer. When making treatment plan decisions, patients are also encouraged to consider clinical trials. A clinical trial is a research study to test a new approach to treatment to evaluate whether it is safe, effective, and possibly better than the standard treatment. Clinical trials may test approaches such as a new drug, a new combination of standard treatments, or new doses of current therapies. Your doctor can help you review all treatment options. For more information, see the Clinical Trials [3] and Latest Research [4] sections.

Treatment overview

In cancer care, doctors specializing in different areas of cancer treatment work together to create a patient?s overall treatment plan that combines different types of treatments. This is called a multidisciplinary team [5] and includes surgeons, medical oncologists, radiation oncologists, plastic surgeons, and others as needed.

The biology and behavior of a breast cancer affects the treatment. Some tumors are small but grow fast, while others are large and grow slowly. Treatment options and recommendations depend on several factors, including:

- The stage [6] of the tumor
- The tumor?s hormone receptor status (ER, PR) and HER2 status (see Diagnosis [7])
- Other markers, such as Ki67, Oncotype DX?, Mammaprint? (if appropriate)
- The patient?s age, general health, and preferences
- The patient?s menopausal status
- The presence of known mutations in inherited breast cancer genes, such as *BRCA1* or *BRCA2*

Even though your health care team will specifically tailor the treatment for each patient and the breast cancer, there are some general steps for treating breast cancer.

For both DCIS and early-stage invasive breast cancer, doctors generally recommend surgery to remove the tumor. To make sure that the entire tumor is removed, the surgeon will also remove a small area of normal tissue around the tumor. Although the goal of surgery is to remove all of the visible cancer, microscopic cells can be left behind, either in the breast or elsewhere. In some situations, this means that another surgery could be needed to remove remaining cancer cells. For larger cancers, or those that are growing more quickly, doctors may recommend treatment with chemotherapy before surgery, called neoadjuvant therapy. Neoadjuvant hormonal therapy may also be recommended in specific situations.

After surgery, the next step in managing early-stage breast cancer is to lower the risk of recurrence and to get rid of any remaining cancer cells. These cancer cells are invisible, but are believed to be responsible for both local and distant recurrence of cancer. Treatment given after surgery is called adjuvant therapy. Adjuvant therapies include radiation therapy, chemotherapy, targeted therapy, and/or hormonal therapy (see below for more information on these treatments). Whether adjuvant therapy is needed depends on the chance that any cancer cells remain in the breast or the body and the chance that a specific treatment will work to treat the cancer. Although adjuvant therapy lowers the risk of recurrence, it does not completely get rid of the risk.

Along with staging, other tools can help estimate prognosis and help you and your doctor make decisions about adjuvant therapy. The website Adjuvant! Online (found at another, independent website called www.adjuvantonline.com [8]) is a tool that your doctor can access to interpret a variety of prognostic factors. This website should only be used with the interpretation of your doctor. In addition, other tests that can predict the risk of recurrence for your specific tumor by testing your tumor tissue (such as Oncotype Dx? and Mammaprint?; see Diagnosis [7]) may be also used to better understand whether chemotherapy may work.

When surgery to remove the cancer is not possible, it is called inoperable. Chemotherapy, targeted therapy, radiation therapy, and/or hormonal therapy may be given to shrink the cancer.

The treatment of recurrent cancer and metastatic cancer depends on how the cancer was first treated and the characteristics of the cancer mentioned above, such as ER, PR, and HER2.

Descriptions of the most common treatment options for breast cancer are listed below. Your care plan should also include treatment for symptoms and side effects, an important part of cancer care. Take time to learn about all of your treatment options and be sure to ask questions about things that are unclear. Also, talk about the goals of each treatment with your doctor and what you can expect while receiving the treatment, and after the treatment is completed. Learn more about making treatment decisions [9].

Surgery

Surgery is the removal of the tumor and surrounding tissue during an operation. Surgery is also used to examine the nearby underarm or axillary lymph nodes. A surgical oncologist is a doctor who specializes in treating cancer with surgery. Generally, the smaller the tumor, the more surgical options a patient has [10]. The types of surgery include the following:

- A lumpectomy is the removal of the tumor and a small, cancer-free margin of normal tissue

around the tumor. Most of the breast remains. For both DCIS and invasive cancer, radiation therapy to the remaining breast tissue is generally recommended after surgery. A lumpectomy may also be called breast-conserving surgery, a partial mastectomy, quadrantectomy, or a segmental mastectomy.
- A mastectomy is the surgical removal of the entire breast. There are several types of mastectomies. Talk with your doctor about whether the skin can be preserved, called a skin-sparing mastectomy, or the skin and the nipple, called a total skin-sparing mastectomy.

Lymph node removal and analysis

Cancer cells can be found in the axillary lymph nodes in some cancers; this information is used to determine treatment and prognosis. It is important to find out whether any of the lymph nodes near the breast contain cancer.

Sentinel lymph node biopsy. The sentinel lymph node biopsy procedure allows for the removal of one to a few lymph nodes, avoiding the removal of multiple lymph nodes in an axillary lymph node dissection (see below) procedure for patients whose sentinel lymph nodes are free of cancer. The smaller lymph node procedure helps patients lower the risk of swelling of the arm called lymphedema [11] and decreases the risk of numbness, as well as arm movement and range-of-motion problems, which are long-lasting issues that can severely affect a person?s quality of life.

In a sentinel lymph node biopsy, the surgeon finds and removes about one to three sentinel lymph nodes from under the arm that receive lymph drainage from the breast. The pathologist then examines these lymph nodes for cancer cells. To find the sentinel lymph node, the surgeon injects a dye and/or a radioactive tracer into the area of the cancer and/or around the nipple. The dye or tracer travels to the lymph nodes, arriving at the sentinel node first. The surgeon can find the node when it turns color if the dye is used or gives off radiation if the tracer is used.

If the sentinel lymph node is cancer-free, research has shown that it is likely that the remaining lymph nodes will also be free of cancer and no further surgery is needed. If the sentinel lymph node shows that there is cancer, then the surgeon may perform an axillary lymph node dissection to remove more lymph nodes to look for cancer, depending on the stage of the cancer, the features of the tumor, and the amount of cancer in the sentinel lymph nodes. It is recommended that patients with signs of cancer in the axillary lymph nodes receive an axillary lymph node dissection, regardless of whether a sentinel lymph node biopsy is done. Find out more about ASCO's recommendations for sentinel lymph node biopsy [12].

Axillary lymph node dissection. In an axillary lymph node dissection, the surgeon removes many lymph nodes from under the arm, which are then examined by a pathologist for cancer cells. The actual number of lymph nodes removed varies from person to person. Recent research has shown that an axillary lymph node dissection may not be needed for all women with early-stage breast cancer with small amounts of cancer in the sentinel lymph nodes. Women having a lumpectomy and radiation therapy who have a smaller tumor and no more than two sentinel lymph nodes involved with cancer may avoid a full axillary lymph node dissection, which helps reduce the risk of side effects and does not decrease survival. If cancer is found in the sentinel lymph node, whether more surgery is needed to remove additional lymph nodes varies depending on the specific situation.

Most patients with invasive cancer will have either a sentinel lymph node biopsy or an axillary lymph node dissection. A sentinel lymph node biopsy alone may not be done if there is obvious evidence of cancer in the lymph nodes before any surgery. In this situation, a full axillary lymph node dissection is preferred. Normally, the lymph nodes are not evaluated when the cancer is DCIS, since the risk of spread is very low. However, the surgeon may consider a sentinel lymph node biopsy for patients diagnosed with DCIS who choose to have or need a mastectomy. If some invasive cancer is found with DCIS at the time of the mastectomy, which happens occasionally, the lymph nodes will then need to be evaluated. Once the breast tissue has been removed with a mastectomy, it is more difficult to find the sentinel lymph nodes since it is not as obvious where to inject the dye.

Reconstructive (plastic) surgery

Women who have a mastectomy may want to consider breast reconstruction, which is surgery to create a breast using either tissue taken from another part of the body or synthetic implants. Reconstruction is usually performed by a plastic surgeon. A woman may be able to have reconstruction at the same time as the mastectomy, called immediate reconstruction, or at some point in the future, called delayed reconstruction. In addition, reconstruction may be done at the same time as a lumpectomy to improve the look of the breast and to match the breasts, this is called oncoplastic surgery, and many breast surgeons can do this without the help of a plastic surgeon. Surgery on the healthy breast is also often done so both breasts have a similar appearance. Talk with your doctor for more information.

External breast forms (prostheses)

An external breast prosthesis or artificial breast form provides an option for women who plan to delay or not have reconstructive surgery. Breast prostheses can be made to provide a good fit and natural appearance for each woman.

Summary of surgical options

To summarize, surgical treatment options include the following:

- Removal of cancer in the breast: Lumpectomy or partial mastectomy almost always followed by radiation therapy *or* mastectomy, with or without immediate reconstruction
- Lymph node evaluation: Sentinel lymph node biopsy and/or axillary lymph node dissection

Women are encouraged to talk with their doctors about which surgical option is right for them. More aggressive surgery, such as a mastectomy, is not always better and may cause more complications. The combination of lumpectomy and radiation therapy has a slightly higher risk of the cancer coming back in the same breast or near the breast and new cancers in the breast, but the long-term survival of women who choose lumpectomy is the same as those who have a mastectomy. Learn more about cancer surgery [13].

Radiation therapy

Radiation therapy is the use of high-energy x-rays or other particles to kill cancer cells. A doctor who specializes in giving radiation therapy to treat cancer is called a radiation oncologist. The most common type of radiation treatment is called external-beam radiation therapy, which is radiation given from a machine outside the body. When radiation treatment is given using a probe in the operating room, it is called intra-operative radiation. When radiation is given by placing radioactive sources into the tumor, it is called brachytherapy. Although the research results are encouraging, intra-operative radiation and brachytherapy are not widely used, and treatment is reserved for a small cancer with no evidence that it has spread to the lymph nodes.

A radiation therapy regimen (schedule; see below) usually consists of a specific number of treatments given over a set period of time. Most commonly, radiation therapy is given after a lumpectomy, and following adjuvant chemotherapy if recommended. Radiation therapy is usually given daily for a set number of weeks to get rid of any remaining cancer cells near the tumor site or elsewhere in the breast. This helps lower the risk of recurrence in the breast. In fact, with modern surgery and radiation therapy, recurrence rates in the breast are now be less than 5% in the 10 years after treatment, and survival is often the same with lumpectomy or mastectomy.

Adjuvant radiation therapy is also recommended for some women after a mastectomy, depending on the age of the patient, the size of their tumor, the number of lymph nodes under the arm that contain cancer, the width of normal tissue around the tumor removed by the surgeon, the ER, PR, and HER2 status, and other factors.

Neoadjuvant radiation therapy is radiation therapy given before surgery to shrink a large tumor, which makes it easier to remove, although this approach is not common and is only used when a tumor cannot be removed by surgery.

Radiation therapy causes side effects, including fatigue, swelling of the breast, redness and/or skin discoloration/hyperpigmentation and pain/burning in the skin where the radiation was directed, sometimes with blistering or peeling. Very rarely, a small amount of the lung can be affected by the radiation, causing pneumonitis, a radiation-related swelling of the lung tissue. This risk depends on the size of the area that received radiation therapy. In the past, with older equipment and radiation therapy techniques, women who received treatment for breast cancer on the left side of the body had a small increase in the long-term risk of heart disease. Modern techniques are now able to spare most of the heart from the effects of radiation.

Many types of radiation therapy may be available to you with different schedules (see below). Talk with your doctor about the advantages and disadvantages of each option.

Radiation therapy schedule

Standard radiation therapy after a lumpectomy is external-beam radiation therapy given Monday through Friday for five to six weeks. This often includes radiation therapy to the whole breast the first four to five weeks, followed by a more focused treatment to where the tumor was located in the breast for the remaining treatments.

This focused part of the treatment, called a boost, is standard for women with invasive breast cancer to reduce the risk of a recurrence in the breast. Women with DCIS may also receive the boost. For women with a low risk of recurrence, the boost may be optional. It is important to discuss this treatment approach with your doctor.

If there is cancer in the lymph nodes under the arm, radiation therapy may also be given to the same side of the neck or underarm near the breast or chest wall. Patients who have a mastectomy may not need radiation therapy, depending on the features of the tumor. Radiation may be recommended after mastectomy for patients with tumors larger than 5 cm, for those with cancer in many lymph nodes, for those with cancer cells outside of the capsule of the lymph node, and for those whose cancer has grown into the skin or chest wall, as well as other reasons. Radiation therapy following a mastectomy can be given after reconstruction, and is usually given five days a week for five to six weeks.

There has been growing interest in the use of newer regimens that shorten the length of radiation treatment from six to seven weeks to three to four weeks. In one method called hypo-fractionated radiation therapy, a higher daily dose is given to the whole breast so that the overall length of treatment is shortened to three to four weeks. This approach can also be combined with a boost to the tumor site either during or after the whole breast radiation treatments. Even shorter schedules have been studied and are in use in some centers, including accelerated partial breast radiation for five days, and others are researching a three-week schedule.

Research studies have shown that these shorter schedules are similarly safe and control the cancer as well as longer radiation treatment schedules in patients with node-negative breast cancer. These shorter schedules are becoming more accepted in the United States for cancers that have a lower risk of recurrence, and are one way to improve the convenience and reduce the time needed to complete radiation therapy (see also partial breast irradiation below). Information about the long-term effectiveness of these very short courses of radiation is not yet available.

Partial breast irradiation

Partial breast irradiation (PBI) is radiation therapy that is given directly to the tumor area, usually after a lumpectomy, instead of the entire breast, as is usually done with standard radiation therapy. Targeting radiation directly to the tumor area more directly usually shortens the amount of time that patients need to receive radiation therapy. However, only some patients may be able to have PBI. Although early results have been promising, PBI is still being studied. It is the subject of a large, nationwide clinical trial, and the results on the safety and effectiveness compared with standard radiation therapy are not yet ready. This study will help find out which patients are the most likely to benefit from PBI.

PBI can be done with standard external-beam radiation therapy that is focused on the area where tumor was removed and not on the entire breast. PBI may also be performed using brachytherapy. Brachytherapy is the use of plastic catheters or a metal wand placed temporarily in the breast. Breast brachytherapy can involve short treatment times, ranging from one dose to one week, or it can be given as one dose in the operating room immediately after the tumor is removed. These forms of focused radiation are currently used only for patients with a smaller, less-aggressive, and node-negative tumor.

Intensity-modulated radiation therapy

Intensity-modulated radiation therapy (IMRT) is a more advanced way to give external-beam radiation therapy to the breast. The intensity of the radiation directed at the breast is varied to better target the tumor, spreading the radiation more evenly throughout the breast. The use of IMRT lessens the radiation dose and the possible damage to nearby organs, such as the heart and lung, and lower the risks of some immediate side effects, such as peeling of the skin during treatment. This can be especially important for women with medium to large breasts who have a higher risk of side effects, such as peeling and burns, compared with women with smaller breasts. IMRT may also help to lessen the long-term effects on the breast tissue that were common with older radiation techniques such as hardness, swelling, or discoloration.

Even though IMRT has fewer short-term side effects, many insurance providers may not cover IMRT. It is important to check with your health insurance company before any treatment begins to make sure it is covered.

Adjuvant radiation therapy concerns for older patients and/or those with small tumors

Recent research studies have looked at the possibility of avoiding radiation therapy for women age 70 or older or for those women with a small tumor. Overall, these studies show that radiation therapy reduces the risk of breast cancer recurrence in the same breast, compared with no radiation therapy, but does not lengthen lives. Guidelines from the National Comprehensive Cancer Network (NCCN) continue to recommend radiation therapy as the standard option after lumpectomy. However, they note that women with special situations or low-risk tumors could reasonably choose not to have radiation therapy and use only hormonal therapy (see below) after lumpectomy, if they are willing to accept a modest increase in the risk that the cancer will come back in the breast. This includes women age 70 or older or those with other medical conditions that could limit life expectancy within five years.

Learn more about radiation therapy [14].

Chemotherapy

Chemotherapy is the use of drugs to destroy cancer cells, which work by stopping the cancer cells? ability to grow and divide. Chemotherapy is prescribed by a medical oncologist, a doctor who specializes in treating cancer with medication.

Systemic chemotherapy is delivered through the bloodstream to reach cancer cells throughout the body. Common ways to give chemotherapy include an intravenous (IV) tube placed into a

vein using a needle or in a pill or capsule that is swallowed (orally).

Chemotherapy may be given before surgery to shrink a large tumor and reduce the risk of recurrence, called neoadjuvant chemotherapy. It may also be given after surgery to reduce the risk of recurrence, called adjuvant chemotherapy. Chemotherapy is also commonly given if a patient has a metastatic breast cancer recurrence.

A chemotherapy regimen (schedule) consists of a specific treatment schedule of drugs given at repeating intervals for a set period of time. Chemotherapy may be given on many different schedules depending on what worked best in clinical trials for that specific type of regimen. It may be given once a week, once every two weeks (also called dose-dense), once every three weeks, or even once every four weeks. Common drugs for breast cancer include:

- Capecitabine (Xeloda)
- Carboplatin (Paraplatin)
- Cisplatin (Platinol)
- Cyclophosphamide (Neosar)
- Docetaxel (Docefrez, Taxotere)
- Doxorubicin (Adriamycin)
- Pegylated liposomal doxorubicin (Doxil)
- Epirubicin (Ellence)
- Fluorouracil (5-FU, Adrucil)
- Gemcitabine (Gemzar)
- Methotrexate (multiple brand names)
- Paclitaxel (Taxol)
- Protein-bound paclitaxel (Abraxane)
- Vinorelbine (Navelbine)
- Eribulin (Halaven)
- Ixabepilone (Ixempra)

A patient may receive one drug at a time or combinations of different drugs at the same time. Research has shown that combinations of certain drugs are sometimes more effective than single drugs for adjuvant treatment. The following drugs or combinations of drugs may be used as adjuvant therapy to treat breast cancer:

- AC (doxorubicin and cyclophosphamide)
- AC or EC (epirubicin and cyclophosphamide) followed by T (doxorubicin and cyclophosphamide, followed by paclitaxel or docetaxel, or the reverse)
- CAF (cyclophosphamide, doxorubicin, and 5-FU)
- CEF (cyclophosphamide, epirubicin, and 5-FU)
- CMF (cyclophosphamide, methotrexate, and 5-FU)
- EC
- TAC (docetaxel, doxorubicin, and cyclophosphamide)
- TC (docetaxel and cyclophosphamide)

Trastuzumab, lapatinib, and pertuzumab are HER2-targeted therapies that may be given with chemotherapy for HER2-positive breast cancer (see Targeted therapy, below). Bevacizumab (Avastin) is another targeted therapy that has been used in combination with chemotherapy for

the treatment of metastatic breast cancer, but is no longer approved for the treatment of breast cancer.

The side effects of chemotherapy depend on the individual, the drug(s) used, and the schedule and dose used. These side effects can include fatigue, risk of infection, nausea and vomiting, hair loss, loss of appetite, and diarrhea. These side effects can often be prevented or managed during treatment, and they usually go away once treatment is finished. Rarely, long-term side effects may occur, such as heart damage, nerve damage, or secondary cancers.

Learn more about chemotherapy [15] and preparing for treatment [16]. The medications used to treat cancer are continually being evaluated. Talking with your doctor, oncology nurse, or pharmacist is often the best way to learn about the medications prescribed for you, their purpose, and their potential side effects or interactions with other medications. Learn more about your prescriptions by using searchable drug databases [17].

Hormonal therapy

Hormonal therapy, also called endocrine therapy, is an effective treatment for most tumors that test positive for either estrogen or progesterone receptors (ER-positive or PR-positive; see Diagnosis [7]), in both early-stage and metastatic cancer. This type of tumor uses hormones to fuel its growth. Blocking the hormones can help prevent a cancer recurrence and death from breast cancer when used for early-stage disease either by itself or after adjuvant or neoadjuvant chemotherapy. Hormonal therapy is also effective as treatment for metastatic breast cancer, shrinking the cancer and improving cancer-related symptoms.

Tamoxifen is a drug that blocks estrogen from binding to breast cancer cells. It is effective for lowering the risk of recurrence in the breast that had cancer, the risk of developing cancer in the other breast, and the risk of distant recurrence. It is also approved to reduce the risk of breast cancer in women at high risk for developing breast cancer and for lowering the risk of a local recurrence for women with DCIS who have had a lumpectomy. Tamoxifen is also an effective treatment for metastatic hormone receptor-positive breast cancer.

Tamoxifen is a pill that is taken daily by mouth. It is important to discuss any other medications or supplements you take with your doctor, as there are some that can interfere with tamoxifen. The side effects of tamoxifen include hot flashes; vaginal dryness, discharge or bleeding; a small increased risk of cancer in the uterus including uterine sarcoma; cataracts; and an increase in the risk of blood clots. However, tamoxifen may improve bone health and cholesterol levels and is effective for the treatment of breast cancer in both premenopausal and postmenopausal women.

Aromatase inhibitors (AIs) decrease the amount of estrogen made by tissues other than the ovaries in postmenopausal women by blocking the aromatase enzyme, which changes weak male hormones called androgens into estrogen when the ovaries have stopped making estrogen during menopause. These drugs include anastrozole (Arimidex), letrozole (Femara), and exemestane. All of the AIs are pills taken daily by mouth. Treatment with AIs, either alone or following tamoxifen, is more effective than tamoxifen alone at reducing the risk of recurrence from early-stage breast cancer in post-menopausal women. AIs are also an effective treatment for metastatic hormone receptor positive breast cancer.

The side effects of AIs may include muscle and joint pain, hot flashes, vaginal dryness, an increased risk of osteoporosis and broken bones, and increased cholesterol levels. Research shows that all three AI drugs work equally well and have similar side effects. However, women who have severe side effects while taking one AI may have fewer side effects with another AI for unclear reasons. Women who have not gone through menopause should not take AIs, as they do not block the effects of estrogen made by the ovaries. Often, doctors will monitor blood estrogen levels in women whose periods have recently stopped, or those whose periods stop with chemotherapy to be sure that the ovaries are no longer producing estrogen.

Women who have gone through menopause and are given hormonal therapy have several options: take tamoxifen or an AI for five years, begin treatment with tamoxifen for two to three years and then switch to an AI for the rest of the five-year period, or take tamoxifen for five years then switch to an AI for what is called extended hormonal therapy. Recent research has shown that taking tamoxifen for longer than five years can further reduce the risk of recurrence following a diagnosis of early-stage breast cancer, although side effects are also increased with longer duration of therapy. Learn more about ASCO's recommendations for hormonal therapy for hormone receptor-positive breast cancer [18].

As noted above, premenopausal women should not take AIs, as they are not effective. Options for adjuvant hormonal therapy for premenopausal women include five or more years of tamoxifen, switching to an AI after menopause begins, or either drug combined with suppression of ovarian function. One of the oldest hormone treatments for hormone receptor-positive breast cancer is to stop the ovaries from making estrogen, called ovarian suppression. Medications called gonadotropin or luteinizing releasing hormone (GnRH or LHRH) analogues stop the ovaries from making estrogen, causing temporary menopause. Goserelin (Zoladex) and leuprolide (Lupron) are drugs given by injection under the skin that can stop the ovaries from making estrogen for one to three months. Most commonly, these are given with tamoxifen or AIs as part of adjuvant therapy for breast cancer. Less commonly, these drugs may be given alone. Surgical removal of the ovaries, which is a permanent way to stop the ovaries from working, may also be considered in certain situations. Ovarian suppression or ablation is also used for premenopausal women with metastatic breast cancer, in combination with tamoxifen or an AI. Learn more about recommendations for ovarian ablation [19].

Tamoxifen, ovarian suppression and AIs are also commonly used to treat metastatic breast cancer. Fulvestrant (Faslodex) is an additional hormonal therapy approved for patients with metastatic breast cancer. Fulvestrant is a selective estrogen receptor downregulator (SERD). Unlike the other oral hormonal therapies used to treat breast cancer, fulvestrant is given monthly by an injection into a muscle. Most commonly, two injections are given every two weeks for three doses, then continued monthly. Side effects from fulvestrant include menopausal symptoms, such as hot flashes and vaginal dryness. The combination of fulvestrant and an AI has been tested as treatment for metastatic breast cancer that has not yet been treated with hormonal therapy. The combination was more effective than an AI alone in one study, but similar to the AI in a second study. Additional clinical trials are testing this combination, so more data should be available in the near future.

Other hormonal therapies used to treat metastatic breast cancer after AIs, fulvestrant, tamoxifen,

and targeted therapy include megestrol acetate (Megace) and high-dose estradiol, which is an estrogen replacement.

Targeted therapy

Targeted therapy is a treatment that targets the cancer?s specific genes, proteins, or the tissue environment that contributes to cancer growth and survival. This type of treatment blocks the growth and spread of cancer cells while limiting damage to healthy cells.

Recent studies show that not all tumors have the same targets. To find the most effective treatment, your doctor may run tests to identify the genes, proteins, and other factors in your tumor, although this is considered experimental. In addition, many research studies are taking place now to find out more about specific molecular targets and new treatments directed at them. Learn more about targeted treatments [20].

The first approved targeted therapies for breast cancer were hormonal therapies. Then, HER2 targeted therapies were been approved to treat HER2-positive breast cancer. Most recently, a drug that targets a protein called mTOR, which contributes to cancer growth, was approved in combination with hormonal therapy for the treatment of metastatic breast cancer. Targeted therapy is also used to prevent growth of cancer that has spread to the bone and to maintain bone health. Talk with your doctor about possible side effects of specific medications and how they can be managed.

HER2 targeted therapy

- Trastuzumab is approved for both the treatment of advanced breast cancer and as an adjuvant therapy for early-stage HER2-positive breast cancer. Currently, one year of trastuzumab is recommended for the treatment of early-stage breast cancer. For metastatic cancer, trastuzumab is given in combination with different types of chemotherapy. Patients receiving trastuzumab have a small (2% to 5%) risk of heart problems. This risk is increased if a patient has other risk factors for heart disease or receives chemotherapy that also increases the risk of heart problems at the same time. These heart problems do not always go away, but they are usually treatable with medication.
- Pertuzumab is approved for the treatment of advanced breast cancer, and is being studied as a treatment for early-stage disease. Research shows that adding pertuzumab to trastuzumab and the chemotherapy drug docetaxel for advanced breast cancer not yet treated with either chemotherapy or trastuzumab increases the effectiveness of treatment and lengthens lives with few additional side effects. Based on this data, the combination of trastuzumab, pertuzumab, and either docetaxel or paclitaxel has become the standard of care for the treatment of untreated advanced breast cancer. Pertuzumab is also approved as neoadjuvant treatment for breast cancer in the United States, in combination with trastuzumab and docetaxel or paclitaxel.
- Lapatinib is commonly used for women with HER2-positive metastatic breast cancer when trastuzumab and pertuzumab in combination with docetaxel are no longer effective at controlling the cancer?s growth. The combination of lapatinib and the chemotherapy capecitabine is approved to treat advanced or metastatic HER2-positive breast cancer when a patient has already received chemotherapy and trastuzumab. The combination of lapatinib and letrozole is also approved for metastatic HER2-positive and ER-positive cancer.

Lapatinib is also used in combination with trastuzumab for patients whose cancers were growing on trastuzumab. Lapatinib is being studied for early-stage breast cancer in combination with trastuzumab. The recent approval of ado-trastuzumab emtansine (see below) has changed the use of lapatinib, as this drug was shown to be more effective than the combination of lapatinib and capecitabine. Lapatinib is now more commonly used following treatment with T-DM1.

- Ado-trastuzumab emtansine or T-DM1 is approved for the treatment of metastatic breast cancer for patients who have previously received trastuzumab and chemotherapy with either paclitaxel or docetaxel. T-DM1 is made up of trastuzumab linked to a type of chemotherapy. Research shows that treatment with this drug caused fewer side effects and controlled tumor growth better than the combination of lapatinib and the capecitabine. T-DM1 is given by vein every three weeks. Studies are now testing T-DM1 as a treatment for early-stage breast cancer

mTOR inhibitor therapy

Everolimus (Afinitor) is approved in combination with exemestane (see above) for the treatment of metastatic hormone receptor-positive breast cancer that has grown while receiving hormonal therapy with letrozole or anastrozole. In clinical trials, the combination controlled cancer for longer than exemestane alone, although it also resulted in more side effects including mouth sores and rarely an inflammation of the lungs called interstitial pneumonitis. Everolimus and similar drugs are being researched in combination with hormonal therapy for metastatic and early-stage breast cancer.

Osteoclast targeted therapy (drugs that block bone destruction)

- Bisphosphonates are drugs that block the cells that destroy bone, called osteoclasts. Bisphosphonates are commonly used in low doses to prevent and treat osteoporosis. Osteoporosis is the thinning of the bones. In women with breast cancer that has spread to bone, higher doses of bisphosphonates have been shown to reduce the side effects of cancer in the bone, including broken bones and pain. Pamidronate (Aredia) and zoledronic acid (Zometa) are two intravenous bisphosphonates used to treat breast cancer bone metastasis. These drugs may also be able to reduce breast cancer recurrences, particularly in bone, when given after treatment in postmenopausal women, although the research on this effect is conflicting.
- Denosumab (Xgeva) is another osteoclast-targeted therapy called a RANK ligand inhibitor. Recent studies have shown that denosumab works well to treat breast cancer bone metastases, and may be better than bisphosphonates at controlling the symptoms of bone metastases. Denosumab is also effective at treating osteoporosis and is being studied as a cancer treatment in early-stage breast cancer.

Learn more about drugs that block bone destruction [21].

Getting care for symptoms and side effects

Cancer and its treatment cause symptoms and side effects. In addition to treatment to slow, stop, or eliminate the cancer, an important part of cancer care is relieving a person?s symptoms and side effects. This approach is called supportive or palliative care, and it includes supporting the

patient with his or her physical, emotional, and social needs.

Supportive or palliative care can help a person at any stage of illness. People often receive treatment for the cancer and treatment to ease side effects at the same time. In fact, patients who receive both often have less severe symptoms, better quality of life, and report they are more satisfied with treatment.

Palliative treatments vary widely and often include medications, nutritional support, relaxation techniques, and other therapies. You may also receive palliative treatments similar to those meant to eliminate the cancer, such as chemotherapy, surgery, and radiation therapy. Talk with your doctor about the goals of each option in your treatment plan.

Before treatment begins, talk with your health care team about the possible side effects of your specific treatment and supportive care options. During and after treatment, be sure to tell your doctor or another health care team member if you are experiencing a problem so it is addressed as quickly as possible. Learn more about palliative care [22].

Metastatic breast cancer

If cancer has spread to another location in the body or come back in a distant location, it is called metastatic breast cancer. Patients with diagnosed with metastatic breast cancer are encouraged to talk with doctors who are experienced in treating this stage of cancer, because there can be different opinions about the best treatment plan. Learn more about seeking a second opinion [23] before starting treatment, so you are comfortable with the treatment plan chosen. This discussion may include clinical trials [3] studying new treatments.

Your health care team may recommend a treatment plan that includes a combination of systemic therapies, such as chemotherapy, hormonal therapy, and targeted therapies. Radiation therapy and surgery may be used in certain situations for women with metastatic breast cancer. Supportive care is also important to help relieve symptoms and side effects. For instance, radiation therapy is often used to treat painful bone metastases.

For most patients, a diagnosis of metastatic cancer is very stressful and, at times, difficult to bear. Patients and their families are encouraged to talk about the way they are feeling with doctors, nurses, social workers, or other members of the health care team. It may also be helpful to talk with other patients, including through a support group.

For an overview of metastatic breast cancer, read a one-page fact sheet [24] (available as a PDF) that offers information on coping the diagnosis.

Remission and the chance of recurrence

A remission is when cancer cannot be detected in the body by physical examination or imaging tests and there are no symptoms. This may also be called ?no evidence of disease? or NED.

A remission can be temporary or permanent. This uncertainty leads to many survivors feeling worried or anxious that the cancer will come back. While many remissions following treatment of early-stage breast cancer are permanent, it?s important to talk with your doctor about the

possibility of the cancer returning. Understanding the risk of recurrence and the treatment options may help you feel more prepared if the cancer does return, and will help you make decisions about your treatment. Learn more about coping with the fear of recurrence [25].

If the cancer does return after treatment for early-stage disease, it is called recurrent cancer. It may come back in the same place (called a local recurrence), in the chest wall or lymph nodes under the arm or in the chest (regional recurrence), or in another place, including distant organs such as the bones, lungs, liver, and brain (distant recurrence). A local or regional recurrence is often managed with further treatment. A metastatic (distant) recurrence is generally incurable, but treatable. Some patients live years after a metastatic recurrence of breast cancer, depending on a number of factors.

Other than mammograms and MRI scans of the breast, routine scans and blood tests after a diagnosis of early-stage breast cancer are not a good way to screen for recurrent cancer [26], and they can expose a patient to risk from unnecessary additional testing. Generally, a recurrence is detected when a person has symptoms or an abnormal finding on physical examination. These symptoms depend on where the cancer has recurred and may include:

- A lump under the arm or along the chest wall
- Pain that is constant, worsening, and not relieved by over-the-counter medication
- Bone pain or fractures, a possible sign of bone metastases
- Headaches or seizures, a possible sign of brain metastases
- Chronic coughing or trouble breathing, possible symptoms of lung metastases
- Abdominal pain or yellow skin and eyes from a condition called jaundice, which may be associated with liver metastases

Other symptoms may be related to the location of metastasis and may include changes in vision, changes in energy levels, feeling ill, low appetite and/or weight loss, or extreme fatigue.

If a woman has a recurrence, a cycle of testing will begin to learn as much as possible about the recurrence, including whether the cancer?s stage has changed. A biopsy of the recurrent tumor is recommended confirm the diagnosis and to check for ER, PR, and HER2 status, because this may have changed since the original diagnosis. After testing is done, you and your doctor will talk about your treatment options. Often the treatment plan will include the therapies described above such as surgery, radiation therapy, chemotherapy, targeted therapy, and hormonal therapy, but they may be used in a different combination or at a different pace. Your doctor may also suggest clinical trials that are studying new ways to treat this type of recurrent cancer.

The treatment of recurrent breast cancer depends on the previous treatment(s), the time since the original diagnosis, the location of the recurrence, and the characteristics of the tumor, such as ER, PR, and HER2 status.

- For women with a local recurrence within the breast after initial treatment with lumpectomy and adjuvant radiation therapy, the recommended treatment is mastectomy. Usually the cancer is completely removed with this treatment.
- For women with a local or regional recurrence in the chest wall after an initial mastectomy, surgical removal of the recurrence followed by radiation therapy to the chest wall and lymph nodes is the recommended treatment, unless radiation therapy has already been given

because radiation therapy cannot usually be given at full dose to the same area more than once.
- Other treatments used to reduce the chance of a future distant recurrence include radiation, chemotherapy, hormonal therapy, and targeted therapy and are used depending on the tumor and the type of treatment previously used.

Women with recurrent breast cancer often experience emotions such as disbelief or fear. Patients are encouraged to talk with their health care team about these feelings and ask about support services to help them cope. Learn more about dealing with cancer recurrence [27].

If treatment fails

Recovery from cancer is not always possible. In general, metastatic breast cancer is incurable, although it can be treated and controlled for some time. However, at some point, options for treatment become very limited and the cancer will become difficult to control.

This diagnosis is stressful, and this is difficult to discuss for many people. However, it is essential to have open and honest conversations with your doctor and health care team, as well as your family, to express your feelings, preferences, and concerns. The health care team is there to help, and many team members have special skills, experience, and knowledge to support patients and their families. Making sure a person is physically comfortable and free from pain is extremely important.

Patients who have advanced cancer and who are expected to live less than six months may want to consider a type of palliative care called hospice care. Hospice care is designed to provide the best possible quality of life for people who are near the end of life. You and your family are encouraged to think about where you would be most comfortable: at home, in the hospital, or in an inpatient hospice environment. Nursing care and special equipment can make staying at home a workable and preferable alternative for many families. Learn more about advanced cancer care planning [28].

After the death of a loved one, many people need support to help them cope with the loss. Learn more about grief and loss [29].

The next section helps explain clinical trials, which are research studies. Use the menu on the side of your screen to select About Clinical Trials, or you can select another section, to continue reading this guide.

Links:
[1] http://www.cancer.net/cancer-types/breast-cancer/treatment-options
[2] http://www.cancer.net/about-us
[3] http://www.cancer.net/node/18627
[4] http://www.cancer.net/node/18630
[5] http://www.cancer.net/node/24957
[6] http://www.cancer.net/node/18625
[7] http://www.cancer.net/node/18624
[8] http://www.adjuvantonline.com/
[9] http://www.cancer.net/node/24582
[10] http://www.cancer.net/node/24393

[11] http://www.cancer.net/node/25250
[12] http://www.cancer.net/node/29806
[13] http://www.cancer.net/node/24720
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[21] http://www.cancer.net/node/29876
[22] http://www.cancer.net/navigating-cancer-care/how-cancer-treated/caring-symptoms-cancer-and-its-treatment
[23] http://www.cancer.net/node/25355
[24] http://www.cancer.net/sites/cancer.net/files/asco_answers_breast_cancer_metastatic.pdf
[25] http://www.cancer.net/node/25241
[26] http://www.cancer.net/node/30481
[27] http://www.cancer.net/node/25042
[28] http://www.cancer.net/node/25113
[29] http://www.cancer.net/node/25111