



Breast Cancer Overview

The information that follows is an overview of this type of cancer. It is based on the more detailed information in our document, *Breast Cancer*. This document and other information can be obtained by calling our toll-free number (1-800-227-2345) or visiting our Web site at www.cancer.org.

What is cancer?

The body is made up of trillions of living cells. Normal body cells grow, divide, and die in an orderly way. During the early years of a person's life, normal cells divide faster to allow the person to grow. After the person becomes an adult, most cells divide only to replace worn-out, damaged, or dying cells.

Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of this out-of-control growth of abnormal cells.

Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells keep on growing and form new cancer cells. These cancer cells can grow into (invade) other tissues, something that normal cells cannot do. Being able to grow out of control and invade other tissues are what makes a cell a cancer cell.

In most cases the cancer cells form a tumor. But some cancers, like leukemia, rarely form tumors. Instead, these cancer cells are in the blood and bone marrow.

When cancer cells get into the bloodstream or lymph vessels, they can travel to other parts of the body. There they begin to grow and form new tumors that replace normal tissue. This process is called *metastasis* (muh-**tas**-tuh-sis).

No matter where a cancer may spread, it is always named for the place where it started. For instance, breast cancer that has spread to the liver is still called breast cancer, not liver cancer. Likewise, prostate cancer that has spread to the bone is called metastatic prostate cancer, not bone cancer.

Different types of cancer can behave very differently. For example, lung cancer and breast cancer are very different diseases. They grow at different rates and respond to different treatments. That is why people with cancer need treatment that is aimed at their own kind of cancer.

Not all tumors are cancerous. Tumors that aren't cancer are called *benign* (be-**nine**). Benign tumors can cause problems-- they can grow very large and press on healthy organs and tissues. But they cannot grow into other tissues. Because of this, they also can't spread to other parts of the body (metastasize). These tumors are almost never life threatening.

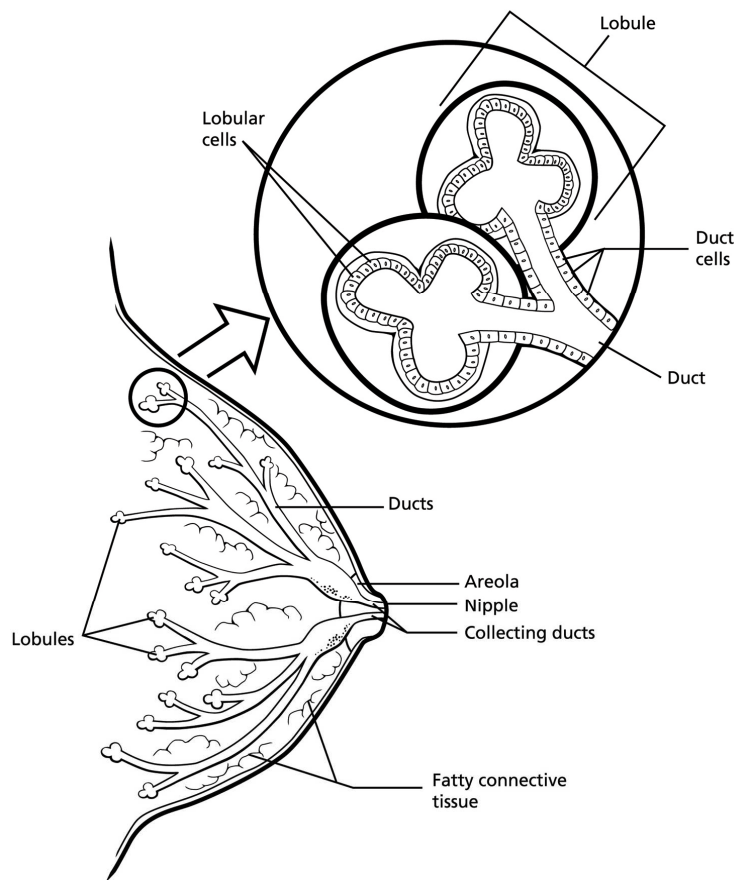
What is breast cancer?

Breast cancer is a malignant (cancer) tumor that starts in the cells of the breast. It is found mostly in women, but men can get breast cancer, too. Here we will only talk about breast cancer in women. **You can learn more about breast cancer in men in our document, *Breast Cancer in Men*.**

The normal breast

To understand breast cancer, it helps to know something about the normal parts of the breasts, as shown in the picture below.

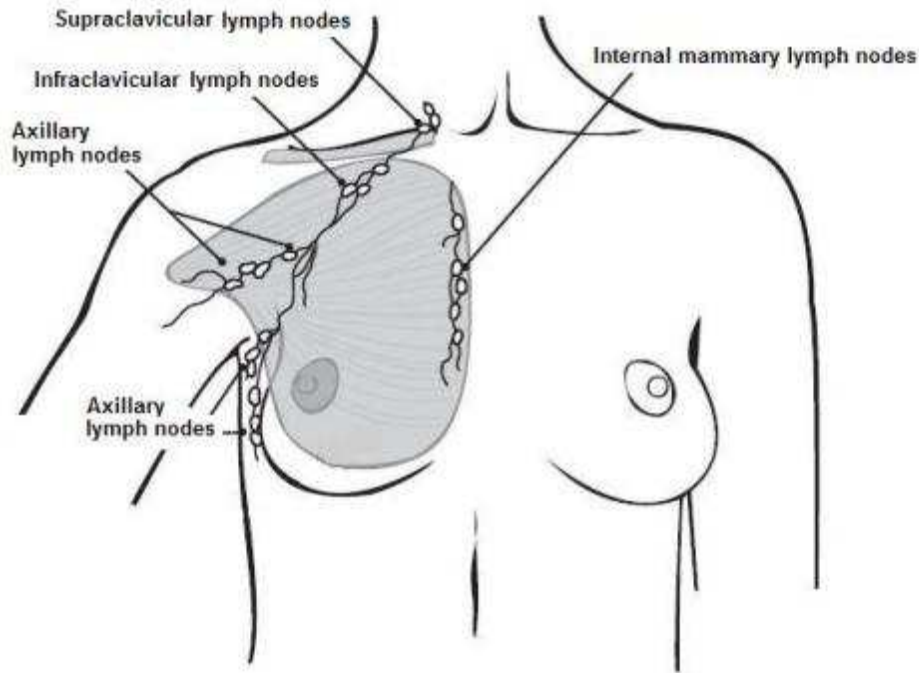
A woman's breast is made up of glands (called *lobules*) that make breast milk, *ducts* (small tubes that carry milk from the lobules to the nipple), fatty and connective tissue, blood vessels, and lymph (pronounced **limf**) vessels. Most breast cancers begin in the cells that line the ducts (ductal cancer), some begin in the lobules (lobular cancer), and a small number start in other tissues.



The lymph system of the breast

The lymph system is one of the main ways in which breast cancers can spread. Lymph nodes are small, bean-shaped groups of immune system cells (cells that fight infections) that are connected by lymphatic vessels. Lymphatic vessels are like small veins, except that they carry a clear fluid called lymph (instead of blood) away from the breast. Breast cancer cells can enter lymphatic vessels and begin to grow in lymph nodes.

Most lymph vessels of the breast lead to lymph nodes under the arm. These are called *axillary nodes*. If breast cancer cells reach the underarm lymph nodes and keep on growing, they cause the nodes to swell. The doctor needs to know whether cancer cells have spread to lymph nodes because if they have, there is a higher chance that the cells have also gotten into the bloodstream and spread to other places in the body. The more lymph nodes that have cancer in them, the more likely it is that the cancer will be found in other organs, too. This could affect the treatment plan.



Breast lumps that are not cancer (benign breast lumps)

Most breast lumps are benign. This means they are not cancer. Benign breast tumors are abnormal growths, but they do not spread outside of the breast and they are not life threatening. But some benign breast lumps can increase a woman's risk of getting breast cancer.

Most lumps are caused by fibrocystic changes. Cysts are fluid-filled sacs. Fibrosis is the formation of scar-like tissue. These changes can cause breast swelling and pain. They often happen just before a woman's period is about to start. The breasts may feel lumpy, and sometimes there is a clear or slightly cloudy nipple discharge. For more on fibrocystic changes and other benign breast changes, please see our document, *Non-cancerous Breast Conditions*.

Breast cancer terms

It can be hard to know the meaning of some of the words your doctor uses to talk about breast cancer. Here are some of the key words you might hear:

Carcinoma: This is a term used to describe a cancer that begins in the lining layer of organs such as the breast. Nearly all breast cancers are carcinomas (either ductal carcinomas or lobular carcinomas).

Adenocarcinoma: An adenocarcinoma is a type of cancer that starts in gland tissue (tissue that makes and secretes a substance). The ducts and lobules of the breast are gland tissues because they make breast milk, so cancers starting in these areas are often called adenocarcinomas.

Carcinoma in situ: This term is used for an early stage of cancer, when it is still confined to the layer of cells where it began. In breast cancer, *in situ* means that the cancer cells are only in the ducts (*ductal carcinoma in situ*) or lobules (*lobular carcinoma in situ*). They have not spread into deeper tissues in the breast or to other organs in the body. Because of this, some types of carcinoma in situ are sometimes called *non-invasive* or *pre-invasive* breast cancers.

Invasive (infiltrating) carcinoma: An invasive cancer is one that has already grown beyond the layer of cells where it started (unlike carcinoma in situ). Most breast cancers are invasive carcinomas — either invasive ductal carcinoma or invasive lobular carcinoma.

Sarcoma: Sarcomas are cancers that start from connective tissues such as muscle tissue, fat tissue or blood vessels. Sarcomas of the breast are rare and are not discussed further in this document.

Types of breast cancers

There are many types of breast cancer, but some of them are very rare. Sometimes a breast tumor can be a mix of these types or a mixture of invasive and in situ cancer.

Ductal carcinoma in situ (DCIS): This is the most common type of non-invasive breast cancer. DCIS means that the cancer is only in the ducts. It has not spread through the walls of the ducts into the tissue of the breast and so cannot spread to lymph nodes or other organs. Nearly all women with cancer at this stage can be cured. Often one of the best ways to find DCIS early is with a mammogram.

Lobular carcinoma in situ (LCIS): This is not a true cancer, and is discussed in the section “What causes breast cancer?”

Invasive (or infiltrating) ductal carcinoma (IDC): This is the most common breast cancer. It starts in a milk passage (a duct), breaks through the wall of the duct, and invades the tissue of the breast. From there it may be able to spread (metastasize) to other parts of the body. It accounts for about 8 out of 10 invasive breast cancers.

Invasive (infiltrating) lobular carcinoma (ILC): This cancer starts in the milk glands (the lobules) and then spreads through the wall of the lobules. It can then spread (metastasize) to other parts of the body. About 1 in 10 invasive breast cancers are of this type.

Inflammatory breast cancer (IBC): This uncommon type of invasive breast cancer accounts for about 1% to 3% of all breast cancers. Usually there is no single lump or tumor. Instead, IBC makes the skin of the breast look red and feel warm. It also may

make the skin look thick and pitted, something like an orange peel. The breast may get bigger, hard, tender, or itchy.

In its early stages, inflammatory breast cancer is often mistaken for infection. Because there is no defined lump, it may not show up on a mammogram, which may make it even harder to catch it early. It has a higher chance of spreading and a worse outlook than invasive ductal or lobular cancer. For more details, see our document, *Inflammatory Breast Cancer*.

There are also many other less common types of breast cancer. You can get details about these through our toll-free number or on our Web site.

How many women get breast cancer?

The American Cancer Society's most recent estimates for breast cancer in the United States are for 2012:

- About 226,870 new cases of invasive breast cancer in women
- About 63,000 new cases of carcinoma in situ (CIS) will be found (CIS is non-invasive and is the earliest form of breast cancer).
- About 39,510 deaths from breast cancer (women)

Breast cancer is the most common cancer among women in the United States, other than skin cancer. It is the second leading cause of cancer death in women, after lung cancer.

The chance of a woman having invasive breast cancer some time during her life is a little less 1 in 8. The chance of dying from breast cancer is about 1 in 36. Breast cancer death rates have been going down. This is probably the result of finding the cancer earlier and better treatment. Right now there are more than 2½ million breast cancer survivors in the United States.

What are the risk factors for breast cancer?

Certain changes in DNA can cause normal breast cells to become cancer. DNA is the chemical in each of our cells that makes up our genes — the instructions for how our cells work. Some inherited DNA changes (mutations) can increase the risk for developing cancer and cause the cancers that run in some families. For instance, BRCA1 and BRCA2 are tumor suppressor genes — they keep cancer tumors from forming. When they are changed (mutated), they no longer cause cells to die at the right time, and cancer is more likely to develop.

But most breast cancer DNA changes happen in single breast cells during a woman's life rather than having been inherited. So far, the causes of most of the DNA mutations that could lead to breast cancer are not known.

Risk factors

While we do not yet know exactly what causes breast cancer, we do know that certain risk factors are linked to the disease. A risk factor is something that affects your chance of getting a disease such as cancer. Different cancers have different risk factors. Some risk factors, such as smoking, drinking, and diet are linked to things a person does. Others, like a person's age, race, or family history, can't be changed.

But risk factors don't tell us everything. Having a risk factor, or even several, doesn't mean that a woman will get breast cancer. Some women who have one or more risk factors never get the disease. And most women who do get breast cancer don't have any risk factors (other than being a woman and growing older). Some risk factors have a greater impact than others, and your risk for breast cancer can change over time, due to factors such as aging or lifestyle.

Although many risk factors may increase your chance of having breast cancer, it is not yet known just how some of these risk factors cause cells to become cancer. Hormones seem to play a role in many cases of breast cancer, but just how this happens is not fully understood.

Risk factors you cannot change

Gender: Being a woman is the main risk for breast cancer. While men also get the disease, it is about 100 times more common in women than in men.

Age: The chance of getting breast cancer goes up as a woman gets older. About 2 of 3 women with invasive breast cancer are 55 or older when the cancer is found.

Genetic risk factors: About 5% to 10% of breast cancers are thought to be linked to inherited changes (mutations) in certain genes. The most common gene changes are those of the BRCA1 and BRCA2 genes. Women with these gene changes have up to an 80% chance of getting breast cancer during their lifetimes. Other gene changes may raise breast cancer risk, too.

Family history: Breast cancer risk is higher among women whose close blood relatives have this disease. The relatives can be from either the mother's or father's side of the family. Having a mother, sister, or daughter with breast cancer about doubles a woman's risk. It's important to note that most (over 85%) women who get breast cancer *do not* have a family history of this disease.

Personal history of breast cancer: A woman with cancer in one breast has a greater chance of getting a new cancer in the other breast or in another part of the same breast. This is different from a return of the first cancer (called *recurrence*).

Race: Overall, white women are slightly more likely to get breast cancer than African-American women. But in women under 45 years of age, breast cancer is more common in African American women. African American women, though, are more likely to die of breast cancer. Asian, Hispanic, and Native-American women have a lower risk of getting and dying from breast cancer.

Dense breast tissue: Dense breast tissue means there is more gland tissue and less fatty tissue. Women with denser breast tissue have a higher risk of breast cancer. Dense breast tissue can also make it harder for doctors to spot problems on mammograms.

Certain benign (not cancer) breast problems: Women who have certain benign breast changes may have an increased risk of breast cancer. Some of these are more closely linked to breast cancer risk than others. For more details about these, see our document, *Non-cancerous Breast Conditions*.

Lobular carcinoma in situ: This begins in the milk-making glands (lobules) but does not go through the wall of the lobules and cannot spread to other parts of the body. It is not a true cancer or pre-cancer, but having LCIS increases a woman's risk of getting cancer later. For this reason, it's important that women with LCIS make sure they have regular mammograms and doctor visits. Women with lobular carcinoma in situ (LCIS) have a 7 to 11 times greater risk of developing cancer in either breast.

Menstrual periods: Women who began having periods early (before age 12) or who went through the change of life (menopause) after the age of 55 have a slightly increased risk of breast cancer. The increase in risk may be due to a longer lifetime exposure to the hormones estrogen and progesterone.

Breast radiation early in life: Women who have had radiation treatment to the chest area (as treatment for another cancer) earlier in life have a greatly increased risk of breast cancer. The risk varies with the patient's age when they had radiation. The risk from chest radiation is highest if the radiation were given during the teens, when the breasts were still developing. Radiation treatment after age 40 does not seem to increase breast cancer risk.

Treatment with DES: In the past, some pregnant women were given the drug DES (diethylstilbestrol) because it was thought to lower their chances of losing the baby (miscarriage). Studies have shown that these women and the children exposed in the womb have a slightly increased risk of getting breast cancer. For more information on DES see our document, *DES Exposure: Questions and Answers*.

Breast cancer risk and lifestyle choices

Not having children or having them later in life: Women who have had not had children, or who had their first child after age 30, have a slightly higher risk of breast cancer. Being pregnant many times and at an early age reduces breast cancer risk. Being pregnant lowers a woman's total number of lifetime menstrual cycles, which may be the reason for this effect.

Recent use of birth control pills: Studies have found that women who are using birth control pills have a slightly greater risk of breast cancer than women who have never used them. This risk seems to go back to normal over time once the pills are stopped. Women who stopped using the pill more than 10 years ago do not seem to have any increased risk. It's a good idea to talk to your doctor about the risks and benefits of birth control pills.

Using hormone therapy after menopause: Post-menopausal hormone therapy (PHT) has been used for many years to help relieve symptoms of menopause and to help prevent thinning of the bones (osteoporosis). This treatment goes by other names, such *hormone replacement therapy* (HRT), and *menopausal hormone therapy* (MHT).

There are 2 main types of PHT. For women who still have a womb (uterus), doctors most often prescribe both estrogen and progesterone (known as combined hormone therapy or HT). Estrogen alone can increase the risk of cancer of the uterus, so progesterone is needed to help prevent this. For women who no longer have a uterus (those who've had a hysterectomy), estrogen alone can be prescribed. This is known as estrogen replacement therapy (ERT) or just *estrogen therapy* (ET).

- **Combined HT:** Use of combined HT after menopause increases the risk of getting breast cancer. It may also increase the chances of dying from breast cancer. Breast cancer in women taking hormones may also be found at a more advanced stage, perhaps because it lowers how well mammograms work by increasing breast density. Five years after stopping HT, the breast cancer risk seems to drop back to normal. The word *bioidentical* is sometimes used to describe versions of estrogen and progestin with the same chemical structure as those found naturally in people. The use of these hormones has been marketed as a safe way to treat the symptoms of menopause. It is important to keep in mind that although there are few studies comparing “bioidentical” or “natural” hormones to man-made versions of hormones, there is no evidence that they are safer or work better. The use of these bioidentical hormones should be assumed to have the same health risks as any other type of hormone therapy.
- **ET:** The use of estrogen alone does not seem to increase the risk of developing breast cancer. In fact, some research has seemed to show that women who have had their uterus removed and who take estrogen actually have a lower risk of breast cancer. But women taking estrogen seem to have more problems with strokes and other blood clots. And when used for a long time (for more than 10 years), some studies have found that ET increases the risk of ovarian cancer.

At this time, there seem to be few strong reasons to use PHT, other than for short-term relief of menopausal symptoms. Because there are other factors to think about, you should talk with your doctor about the pros and cons of using PHT. If you and your doctor decide to try PHT for symptoms of menopause, it is usually best to use it at the lowest dose that works for you and for as short a time as possible.

Not breast-feeding: Some studies have shown that breast-feeding slightly lowers breast cancer risk, especially if the breast-feeding lasts 1½ to 2 years. This could be because breast-feeding lowers a woman's total number of menstrual periods, as does pregnancy. But this has been hard to study because, in countries such as the United States, breast-feeding for this long is uncommon.

Alcohol: The use of alcohol is clearly linked to an increased risk of getting breast cancer. Women who have one drink a day have a very small increased risk. Those who have 2 to 5 drinks daily have about 1½ times the risk of women who drink no alcohol. Too much alcohol use is also known to increase the risk of several other types of cancer.

Being overweight or obese: Being overweight or obese is linked to a higher risk of breast cancer, especially for women after change of life or if the weight gain took place during adulthood. But the link between weight and breast cancer risk is complex. The risk seems to be higher if the extra fat is around the waist.

Lack of exercise: Studies show that exercise reduces breast cancer risk. The only question is how much exercise is needed. One study found that as little as 1 hour and 15 minutes to 2½ hours of brisk walking per week reduced the risk by 18%. Walking 10 hours a week reduced the risk a little more.

Risk factors that are not certain or that haven't been proven

Diet and vitamin intake: Many studies have looked for a link between what women eat and breast cancer risk, but so far there are no clear answers. Some studies seemed to show that diet may play a role, while others found no evidence that diet has an effect on breast cancer risk. Studies have looked at the amount of fat in the diet, intake of fruits and vegetables, and intake of meat. No clear link to breast cancer risk was found. Studies have also looked at vitamin levels, but the results are not clear. So far, no study has shown that taking vitamins lowers breast cancer risk. This is not to say that there is no point in eating a healthy diet. A diet low in fat, low in red meat and processed meat, and high in fruits and vegetables may have other health benefits.

Most studies found that breast cancer is less common in countries where the typical diet is low in fat. On the other hand, many studies of women in the United States have not found breast cancer risk to be linked to how much fat they ate. Researchers are still not sure how to explain this difference. More research is needed to better understand the effect of the types of fat eaten and body weight on breast cancer risk.

Antiperspirants and bras: Internet e-mail rumors have suggested that underarm antiperspirants can cause breast cancer. There is very little evidence to support this idea. A large study of breast cancer causes found no increase in breast cancer in women who used antiperspirants. Also, there is no evidence to support the idea that bras cause breast cancer.

Induced abortions: Several studies show that induced abortions do not increase the risk of breast cancer. Also, there is no evidence to show a direct link between miscarriages and breast cancer. For more detailed information, see our document, *Is Abortion Linked to Breast Cancer?*

Breast implants: Silicone breast implants can cause scar tissue to form in the breast. But studies have found that this does not increase breast cancer risk. If you have breast implants, you might need special x-ray pictures during mammograms.

Pollution: A lot of research is being done to learn how the environment might affect breast cancer risk. This issue understandably invokes a great deal of public concern, but at this time research does not show a clear link between breast cancer risk and exposure to things like plastics, certain cosmetics and personal care products, and pesticides (such

as DDE). More research is needed to better define the possible health effects of these and similar substances.

Tobacco Smoke: For a long time, studies found no link between active cigarette smoking and breast cancer. In recent years, though, some studies have found that smoking may increase the risk of breast cancer. The increased risk seems to affect certain groups, such as women who started smoking when they were young. In 2009, the International Agency for Research on Cancer concluded that there is limited evidence that tobacco smoking causes breast cancer.

An issue that continues to be a focus of research is whether secondhand smoke (smoke from another person's cigarette) may increase the risk of breast cancer. But the evidence about secondhand smoke and breast cancer risk in human studies is not clear. In any case, a possible link to breast cancer is yet another reason to avoid being around secondhand smoke.

Night Work: A few studies have suggested that women who work at night (nurses on the night shift, for instance) have a higher risk of breast cancer. This is a fairly recent finding, and more studies are being done to look at this.

Can breast cancer be prevented?

There is no sure way to prevent breast cancer. But there are things all women can do that might reduce their risk and help increase the odds that if cancer does occur, it is found at an early, more treatable stage.

Lowering your risk: You can lower your risk of breast cancer by changing those risk factors that are under your control. Body weight, physical activity, and diet have all been linked to breast cancer, so these may be areas where you can take action.

At this time, the best advice about diet and activity to possibly reduce the risk of breast cancer is to:

- Get regular physical activity.
- Reduce your lifetime weight gain by eating fewer calories and getting regular exercise.
- Avoid or limit your alcohol intake.

To find out more, see our document, *American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention*.

Women who choose to breast-feed for at least several months may also reduce their breast cancer risk. Not using hormone therapy after menopause can also help you avoid raising your risk.

It's not clear at this time whether chemicals that have estrogen-like properties (like those found in some plastic bottles or certain cosmetics and personal care products) increase breast cancer risk. If there is an increased risk, it is likely to be very small. Still, women

who are concerned may choose to avoid products that contain these substances when they can.

Finding breast cancer early: It is also important for women to follow the American Cancer Society's guidelines for finding breast cancer early. (See the section, "How is breast cancer found?")

For women who are or may be at increased risk

If you have a higher risk for breast cancer there may be some things you can do to reduce your chances of getting breast cancer. Before deciding which, if any, of these may be right for you, talk with your doctor.

Genetic testing

There are tests that can tell if a woman has certain changed (mutated) genes linked to breast cancer. With this information, women can then take steps to reduce their risk. Recently the U.S. Preventive Services Task Force made recommendations for genetic testing. They suggest that only women with a strong family history be evaluated for genetic testing for BRCA mutations. This group is only about 2% of adult women in the United States. While many women may have relatives with breast cancer, in most cases this is not the result of BRCA gene mutations.

If you are thinking about genetic testing, you should talk to a genetic counselor, nurse, or doctor qualified to explain the process and the results of these tests. It is very important that you know what genetic testing can and can't tell you, and to carefully weigh the benefits and risks of testing before these tests are done. Testing costs a lot and may not be covered by some health insurance plans. For more information, see our document, *Genetic Testing: What You Need to Know*.

Breast cancer chemoprevention

Chemoprevention is the use of drugs to reduce the risk of cancer. Many drugs have been studied for use in lowering breast cancer risk. The drug Tamoxifen[®] has already been used for many years as a treatment for some types of breast cancer. Studies have shown that women at high risk for breast cancer are less likely to get the disease if they take tamoxifen. Another drug, Raloxifene[®], has been approved to help reduce breast cancer risk in women past menopause who are at high risk for breast cancer or who have osteoporosis. Other drugs (such as aromatase inhibitors) are also being studied. To learn more about these drugs, please see the American Cancer Society document, *Medicines to Reduce Breast Cancer Risk*.

Preventive surgery for women with very high breast cancer risk

For the few women who are at a very high risk for breast cancer, surgery to remove the breasts or ovaries may be an option.

Preventive (prophylactic) double (bilateral) mastectomy: For some women who are at very high risk for breast cancer, this surgery (a double mastectomy) may be an option. In this operation both breasts are removed before there is any known breast cancer. While this operation removes nearly all of the breast tissue, a small amount remains. This operation greatly reduces the risk of breast cancer, but the disease can still start in the breast tissue that is left.

The reasons for having this type of surgery need to be very strong. There is no way to know ahead of time whether this surgery will help a given woman. The American Cancer Society Board of Directors has stated that "only very strong clinical and/or pathologic indications warrant doing this type of preventive operation." A second opinion is strongly recommended before making a decision to have this type of surgery.

Some women with breast cancer in one breast choose to have that breast removed to treat the cancer, but they also have the other breast removed to prevent a second breast cancer. This is more common in women who have BRCA mutations, as their risk of a second breast cancer is very high.

Preventive ovary removal (prophylactic oophorectomy): Women with a certain gene change (BRCA mutation) who have their ovaries removed may reduce their risk of breast cancer by half or more. This is because taking out the ovaries removes the main sources of estrogen in the body.

Although this document is not about ovarian cancer, it is important that women with this gene change also know that they also have a high risk of getting ovarian cancer. Most doctors recommend that these women have their ovaries removed after they are done having children.

How is breast cancer found?

The term *screening* refers to tests and exams used to find a disease like cancer in people who do not have any symptoms. The earlier breast cancer is found, the better the chances that treatment will work. The goal is to find cancers before they start to cause symptoms. The size of a breast cancer and how far it has spread are the most important factors in predicting the outlook for the patient. Most doctors feel that tests for finding breast cancer early save many thousands of lives each year. Following the guidelines given here improves the chances that breast cancer can be found at an early stage and treated with success.

ACS recommendations for finding breast cancer early

The ACS recommends the following guidelines for finding breast cancer early in women without symptoms:

Mammogram: Women age 40 and older should have a screening mammogram every year and should keep on doing so for as long as they are in good health. While mammograms can miss some cancers, they are still a very good way to find breast cancer.

Clinical breast exam: Women in their 20s and 30s should have a clinical breast exam (CBE) as part of a regular exam by a health expert at least every 3 years. After age 40, women should have a breast exam by a health expert every year. It might be a good idea to have the CBE shortly before the mammogram. You can use the exam to learn what your own breasts look and feel like.

Breast self-exam (BSE): BSE is an option for women starting in their 20s. Women should be told about the benefits and limitations of BSE. Women should report any changes in how their breasts look or feel to a health expert right away.

Research has shown that BSE plays a small role in finding breast cancer compared with finding a breast lump by chance or simply being aware of what is normal for each woman. If you decide to do BSE, you should have your doctor or nurse check your method to make sure you are doing it right. If you do BSE on a regular basis, you get to know how your breasts normally look and feel. Then you can more easily notice changes. But it's OK not to do BSE or not to do it on a fixed schedule.

The goal, with or without BSE, is to see a doctor right away if you notice any of these changes: a lump or swelling, skin irritation or dimpling, nipple pain or the nipple turning inward, redness or scaliness of the nipple or breast skin, or a discharge other than breast milk. But remember that most of the time these breast changes are not cancer.

Magnetic resonance imaging (MRI): Women at high risk should get an MRI and a mammogram every year (women who are at high risk have at least a 25% lifetime risk of breast cancer). Women at moderately increased risk should talk with their doctors about the benefits and limitations of adding MRI screening to their yearly mammogram. Yearly MRI screening is not recommended for women whose lifetime risk of breast cancer is less than 15%. To find out more about what makes someone high risk, as well as about the use of MRIs for breast cancer screening, please see our document, *Breast Cancer*.

Mammograms

A mammogram is an x-ray of the breast. A *screening mammogram* is used to look for breast disease in women who do not seem to have breast problems. A mammogram can also be used when women have symptoms such as a lump, skin change, or nipple discharge. This is called a *diagnostic mammogram*. Diagnostic mammograms are also used to follow-up abnormal screening mammograms.

For the mammogram, you undress above the waist. You will have a wrap to cover yourself. A technologist (most often a woman) will position your breast for the test. The breast is pressed between 2 plates to flatten and spread the tissue. The pressure lasts only a few seconds while the picture is taken. The whole process takes about 20 minutes. Although this may cause some pain for a moment, it is needed to get a good picture. You should get your results within 30 days or even sooner.

About 1 in 10 women who get a mammogram will need more pictures taken. But most of these women do not have breast cancer, so try not to worry if this happens to you. Only 2 to 4 of every 1,000 mammograms leads to a diagnosis of cancer.

Very low levels of radiation are used. While many people are worried about exposure to x-rays, the low level of radiation used for mammograms does not increase the risk of breast cancer. You might think of it this way: if a woman with breast cancer is treated with radiation, she will get around 5,000 rads (a term used to measure radiation dose). If she had a mammograms every year from age 40 to age 90, she will have had 20 to 40 rads total.

Help with mammogram costs

Medicare, Medicaid, and most private health plans cover all or part of the cost of this test. Call us at 1-800-227-2345 for information about facilities in your area. Breast cancer testing is available to women without health insurance and women who don't have coverage for breast cancer screening. It may be free or offered at very little cost through a special program called the National Breast and Cervical Cancer Early Detection Program (NBCCEDP). Your state's Department of Health will have details about this program.

There is also a program to help pay for breast cancer treatment for women in need. To learn more about these programs, you can contact the Centers for Disease Control and Prevention at 1-800-CDC INFO (1-800-232-4636) or on the Internet at www.cdc.gov/cancer/nbccedp.

For more details about mammograms, please see our document, *Mammograms and Other Breast Imaging Procedures*.

Clinical breast exam

A clinical breast exam (CBE) is an exam of your breasts by a health expert such as a doctor, nurse practitioner, nurse, or physician assistant. For this exam, you undress from the waist up. The examiner will first look at your breasts for changes in size or shape. Then, using the pads of the fingers, she or he will gently feel your breasts for lumps. The area under both arms will also be checked. This is a good time to learn how to do breast self-exam if you don't already know how.

Breast awareness and breast self-exam

Women should be aware of how their breasts normally look and feel and report any changes to a doctor right away. Finding a change does not mean that you have cancer.

By being aware of how your own breasts look and feel, you are likely to notice any changes that might take place. You can also choose to use a step-by-step approach to checking your breasts on a set schedule. The best time to do breast self-examination (BSE) is when your breasts are not tender or swollen. If you find any changes, see a doctor right away.

Women with breast implants can do BSE. It may help to have the surgeon help you feel the edges of the implant so that you know where they are. It may be that the implants push out the breast tissue and actually make it easier to examine.

It's OK for women not to do BSE or to do it once in a while. We have detailed information on how to do BSE for women who want to do it. You can find it on our Web site or you can call and ask for it.

MRI (magnetic resonance imaging)

MRI scans use magnets and radio waves (instead of x-rays) to produce very detailed, cross-sectional images of the body. The most useful MRI exams for breast imaging use a contrast material that is put into a vein in the arm before or during the exam. This helps the MRI to clearly show breast tissue details.

MRI scans can take a long time — often up to an hour. For a breast MRI, you have to lie inside a narrow tube, face down on a special platform. The platform has openings for each breast that allow the image to be taken without pressing on the breast. The platform contains the sensors needed to capture the MRI image. It is important to remain very still throughout the exam. Lying in the tube can feel close and might upset people with a fear of enclosed spaces.

For certain women at high risk for breast cancer, screening MRI is recommended along with a yearly mammogram. It is not generally recommended as a screening tool by itself because it may miss some cancers that mammograms would find. MRI also costs more than mammograms. Most major insurance companies will likely pay for a screening MRI if a woman can be shown to be at high risk, but it's not yet clear if all companies will do so. More details about MRI can be found below.

Signs and symptoms of breast cancer

The widespread use of screening mammograms has increased the number of breast cancers found before they cause any symptoms, but some are still missed.

The most common sign of breast cancer is a new lump or mass. A lump that is painless, hard, and has uneven edges is more likely to be cancer. But some cancers are tender, soft, and rounded or even painful. So it's important to have anything new or unusual checked by a doctor.

Other signs of breast cancer include the following:

- Swelling of all or part of the breast
- Skin irritation or dimpling
- Breast pain
- Nipple pain or the nipple turning inward
- Redness, scaliness, or thickening of the nipple or breast skin
- A nipple discharge other than breast milk

Sometimes breast cancer can spread to lymph nodes under the arm or around the collarbone and cause a lump or swelling there, even before the tumor in the breast tissue is large enough to be felt.

If you have any symptoms that might be a sign of breast cancer, be sure see a doctor as soon as you can. After asking you some questions and doing a complete physical exam (including a clinical breast exam), your doctor may want to do more tests, such as those listed below.

Imaging tests

These tests use different methods to create pictures of the inside of your body. The tests may be done for a number of reasons: to help find out whether a suspicious area might be cancer, to learn how far cancer may have spread, and to help figure out if treatment is working.

Mammograms: Although mammograms are mostly used for screening, they can also be used if there is a breast problem. These are called *diagnostic mammograms*. This kind of mammogram might show that everything is OK and you can go back to having yearly mammograms. Or it might show that a biopsy should be done. Even if the mammogram doesn't show a tumor, if you or your doctor can feel a lump you may need a biopsy. The exception would be if ultrasound (see below) shows that the lump is a cyst.

Mammograms often don't work as well in younger women, mostly because their breasts are dense and this can hide a tumor. This is also true for pregnant women and women who are breast feeding. Since most breast cancers occur in older women, this is usually not a major problem. But it is a problem for young women who have a genetic risk factor for breast cancer because they often get breast cancer at a younger age. For this reason, some doctors now suggest MRI along with mammograms for screening these women.

A mammogram cannot show for sure whether or not cancer is present. If your mammogram shows a possible problem, a sample of breast tissue is removed and looked at under a microscope. This is called a biopsy (see below).

MRI scans: MRI scans use radio waves and strong magnets instead of x-rays. MRI scans can be used along with mammograms for screening women who have a high risk of getting breast cancer. Or they can be used to look at areas of concern found on a mammogram. MRI is also sometimes used for women who are known to have breast cancer in order to help figure out the size of the cancer.

A contrast material called gadolinium is often put into a vein before the scan to better show details. MRI scans can take a long time — often up to an hour. You have to lie inside a narrow tube, which may upset people with a fear of enclosed spaces. The machine makes loud buzzing and clicking noises that you may find disturbing. Some places will give you headphones with music to block this out.

Breast ultrasound: An ultrasound uses sound waves to outline a part of the body. The sound wave echoes are picked up by a computer to create a picture on a computer screen.

Ultrasound is a good test to use along with mammograms because it is widely available and costs less than other tests. But ultrasound should not be used instead of mammograms. Usually, it is used to look at a certain area of concern found by the mammogram. It sometimes helps to tell the difference between cysts and solid masses (tumors) without using a needle to draw out fluid.

Ductogram (also called a galactogram): This is a special kind of x-ray that is sometimes helpful in finding the cause of a nipple discharge. A very thin plastic tube is placed into the opening of the duct at the nipple. A dye is injected to outline the shape of the duct on an x-ray picture. It will show if there is a tumor inside the duct. If there is a discharge, the fluid can be tested for cancer cells.

There are several other tests that can help tell the doctor more about your situation. Feel free to ask your doctor to explain any test to you. You can also contact us for more information.

Biopsy

A biopsy is done when other tests show that you might have breast cancer. The only way to know for sure is for you to have a biopsy. During this test, cells from the area of concern are removed so they can be studied in the lab. There are several kinds of biopsies. The doctor will use the one best for you.

Types of biopsies

Fine needle aspiration (FNA) biopsy: For this test, a very thin (fine), hollow needle is used to pull out fluid or tissue from the lump. The needle used in an FNA is thinner than the ones used for blood tests. Your doctor might use ultrasound to guide the needle into the lump. Medicine may be used to make the skin numb.

If the fluid drawn out is clear, the lump is most likely a benign cyst (not cancer). Bloody or cloudy fluid can mean either a cyst or — rarely — cancer. If the lump is solid, small pieces of tissue are taken out. These will be looked at under a microscope to see if they are cancer.

An FNA biopsy is the easiest type of biopsy to have, but it has some downsides. It can sometimes miss a cancer if the needle is not placed among the cancer cells. And even if cancer cells are found, it is usually not possible to tell whether the cancer is invasive. In some cases there may not be enough cells to do some of the other lab tests that are needed. If the FNA does not give a clear answer, a second FNA or a different type of biopsy may be needed.

Core needle biopsy: The needle used for this test is larger than the one for fine needle biopsy and so it can remove more tissue. It is used to remove one or more cores (pieces) of tissue. Because more tissue is removed, a core needle biopsy is more likely than an FNA to provide a clear result. It is less likely to miss a cancer, although that is still possible, and often there are enough cells to do other tests. The biopsy is done with local anesthesia (the area is numbed) in an outpatient setting.

Vacuum-assisted biopsies: These can be done with systems such as the Mammotome[®] or ATEC[®] (Automated Tissue Excision and Collection) under the guidance of a mammogram or MRI. First the skin is numbed and a small cut (incision) is made. A hollow probe is put through the cut into the breast tissue. A piece of tissue is sucked out. Several samples can be taken from the same cut. Vacuum-assisted biopsies are done on an outpatient basis. No stitches are needed, and there is only a little scarring. This method usually removes more tissue than core biopsies.

Surgical (open) biopsy: Sometimes surgery is needed to remove all or part of a lump so it can be looked at under a microscope. The whole lump as well as some normal tissue around it may be taken out. Most often this is done in the hospital's outpatient center. Local anesthesia is used (the area around the lump is numbed) and you may also be given drugs to relax you and make drowsy. It can also be done under general anesthesia (you are asleep). Ask your doctor which kind of biopsy you will have and what you can expect during and after the test.

Lymph node dissection and sentinel lymph node biopsy

These procedures are done to look for cancer in the lymph nodes. They are described in more detail in the section, "How is breast cancer treated?"

Biopsy lab tests

The tissue removed during a biopsy is looked at in the lab to see whether it is benign (not cancer) or cancer. If it is not cancer, then no more treatment is needed. If it is cancer, the biopsy can help the doctor decide what type of cancer it is and show whether it is invasive or not. Other lab tests may also be done to help figure out how quickly the cancer is growing and what treatments might work best. Some of these include:

Breast cancer grade: If a biopsy sample is cancer, it is given a *grade* from 1 to 3. Cancers that look more like normal breast tissue tend to grow and spread more slowly. As a rule, a lower grade number means a slower-growing cancer, while a higher number means a faster-growing cancer. The grade helps predict the outcome (prognosis) for the woman. The tumor grade is one factor in deciding if further treatment is needed after surgery.

Hormone receptor status: Receptors are proteins on the outside surfaces of cells that can attach to hormones in the blood. Estrogen and progesterone are hormones that often attach to these receptors on some breast cancer cells to fuel their growth. The biopsy sample can be tested to see whether it has receptors for estrogen and/or progesterone. If it does, it is often referred to as ER-positive, PR-positive, or just hormone receptor-positive. People with such cancers tend to live longer than those with cancers without these receptors because they are much more likely to respond to hormone treatment. About 2 out of 3 breast cancers have at least one of these receptors.

HER2/neu status: About 1 out of 5 breast cancers have too much of a protein called HER2/neu. Tumors with increased levels of HER2/neu are called "HER2-positive." These cancers tend to grow and spread faster than other breast cancers.

HER2/neu testing should be done on all newly diagnosed breast cancers. HER2-positive cancers can be treated with drugs that target the HER2/neu protein, such as trastuzumab (Herceptin[®]) and lapatinib (Tykerb[®]). See the section, "Targeted therapy" for more information on these drugs.

Tests of gene patterns: Research has shown that looking at the patterns of a number of genes at the same time can help tell whether or not an early breast cancer is likely to come back after the first treatment. This can help when deciding whether more treatment, such as chemotherapy, might be useful. There are now 2 of these tests which look at different sets of genes: Oncotype DX[®] and MammaPrint[®]. While some doctors are using these tests (along with other information) to help make decisions about offering chemotherapy, others are waiting for more research to show whether they are really helpful.

Classifying breast cancer

Research on patterns of genes has also suggested some new ways of grouping breast cancers. The current types of breast cancer are based largely on how tumors look under a microscope. A newer system, based on molecular features, may be better able to predict outlook and response to some breast cancer treatments.

Tests to find breast cancer spread

Based on the results of your physical exam and biopsy, your doctor may want you to have certain tests such as those listed below to check for signs of cancer spread. Blood tests may also be done to look at your overall health and can sometimes show whether the cancer has spread to certain organs.

Chest x-ray: This test may be done to see whether the cancer has spread to the lungs.

Mammogram: If they haven't been done already, more mammograms may be done to get better pictures of the breasts. This test is described in the section, "How is breast cancer found?"

Bone scan: This test can help show whether the cancer has spread to the bones. For this test, a very low dose of radioactive material is put into a vein. The bone attracts this material which shows up on the scan as a "hot spot." These hot spots could be cancer, but other problems like arthritis can also cause them. Other tests or even biopsy samples of the hot spots may be needed.

CT scan (computed tomography): A CT scan is a special type of x-ray. Pictures are taken from different angles and these are combined by a computer to make a detailed picture of the organs. In women with breast cancer, this test is most often used to look at the chest and/or belly (abdomen) to see if the cancer has spread to other organs. It can also be used to guide a biopsy needle into an area of concern.

Before the CT scan, you may be asked to drink a contrast liquid to outline your intestines. After the first set of pictures is taken you may get an IV (intravenous) line through which a contrast dye is put into your blood. A second set of pictures is then taken.

The contrast may cause some flushing (a feeling of warmth, especially in the face). Some people are allergic and get hives. Rarely, more serious reactions like trouble breathing or low blood pressure can happen. Before you have this test be sure to tell your doctor if you have ever had a reaction to any contrast material used for x-rays.

CT scans take longer than regular x-rays. You need to lie still on a table while they are being done. You might feel a bit confined by the ring you have to lie in while the pictures are being taken.

MRI (magnetic resonance imaging): An MRI scan takes pictures using radio waves and strong magnets instead of x-rays. This test can be helpful in looking at the brain and spinal cord. MRIs can be a more uncomfortable than CT scans because they take longer and you need to lie in a narrow tube while the test is done. The machine also makes a loud, thumping noise that you may find disturbing. Some centers provide headphones with music to block out the noise.

Ultrasound: This test is described in the section "How is breast cancer found?" as an imaging test of the breast. But ultrasound can also be used to look for cancer that has spread to some other parts of the body.

PET scan (positron emission tomography): This test uses a form of sugar that contains a radioactive atom. The sugar is put into a vein and travels throughout the body. Cancer cells absorb high amounts of this sugar. A special camera can then spot these cells. PET is useful when the doctor thinks the cancer has spread but doesn't know where. Special machines are able to do both a PET and CT scan at the same time. So far, most studies show PET scans are not very helpful in most cases of breast cancer, but they may be used when the cancer is known to have spread.

Staging for breast cancer

Staging is the process of finding out how widespread the cancer is at the time it is found. The stage of a cancer is the most important factor in choosing among treatment options. The stage is based on whether the cancer is invasive or non-invasive, the size of the tumor, how many lymph nodes are involved, and whether it has spread to other parts of the body.

The TNM staging system

The most common system used to describe the stages of breast cancer is the AJCC/TNM system. This system takes into account the tumor size and spread (**T**), whether the cancer has spread to lymph nodes (**N**), and whether it has spread to distant organs (**M**, for metastasis). Numbers after the *T*, *N*, and *M* give details about the cancer.

All of this information is combined in a process called *stage grouping*. The stage is then expressed as a Roman numeral. After stage 0 (carcinoma *in situ*), the other stages are I through IV (1-4). Some of the stages are further sub-divided using the letters A, B, and C. As a rule, the lower the number, the less the cancer has spread. A higher number, such as stage IV (4), means a more advanced cancer. Cancers with similar stages tend to have a similar outlook and are often treated in much the same way.

After looking at your test results, the doctor will tell you the stage of your cancer. Breast cancer staging can be complex. Be sure to ask your doctor to explain your stage in a way you understand. This will help you both decide on the best treatment for you.

Survival rates for breast cancer

Some people with cancer may want to know the survival rates for their type of cancer. Others may not find the numbers helpful, or may even not want to know them. Whether or not you want to read about survival rates is up to you. If you decide that you do not want to read about them, skip to the next section.

The 5-year survival rate refers to the percentage of patients who live at least 5 years after their cancer is found. Of course, many people live much longer than 5 years. Also, people with cancer can die from other things, and these numbers do not take into account the fact that some of the deaths are from causes other than breast cancer. These numbers are based on women treated a number of years ago. Because we now find more cancers early and use newer, better treatments, the survival rates are getting better all the time.

You will see that the table does not divide survival rates by all of the substages, such as IA and IB. The rates for these substages are likely to be close to the rate for the overall stage.

Stage	5-year Survival Rate
0	93%
I	88%
IIA	81%
IIB	74%
IIIA	67%

IIIB	41%*
IIIC	49%*
IV	15%

*These numbers are correct as written (stage IIIB shows worse survival than stage IIIC).

These numbers come from the National Cancer Data Base, and are based on people who were diagnosed with breast cancer in 2001 and 2002.

While these numbers provide an overall picture, keep in mind that every woman is unique and the statistics can't predict exactly what will happen in your case. Talk with your cancer care team if you have questions about your own chances of a cure or how long you might survive your cancer. They know your situation best.

How is breast cancer treated?

This information represents the views of the doctors and nurses serving on the American Cancer Society's Cancer Information Database Editorial Board. These views are based on their interpretation of studies published in medical journals, as well as their own professional experience.

The treatment information in this document is not official policy of the Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor.

Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.

General types of treatment

Treatments can be put into broad groups based on how they work and when they are used.

Local or systemic treatment

Local treatment is used to treat a tumor without affecting the rest of the body. Surgery and radiation are examples of local treatment.

Systemic treatment is given into the bloodstream or by mouth and goes throughout the body to reach cancer cells that may have spread beyond the breast. Chemotherapy (chemo), hormone therapy, and targeted therapy are systemic treatments.

Adjuvant and neoadjuvant therapy

When people who seem to have no cancer left after surgery are given more treatment it is called *adjuvant therapy*. Doctors know that cancer cells can break away from the main tumor and begin to spread through the bloodstream in the early stages of the disease. It's very hard to tell if this has happened. But if it has, the cancer cells can start new tumors in other organs or in the bones. The goal of adjuvant therapy is to kill these hidden cells. Both systemic therapy (like chemo, hormone treatment, and targeted therapy) and radiation can be used as adjuvant therapy. But not every patient needs adjuvant therapy.

Some people are given treatment **before** surgery to shrink a tumor. This is called *neoadjuvant therapy*.

Surgery for breast cancer

Most women with breast cancer have some type of surgery to treat the main breast tumor. The purpose of surgery is to remove as much of the cancer as possible. Surgery can also be done to find out whether the cancer has spread to the lymph nodes under the arm, to restore the breast's shape after a mastectomy, or to relieve symptoms of advanced cancer. Below is a list of some of the most common types of breast cancer surgery.

Breast-conserving surgery

In these types of surgery, only a part of the breast is removed. How much is removed depends on the size and place of the tumor and other factors. It is sometimes called *partial (or segmental) mastectomy*.

Lumpectomy: This surgery removes only the breast lump and some normal tissue around it. Radiation treatment is usually given after this type of surgery. If chemotherapy is also going to be used, the radiation may be put off until the chemo is finished. If there is cancer at the edge (called the *margin*) of the piece of tissue that was removed, the surgeon may need to go back and take out more tissue.

Partial (segmental) mastectomy or quadrantectomy: This surgery removes more of the breast tissue than in a lumpectomy (up to one-quarter of the breast). It is usually followed by radiation therapy. But radiation may be delayed if chemotherapy is also going to be given. Side effects of these operations can include pain, short-term swelling, tenderness, and hardness due to scar tissue that forms in the surgical site.

If cancer cells are found at any of the edges of the piece of tissue removed, it is said to have *positive margins*. When no cancer cells are found at the edges of the tissue, it is said to have *negative* or *clear margins*. The presence of positive margins means that some cancer cells may have been left behind after surgery. If the lab finds positive margins in the tissue removed with surgery, the surgeon may need to go back and remove more tissue. This operation is called a *re-excision*. If the surgeon can't remove enough breast tissue to get clear margins, a mastectomy may be needed.

The distance from the tumor to the margin is also important. Even if the margins are “clear”, they could be “close” — meaning that the distance between the edge of the tumor and edge of the tissue removed is too small and more surgery may be needed, as well. Surgeons can disagree on what is an adequate (or good) margin.

The more of breast removed, the more likely it is that there will be a change in the shape of the breast afterward. If the breasts look very different after surgery, you might be able to have some type of reconstructive surgery (see the section, "Reconstructive or breast implant surgery"), or have the other breast made smaller so the breasts look more alike. This might even be done during the first surgery. You should talk with your doctor before surgery to get an idea of how your breasts are likely to look afterward, and to learn what your options might be.

For most women with stage I or II breast cancer, breast-conservation therapy (lumpectomy/partial mastectomy plus radiation therapy) works as well as mastectomy. Survival rates of women treated with these 2 approaches are the same.

Mastectomy

Mastectomy is surgery to remove the entire breast. All of the breast tissue is removed, sometimes along with other nearby tissues.

Simple (also called total) **mastectomy:** In this surgery the entire breast is removed, but not the lymph nodes under the arm or the muscle tissue beneath the breast. Sometimes both breasts are removed, especially when mastectomy is done to try to prevent cancer. If a hospital stay is needed, most women can go home the next day.

For some women who are planning on having reconstruction right away, a *skin-sparing mastectomy* can be done. For this, most of the skin over the breast (other than the nipple and areola) is left intact. This can work as well as a simple mastectomy. The amount of breast tissue removed is the same as with a simple mastectomy. Although this approach has not been used for as long as the more standard type of mastectomy, many women prefer it because there is less scar tissue and the reconstructed breast seems more natural.

Another option for some women is the *nipple-sparing mastectomy*. This is like a skin-sparing mastectomy but the nipple and areola are also left behind. This procedure is more often an option for women who have a small early stage cancer near the outer part of the breast, with no signs of cancer in the skin or near the nipple.

There are some problems with nipple-sparing surgeries. Afterward, the nipple does not have a good blood supply, so sometimes it can wither away or become deformed. Because the nerves are also cut, there is little or no feeling left in the nipple. In women with larger breasts, the nipple may look out of place after the breast is reconstructed. As a result, many doctors feel that this surgery is best done in women with small to medium sized breasts.

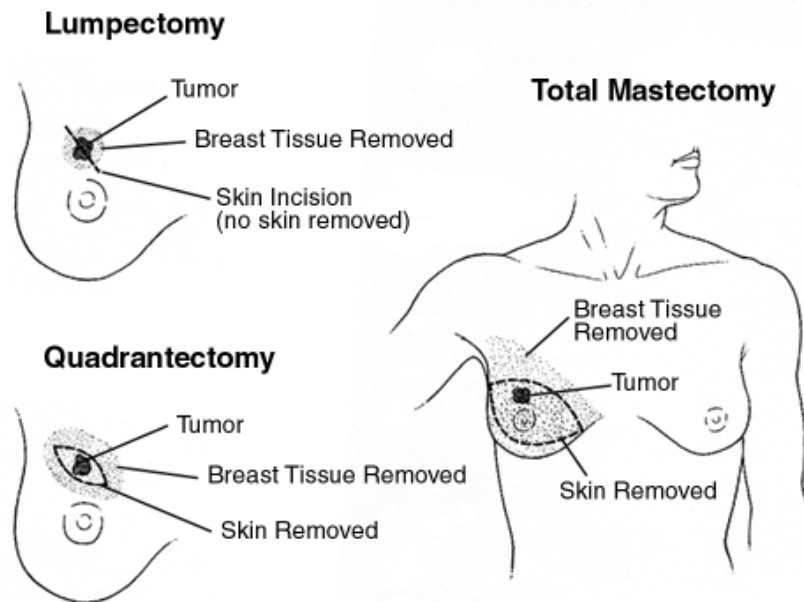
Modified radical mastectomy: This operation involves removing the entire breast and some of the lymph nodes under the arm.

Radical mastectomy: This is a major operation where the surgeon removes the entire breast, the lymph nodes under the arm (axillary lymph nodes), and the chest wall muscles under the breast. This surgery was once very common, but it is rarely done now because modified radical mastectomy has proven to work just as well. But this operation may still be done for large tumors that are growing into the muscles under the breast.

Possible side effects of breast surgery

Aside from pain after the surgery and the change in the shape of the breast(s), the possible side effects of mastectomy and breast-conserving surgery include wound infection, build-up of blood in the wound, and build-up of clear fluid in the wound. If axillary lymph nodes are also removed, other side effects are possible, such as swelling of the arm and chest (*lymphedema*).

Choosing between lumpectomy and mastectomy



Many women with early stage cancers can choose between breast-conserving surgery and mastectomy. One advantage of lumpectomy is that it saves the way the breast looks. A downside is that you will need radiation treatment after surgery. This often takes several weeks. On the other hand, some women who have a mastectomy will also need radiation.

When choosing between a lumpectomy and mastectomy, be sure to get all the facts. You may have an initial gut feeling for mastectomy as a way to "take it all out as quickly as possible." This feeling can lead women tend to prefer mastectomy more often than their surgeons do. But the fact is that for most women with stage I or II breast cancer, lumpectomy or partial mastectomy (along with radiation) is as good as mastectomy. There is no difference in the survival rates of women treated with these 2 methods. Other

factors, though, can affect which type of surgery is best for you. And lumpectomy is not an option for all women with breast cancer. Your doctor can tell you if there are reasons why a lumpectomy is not right for you.

Lymph nodes surgery

Axillary lymph node dissection: This operation is done to find out whether breast cancer has spread to lymph nodes under the arm. About 10 to 40 (though in most cases less than 20) lymph nodes are removed. If the lymph nodes contain cancer cells, there is a higher chance that cancer cells have also spread through the bloodstream to other parts of the body. Axillary lymph node dissection is usually done at the same time as the mastectomy or lumpectomy, but it can be done in a second operation. This was once the most common way to check for breast cancer spread to nearby lymph nodes, and it is still done in some patients. It can be used as a test to help guide other breast cancer treatment decisions.

Sentinel lymph node biopsy: A sentinel lymph node biopsy is a way of learning whether cancer has spread to the lymph nodes under the arm without removing all of them. For this test, a radioactive substance and/or a dye are injected near the tumor. This is carried by the lymph system to the first nodes, called the *sentinel lymph nodes* that gets lymph from the tumor. These lymph nodes are the one most likely to contain cancer cells if the cancer has spread. They are then looked at by the pathologist. If the sentinel nodes contain cancer, more lymph nodes may be removed (either right away or in a separate surgery). If they are free of cancer, further lymph node surgery is not usually needed. This type of biopsy calls for a great deal of skill, so it is best to have it done by a team who has experience with it.

Up to now, if the sentinel nodes had cancer, the surgeon would do a full axillary dissection to see how many other lymph nodes were involved. But this may not always be needed. In some cases, it may be just as safe to leave the rest of the lymph nodes behind. Right now, skipping the axillary dissection is only an option for patients having breast conserving surgery (for tumors that are not large) followed by radiation. It is not thought to be an option for patients having a mastectomy.

Side effects: As with other operations, pain, swelling, bleeding, and infection are possible. The main possible long-term effect of lymph node surgery is lymphedema of the arm. This happens in about 3 out of 10 women who have a full axillary lymph node dissection, but is less common after a sentinel lymph node biopsy. Sometimes the swelling lasts for only a few weeks and then goes away. Other times, the swelling comes up later or lasts a long time. Ways to help prevent or reduce the effects of lymphedema are discussed in the section, "Lymphedema." If your arm is swollen, tight, or painful after lymph node surgery, be sure to tell someone on your cancer care team right away.

Reconstructive or breast implant surgery

After having a mastectomy (or some breast-conserving surgeries), a woman may want to think about having the breast rebuilt. These operations are not meant to treat the cancer.

They are done to restore the way the breast looks. If you are having breast surgery and are thinking about having breast reconstruction, you should talk to a plastic surgeon *before* your operation. There are choices to be made, such as when the surgery can be done and exactly what type it will be.

You can get more detailed information about the different types of surgery and their possible side effects in our document, *Breast Reconstruction After Mastectomy*. You may also find it helpful to talk with a woman who has had the type of reconstruction you are thinking about. Our Reach to Recovery volunteers can help you with this. Call us if you would like to speak to one of these volunteers.

What to expect with surgery

For many people, the thought of surgery can be scary. But knowing what to expect before, during, and afterwards may help ease your fears.

Before surgery: A few days after your biopsy you will know whether or not you have cancer, but the extent of the disease will not be known until after surgery. You will most likely meet with your surgeon a few days before the operation to talk about what will happen. You will be asked to sign a consent form giving the doctor permission to do the surgery. This is a good time to ask any questions you might have.

You may be asked to donate blood ahead of time in case you need it during the surgery. Your doctor will also ask you about medicines, vitamins, or supplements you are taking. You might need to stop taking some of them a week or 2 before surgery.

You will also meet with the health professional who will be giving you the anesthesia (drugs to make you sleep and not feel pain) during your surgery. The type of anesthesia used depends largely on the kind of surgery being done and your medical history.

Surgery: For your surgery, you may be offered the choice of outpatient (where you go home the same day) or you may be stay in the hospital. General anesthesia (you are in a deep sleep) is used for most breast surgeries. You will have an IV line put in (usually into a vein in your arm). It will be used to give medicines that may be needed during the surgery. You will be hooked up to an electrocardiogram (EKG) machine and have a blood pressure cuff on your arm so your heart rhythm and blood pressure can be checked during the surgery.

How long the surgery will take depends on the type of surgery being done. For example, a mastectomy with lymph node removal will take from 2 to 3 hours. After your surgery, you will be taken to the recovery room, where you will stay until you are awake and your vital signs (blood pressure, pulse, and breathing) are stable.

After surgery: The length of your stay in the hospital depends on the type of surgery you had, your overall state of health, whether you have any other medical problems, how well you do during the surgery, and how you feel after the surgery. You and your doctor should decide how long you need to stay in the hospital — not your insurance company. Still, it is important to check your insurance coverage before surgery.

As a rule, women having a mastectomy stay in the hospital for 1 or 2 nights and then go home. But some women may be placed in a 23-hour, short-stay unit before going home.

Less involved operations such as lumpectomy and sentinel lymph node biopsy are usually done on an outpatient basis and an overnight hospital stay is not needed.

After surgery you may have a bandage over the surgery site that wraps snugly around your chest. You may have one or more tubes (drains) from the breast or underarm area to remove fluid that collects during the healing process. You will be taught how to care for the drains. Most drains stay in place for 1 or 2 weeks. Once the flow has gone down to about 1 ounce a day, the drain will be removed.

Most doctors will want you to start moving your arm soon after surgery so that it won't get stiff. Many women who have a lumpectomy or mastectomy are surprised by how little pain they have in the breast area. But they are less happy with the strange feelings (numbness, pinching/pulling) in the underarm area.

Talk with a member of your health care team about what you should do after the surgery to care for yourself. You should get written instructions that will tell you about the following:

- How to take care of the wound and dressing
- How to take care of the drains
- How to know if you have an infection
- When to call the doctor or nurse
- When to begin using the arm and how to do arm exercises to prevent stiffness
- When to start wearing a bra again
- When and how to wear a breast form (sometimes called a prosthesis)
- What to eat and what not to eat
- What medicines to take (including pain medicines and maybe antibiotics)
- What activities you should or should not do
- What feelings you might have about how you look
- When to see your doctor for a follow-up appointment
- Referral to a Reach to Recovery volunteer. Through our Reach to Recovery program, a specially trained volunteer who has had breast cancer can provide information, comfort, and support (see our document, *Reach to Recovery* for more information).

Most patients see their doctor about 7 to 14 days after the surgery. Your doctor should explain the results of your pathology report and talk to you about whether you will need more treatment.

Pain after breast surgery

Nerve pain after a mastectomy or lumpectomy is called *post-mastectomy pain syndrome* or PMPS. The signs of PMPS are chest wall pain and tingling down the arm. Pain may also be felt in the shoulder, scar, arm, or armpit. Other common complaints include numbness, shooting or pricking pain, or unbearable itching.

It is important to talk to your doctor about any pain you are having. PMPS can cause you to not use your arm the way you should, and over time you might not be able to use it normally.

PMPS can be treated. Medicines commonly used to treat pain may not work well for nerve pain. But there are other medicines and treatments that do work for this kind of pain. Talk to your doctor to get the pain control you need.

Radiation therapy for breast cancer

Radiation therapy is treatment with high-energy rays (such as x-rays) to kill cancer cells or shrink tumors. Radiation to the breast is often given after breast-conserving surgery to help lower the chance that the cancer will come back in the breast or nearby lymph nodes. Radiation is also used after mastectomy in some cases as well as to treat cancer that has spread to other areas, for example to the bones or brain. It can be given in 2 main ways.

External beam radiation

Most often, external beam radiation is used for treating breast cancer. It is much like getting a regular x-ray but for a longer time. Radiation therapy may be used to kill cancer cells remaining in the breast, chest wall, or underarm area after surgery or, less often, to shrink a tumor before surgery.

Treatment is usually given 5 days a week (Monday through Friday) in an outpatient center. It starts about a month after surgery and lasts about 6 weeks. Each treatment lasts a few minutes. The treatment itself is painless. Ink marks or small tattoos may be put on your skin. These will be used as a guide to focus the radiation on the right area. You might want ask your health care team if these marks will be permanent. If it is used along with chemotherapy, radiation is usually given after chemotherapy is finished.

Accelerated breast irradiation: Newer methods now being studied involve giving radiation over a much shorter period of time. This is called accelerated radiation. In one approach that works as well as standard radiation, larger doses of radiation are given each day, but the course of radiation is shortened to only 3 weeks. Other approaches can shorten radiation to 5 days or even just one large dose of radiation given in the operating room right after lumpectomy (before the skin is closed). Many forms of accelerated radiation are thought of as experimental at this time.

Possible side effects of external beam radiation: The main side effects of radiation are swelling and heaviness in the breast, sunburn-like changes in the skin over the treated

area, and feeling very tired. Weakness and fracture of the ribs can also occur. Most skin changes get better within a few months. Changes to the breast tissue most often go away in 6 to 12 months, but it can take up to 2 years.

In some women, the breast gets smaller and firmer after radiation therapy. Women who have had breast radiation may have problems breast feeding later on. Radiation to the breast can also sometimes damage some of the nerves to the arm. This is called *brachial plexopathy* and can lead to numbness, pain, and weakness in the shoulder, arm and hand. Radiation of axillary lymph nodes also can cause long-term arm swelling called *lymphedema*. You can get more information on lymphedema in the "Lymphedema" section.

Brachytherapy

Another way to give radiation is to place radioactive seeds (pellets) into the breast tissue next to the cancer. It may be given along with external beam radiation to add an extra "boost" of radiation to the tumor in patients who have had breast conserving surgery. It is also used in some patients as the only source of radiation (instead of radiation to the whole breast). So far the results have been good, but it may not be as good as external beam radiation long-term.

There are different types of brachytherapy. In one method (*interstitial brachytherapy*), several small, hollow tubes called catheters are put into the breast around the lumpectomy and are left in place for several days. Radioactive pellets are put into the catheters several times each day and then removed. This method of brachytherapy has been around longer, but it is not used as much anymore.

Another approach (*intracavitary brachytherapy*) involves putting a source of radiation into the space left from lumpectomy for a short time and then removing it. Treatments are given twice a day for 5 days. This type of brachytherapy can also be thought of as a form of accelerated partial breast irradiation. This treatment can have side effects, including redness, bruising, breast pain, infection, and a break down of an area of fat tissue inside the breast. As with whole breast radiation, weakness and fracture of the ribs can also occur.

More studies are needed to see if brachytherapy should be used instead of whole breast radiation.

Chemotherapy for breast cancer

Chemotherapy (chemo) is the use of cancer-killing drugs. These drugs can be put into a vein, given as a shot, or taken as a pill or liquid. They enter the bloodstream and reach most parts of the body, making this treatment useful for cancers that have spread to distant organs. While these drugs kill cancer cells, they also damage some normal cells, which can lead to side effects.

When is chemo used?

There are several cases where chemo may be used.

Adjuvant chemo: When treatment given to patients *after* surgery who do not seem to have any spread of cancer is called *adjuvant therapy*. When used this way after breast-conserving surgery or mastectomy, chemo reduces the risk of the breast cancer coming back.

Even in the early stages of the disease, cancer cells can break away from the first breast tumor and spread through the bloodstream. These cells don't cause symptoms, they don't show up on an x-ray, and they can't be felt during a physical exam. But if they are allowed to grow, they can form new tumors in other places in the body. Adjuvant chemo can be given to find and kill these cells.

Neoadjuvant chemo: Chemo given *before* surgery is called *neoadjuvant therapy*. The major benefit of this approach is that it can shrink large cancers so that they are small enough to be removed by lumpectomy instead of mastectomy. Another possible advantage is that doctors can see how the cancer responds to the chemo. If the tumor does not shrink, then different drugs may be used. Giving chemo before surgery works as well as giving the same treatment after surgery (as adjuvant treatment).

Chemo for advanced breast cancer: Chemo can also be used as the main treatment for women with cancer that has already spread outside the breast and underarm area at the time it is found, or if it spreads after the first treatments.

How is chemo given?

In most cases, chemo works best if more than one drug is used. Doctors give chemo in cycles, with each round of treatment followed by a rest period. The time between treatments is most often 2 or 3 weeks and varies according to the drug or combination of drugs being used. The total course of treatment usually lasts for 3 to 6 months. Treatment may be longer for advanced breast cancer.

Dose-dense chemo: Doctors have found that giving the cycles of chemo closer together for adjuvant treatment can lower the chance that the cancer will come back and improve survival in some women. This usually means giving the same chemo that is normally given every 3 weeks but giving it every 2 weeks. A drug called a growth factor is also given to help boost the white blood cell count. This approach can lead to more side effects and be harder to take, so it is only used for treatment in women with a higher chance of the cancer coming back after treatment.

Possible side effects

The side effects of chemo depend on the type of drugs used, the amount given, and the length of treatment. You could experience some of these short-term side effects:

- Hair loss

- Mouth sores
- Loss of appetite or increased appetite
- Nausea and vomiting
- A higher risk of infection (from low white blood cell counts)
- Changes in menstrual cycle (this could be permanent)
- Easy bruising or bleeding (from low blood platelet counts)
- Being very tired (called fatigue, often caused by low red blood cell counts or other reasons)

Most of these side effects go away when treatment is over. For example, your hair will grow back and your blood counts will return to normal. If you have any problems with side effects, be sure to tell your doctor or nurse because there are often ways to help.

Menstrual changes: For younger women, changes in menstrual periods are a common side effect of chemo. Permanent side effects can include early change of life (menopause) and not being able to become pregnant (infertility). But even if the chemo has caused your periods to stop, you may still be able to get pregnant. Getting pregnant while having chemo could lead to birth defects and cause problems with treatment. If you are having sex, you should discuss birth control with your cancer doctor. If you are pregnant when you get breast cancer, you still can be treated. Certain chemo drugs can be safely given during the last 2 trimesters of pregnancy.

Neuropathy: Some drugs used to treat breast cancer can damage nerves. This can sometimes lead to symptoms (mainly in the hands and feet) such as pain, burning or tingling, sensitivity to cold or heat, or weakness. In most cases this goes away once treatment is stopped, but it may last a long time in some women. You can learn more about this in our document *Peripheral Neuropathy Caused by Chemotherapy*.

Heart damage: Some of the drugs may cause heart damage if used for a long time or in high doses. Doctors are careful to control the doses of these drugs and watch for signs of problems.

Hand-foot syndrome: Certain chemo drugs can cause problems with the palms of the hands and the soles of the feet. This is called hand-foot syndrome. Early symptoms include numbness, tingling, and redness. If it gets worse, the hands and feet become swollen with discomfort or even pain. The skin may blister, leading to peeling of the skin or even open sores. There is no specific treatment, but these symptoms slowly get better when the drug is stopped or the dose is decreased. The best way to prevent severe hand-foot syndrome is to tell your doctor when early symptoms come up so that the drug dose can be changed.

Chemo brain: Many women who have had chemo notice a change in concentration and memory. This is often called “chemo brain.” It may last a long time. Still, most women function well after chemo. In studies that have found chemo brain to be a side effect of

treatment, the symptoms most often go away in a few years. For more information, see our document, *Chemo Brain*.

Increased risk of leukemia: Very rarely, years after treatment for breast cancer, certain chemo drugs may cause another cancer called acute myeloid leukemia (AML). But for most women the benefit of treating the breast cancer far outweighs the risk of this rare event.

Feeling unwell or tired: Many women do not feel as healthy after having chemo as they did before. Extreme tiredness, called fatigue, can be another long-lasting problem for women who have had chemo. This may last for many years, but it can be helped. Talk to your doctor if fatigue is a problem for you. You can also get more information in our document *Fatigue in People With Cancer*.

Hormone therapy for breast cancer

Hormone therapy is another form of systemic therapy. It is most often used to help reduce the risk of the cancer coming back after surgery, but it may also be used for breast cancer that has spread or come back after treatment.

The female hormone estrogen promotes the growth of breast cancer cells in some women (those who have hormone receptor-positive cancers). For these women, things are done to block the effect of estrogen or lower its levels in order to treat breast cancer.

Drugs used to block estrogen

Tamoxifen and toremifene (Fareston[®]): Drugs like tamoxifen can be given to block estrogen. Tamoxifen is taken in pill or liquid form, usually every day for up to 5 years after surgery, to reduce the risk the cancer will come back. This drug helps women with early breast cancer if their cancer has hormone receptors (is ER-positive or PR-positive). It is also used to treat hormone receptor-positive breast cancer that has spread and to reduce the risk of breast cancer in women who are at high risk.

This drug has side effects. The most common ones are tiredness, hot flashes, vaginal discharge, and mood swings. There is also a small increase of early stage cancer of the lining of the uterus among women taking tamoxifen. But this cancer is usually found at a very early stage and is almost always cured by surgery. If you are taking tamoxifen and have any unusual vaginal bleeding you should tell your doctor right away. Blood clots are another possible side effect of tamoxifen. Still, for almost all women with breast cancer, the benefits of tamoxifen far outweigh the risks.

Toremifene works like tamoxifen, but is not used as often and is only approved for patients with metastatic breast cancer. The side effects of these drugs are similar.

Fulvestrant: Fulvestrant (Faslodex[®]) is a drug that blocks the estrogen receptor and then damages it. It often works even if the breast cancer is no longer responding to tamoxifen. It is given as a shot once a month. Hot flashes, mild nausea, and tiredness are the major

side effects. Right now it is only used in postmenopausal women with advanced breast cancer that no longer responds to tamoxifen or toremifene.

Drugs used to change hormone levels

Aromatase inhibitors (AIs): These are drugs that stop the body from making estrogen. They only work for women who are past menopause and whose cancers are hormone-receptor positive. These drugs may be used after, or even instead of tamoxifen to reduce the chance of the breast cancer coming back. These drugs are taken daily as pills.

For women after menopause, most doctors now recommend using an AI at some point during adjuvant therapy. But it's not yet clear if starting adjuvant therapy with one of these drugs is better than giving tamoxifen and then switching to an AI. And if tamoxifen is given first, it's not clear how long it should be given. The best length of treatment with AIs is not clear. Studies now being done should help answer these questions.

These drugs don't cause uterine cancer and very rarely cause blood clots. But they can cause bone thinning and fractures because they remove estrogens from the body. The most common side effect of AIs is joint stiffness and/or pain — like the feeling of having arthritis in many different joints at one time. This side effect may improve by switching to a different AI, but it has led some women to stop drug treatment. If this occurs, most doctors recommend using tamoxifen to complete 5 years of hormone treatment.

Surgery to change hormone levels

Removing the ovaries (ovarian ablation): In pre-menopausal women, the ovaries are the main source of estrogens. Removing them or shutting them down takes away almost all the estrogen and makes the woman post-menopausal. This may allow some other hormone therapies to work better. Ovarian ablation can be done permanently by taking out the ovaries in surgery. It also can be done with drugs. Both of these methods can cause a woman to have symptoms of menopause, including hot flashes, night sweats, vaginal dryness, and mood swings.

Other types of hormone treatment

Megestrol acetate (Megace[®]) is a progesterone-like drug used as a hormone treatment for advanced breast cancer, mostly for women whose cancers do not respond to the other hormone treatments. Its major side effect is weight gain, and it is sometimes used in higher doses to reverse weight loss in patients with advanced cancer. This is an older drug that is no longer used very often.

Androgens (male hormones) may be used after other hormone treatments for advanced breast cancer have been tried. They sometimes work, but they can cause women to develop male traits, like an increase in body hair and a deeper voice.

Another option that may be tried when the cancer is no longer responding to other hormone drugs is giving high doses of estrogen. The main risk is of serious blood clots. Patients also have trouble with nausea.

Targeted therapy for breast cancer

As we have learned more about the gene changes that cause cancer, researchers have been able to develop newer drugs that are aimed right at these changes. These targeted drugs do not work the same as standard chemo drugs. They often have different and less severe side effects. At this time, they are most often used along with chemo.

Trastuzumab (Herceptin)

Trastuzumab is a monoclonal antibody — a man-made version of a very specific immune system protein. It attaches to the growth-promoting protein called HER2/neu. HER2/neu is found in small amounts on the surface of normal breast cells and in large amounts on some breast cancer cells. Breast cancers that have too much of this protein are called HER2/neu-positive (or just HER2 positive). The protein makes them grow and spread faster. Trastuzumab can stop this protein from causing breast cancer cell growth. It may also help the immune system to better attack the cancer.

Trastuzumab is given into a vein (IV), usually once a week or as a larger dose every 3 weeks. Doctors do not yet know how long it should be given, but studies are looking at this.

The side effects of this drug are fairly mild. These are rare and may include fever and chills, weakness, nausea, vomiting, cough, diarrhea, and headache. They are often mild. These side effects are less common after the first dose. But some women may develop heart damage during or after treatment. For most (but not all) women, this effect has been short-term and gets better when the drug is stopped. If you are getting trastuzumab, you should tell your doctor right away if you have any shortness of breath, swelling, or trouble with physical activities.

Lapatinib (Tykerb)

This is another drug that targets the HER2/neu protein. This drug is given as a pill, most often along with chemo. It is used for some women with cancer that is no longer helped by chemo and trastuzumab. In advanced breast cancer, giving lapatinib along with trastuzumab helped patients live longer than giving it alone. The most common side effects with this drug include diarrhea, nausea, vomiting, rash, and hand-foot syndrome (this was discussed in the section about chemo). Diarrhea is common and can be bad. It is very important to let your health care team know about any changes in your bowel habits as soon as they happen.

Bevacizumab (Avastin[®])

This is another monoclonal antibody that has been used in patients with breast cancer that has spread. It is always used along with other chemo drugs. This antibody helps to keep tumors from making new blood vessels to feed the tumor. Bevacizumab is given by intravenous (IV) infusion. There can be some rare, though serious, side effects and high blood pressure is very common. It is very important that your doctor watches your blood

pressure carefully during treatment and that you let your health care team know about any changes in how you feel.

New study results did not show a real benefit for the women receiving bevacizumab as a part of their treatment, so on November 18, 2011, the FDA removed the breast cancer "indication" for bevacizumab. This does not cause the drug to be removed from the market, as it is FDA-approved for some other cancers. It does mean that the company making the drug can't market it for breast cancer. The company can't tell doctors or patients that the drug is useful in treating breast cancer. At this time, women who are taking bevacizumab can keep on doing so, but they should discuss this treatment with their doctors.

Bisphosphonates for breast cancer

Bisphosphonates are drugs that are used when breast cancer has spread to the bones. These drugs can strengthen bones that have been weakened by invading breast cancer cells and reduce the risk of pain, fractures or breaks. Bisphosphonates may also help prevent bone thinning (osteoporosis) that can result from treatment with aromatase inhibitors (see above) or from early menopause caused by chemo or hormone therapy. When used to treat cancer that has spread to bone, these drugs are given into a vein (IV).

Bisphosphonates can have side effects, including flu-like symptoms and bone pain. A rare but serious side effect from bisphosphonates is damage in the jaw bone. It can be triggered by having a tooth pulled while being treated with the bisphosphonate. It often appears as an open sore in the jaw that won't heal. Doctors don't know why this happens. Most doctors recommend that patients have a dental check-up and have any tooth or jaw problems treated before they start taking bisphosphonates.

Denosumab for breast cancer

A newer drug called *denosumab* (Xgeva™, Prolia™) is also now available to help reduce the risk of problems from breast cancer metastasis to the bone. It works in a different way from bisphosphonates.

In studies of patients with breast cancer that had spread to the bone, it seemed to help prevent problems like fractures (breaks). It also can help bones even after bisphosphonates stop working. It can also be used to help keep bones strong in women on aromatase inhibitors.

High-dose chemo with bone marrow or peripheral blood stem cell transplant for breast cancer

At one time, it was thought that very high doses of chemo followed by a stem cell transplant might offer some women the best chance for a cure — especially those women with a high risk of the cancer coming back or with advanced cancer. But doctors have found that the women who had high-dose therapy did not live any longer than women who had standard dose chemo. And high-dose chemo with stem cell support can

cause serious side effects. For now, experts in the field suggest that women get this treatment only as part of a clinical trial.

Breast cancer that comes back

When cancer comes back after treatment, it is called a *recurrence*. The cancer can come back in the same breast or near the mastectomy scar (this is called local recurrence), or farther away (distant recurrence). Rarely, breast cancer comes back in nearby lymph nodes. This is called *regional* recurrence. Cancer that is found in the opposite breast is not a recurrence: it is a new cancer that calls for its own treatment.

Local recurrence: Treatment of women whose breast cancer has recurred locally depends on what treatment was used before. If the woman had breast-conserving therapy, a mastectomy is usually done. If the first treatment was mastectomy, recurrence near the mastectomy site is treated by removing the tumor whenever possible. This is followed by radiation therapy, but only if none had been given after the first surgery. (Radiation can't be given to the same place twice.) In either case, hormone treatment, trastuzumab (Herceptin), chemo, or some combination of these may be used after surgery and/or radiation therapy.

Regional recurrence: When breast cancer comes back as spread to nearby lymph nodes (such as those under the arm or around the collar bone), it is treated by taking out those lymph nodes. This may be followed by radiation treatments aimed. Treatments like chemo or hormone therapy may be used after the local treatment as well.

Distant recurrence: As a rule, women who have a cancer recurrence that has spread beyond the breast and lymph nodes to other parts of the body (like the bones, lungs, brain, *etc.*), are treated with systemic therapy. Surgery and/or radiation may be useful in some cases. Based on many factors, this may be hormone treatment, chemo, targeted treatments such as trastuzumab, lapatinib (Tykerb) or bevacizumab (Avastin), or some combination of these treatments.

Should your cancer come back, the American Cancer Society document, *When Your Cancer Comes Back: Cancer Recurrence* can give you information on how to manage and cope with this phase of your treatment.

Treatment of breast cancer during pregnancy

Treatment for pregnant women with breast cancer depends on how long the woman has been pregnant.

Radiation treatment during pregnancy is known to increase the risk of birth defects, so it is not recommended for pregnant women with breast cancer. Because of this, breast-conserving treatment (lumpectomy and radiation) is only an option if treatment can wait until it is safe to deliver the baby. A breast biopsy and even modified radical mastectomy and lymph node removal are safe for the mother and the baby.

For a long time it was thought that chemo was a danger to the baby. But some studies have found that using certain chemo drugs during the fourth to ninth months does not increase the risk of birth defects. The safety of chemo during the first 3 months of pregnancy has not been studied.

Hormone treatment may affect the baby and should not be started until after the patient has given birth.

Many chemo and hormone therapy drugs can enter breast milk and could be passed on to the baby, so breast-feeding is not usually recommended if the woman is having these treatments.

For more information, see our document, *Pregnancy and Breast Cancer*.

Clinical trials for breast cancer

You may have had to make a lot of decisions since you've been told you have cancer. One of the most important decisions you will make is deciding which treatment is best for you. You may have heard about clinical trials being done for your type of cancer. Or maybe someone on your health care team has mentioned a clinical trial to you.

Clinical trials are carefully controlled research studies that are done with patients who volunteer for them. They are done to get a closer look at promising new treatments or procedures.

If you would like to take part in a clinical trial, you should start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service for a list of clinical trials that meet your medical needs. You can reach this service at 1-800-303-5691 or on our Web site at <http://www.cancer.org/clinicaltrials>. You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll-free at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials Web site at www.cancer.gov/clinicaltrials.

There are requirements you must meet to take part in any clinical trial. If you do qualify for a clinical trial, it is up to you whether or not to enter (enroll in) it.

Clinical trials are one way to get state-of-the-art cancer treatment. They are the only way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

You can get a lot more information on clinical trials, in our document called *Clinical Trials: What You Need to Know*. You can read it on our Web site or call our toll-free number and have it sent to you.

Complementary and alternative therapies for breast cancer

When you have cancer you are likely to hear about ways to treat your cancer or relieve symptoms that your doctor hasn't mentioned. Everyone from friends and family to Internet groups and Web sites may offer ideas for what might help you. These methods

can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

What are complementary and alternative therapies?

It can be confusing because not everyone uses these terms the same way, and they are used to refer to many different methods. We use *complementary* to refer to treatments that are used *along with* your regular medical care. *Alternative* treatments are used *instead of* a doctor's medical treatment.

Complementary methods: Most complementary treatment methods are not offered as cures for cancer. Mainly, they are used to help you feel better. Some examples of methods that are used along with regular treatment are meditation to reduce stress, acupuncture to help relieve pain, or peppermint tea to relieve nausea. Some complementary methods are known to help, while others have not been tested. Some have been proven to not be helpful, and a few are even harmful.

Alternative treatments: Alternative treatments may be offered as cancer cures. These treatments have not been proven safe and effective in clinical trials. Some of these methods may be harmful, or have life-threatening side effects. But the biggest danger in most cases is that you may lose the chance to be helped by standard medical treatment. Delays or interruptions in your medical treatments may give the cancer more time to grow and make it less likely that treatment will help.

Finding out more

It is easy to see why people with cancer think about alternative methods. You want to do all you can to fight the cancer, and the idea of a treatment with few or no side effects sounds great. Sometimes medical treatments like chemotherapy can be hard to take, or they may no longer be working. But the truth is that most of these alternative methods have not been tested and proven to work in treating cancer.

As you think about your options, here are 3 important steps you can take:

- Look for "red flags" that suggest fraud. Does the method promise to cure all or most cancers? Are you told not to have regular medical treatments? Is the treatment a "secret" that requires you to visit certain providers or travel to another country?
- Talk to your doctor or nurse about any method you are thinking of using.
- Contact us at 1-800-227-2345 to learn more about complementary and alternative methods in general and to find out about the specific methods you are looking at.

The choice is yours

Decisions about how to treat or manage your cancer are always yours to make. If you want to use a non-standard treatment, learn all you can about the method and talk to your doctor about it. With good information and the support of your health care team, you may

be able to safely use the methods that can help you while avoiding those that could be harmful.

What are some questions I can ask my doctor about breast cancer?

As you cope with cancer and cancer treatment, we encourage you to have honest, open talks with your doctor. Feel free to ask any question that's on your mind, no matter how small it might seem. Here are some questions you might want to ask. Be sure to add your own questions as you think of them. Nurses, social workers, and other members of the treatment team may also be able to answer many of your questions.

- Would you please write down the exact type of cancer I have?
- How does this affect my treatment options and outlook?
- May I have a copy of my pathology report?
- Has the cancer spread to my lymph nodes or other organs?
- What is the stage of the cancer? What does that mean in my case?
- Are there other tests that need to be done before we can decide on treatment?
- What treatment choices do I have? What do you recommend? Why?
- Should I think about genetic testing?
- Should I look into taking part in a clinical trial?
- What are the risks or side effects of different treatments?
- What can I do to get ready for treatment?
- How well can I expect breast reconstruction surgery to work if I need or want it?
- What are the pros and cons of having it done right away or waiting until later?
- What will my breasts look and feel like after treatment?
- Will I have normal feeling in my breasts after treatment?
- Will I lose my hair? If so, what can I do about it?
- What are the chances of the cancer coming back with the treatment you suggest? What would we do if that happens?
- Should I follow a special diet or make other lifestyle changes?
- Will I go through menopause as a result of treatment?

- Will I be able to have children after treatment?
- What are my chances of survival, based on my cancer as you see it?
- What type of follow-up will I need after treatment?

Be sure to write down any questions you have that are not on this list. For instance, you might want to ask about recovery times so that you can plan your work schedule. Or you may want to ask about second opinions. Taking another person and/or a tape recorder with you to doctor visits can be helpful. Keeping copies of your medical records, pathology reports, and radiology reports may be useful in case you wish to get a second opinion later.

Add your own questions below:

Moving on after treatment for breast cancer

For many women with breast cancer, treatment may remove or destroy the cancer. Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer coming back. (When cancer comes back after treatment, it is called *recurrence*.) This is a very common concern in people who have had cancer.

It may take a while before your fears lessen. But it may help to know that many cancer survivors have learned to live with this uncertainty and are leading full lives. Our document, *Living with Uncertainty: The Fear of Cancer Recurrence* gives more detailed information on this.

For other people, the cancer may never go away completely. These people may get regular treatments with chemo, radiation, or other treatments to try to help keep the cancer in check. Learning to live with cancer that does not go away can be hard and stressful. It has its own type of uncertainty. Our document, *When Cancer Doesn't Go Away*, talks more about this.

Follow-up care

After your treatment is over, ongoing follow-up is very important. During these visits, your doctors will ask about symptoms, do physical exams, and order blood tests or imaging studies (like CT scans or MRIs). Follow-up is needed to watch for treatment side effects and to check for cancer that has come back or spread.

Almost any cancer treatment can have side effects. Some may last for a few weeks or months, but others can be permanent. Please tell your cancer care team about any

symptoms or side effects that bother you so they can help you manage them. Use this time to ask your health care team questions and discuss any concerns you might have.

At first, these visits are scheduled every 4 to 6 months. The longer you are free of cancer, the less often you will need visits. After 5 years, visits are usually once a year. If you had breast-conserving surgery, you will get a mammogram about 6 months after surgery (and radiation), and then yearly. Women who had a mastectomy should keep on having yearly mammograms on the remaining breast.

If you are taking tamoxifen or toremifene, you should have a pelvic exam every year. Be sure to tell your doctor right away if you have abnormal vaginal bleeding because the drug can increase the risk of uterine cancer if you are post-menopausal. If you are taking an aromatase inhibitor, your doctor might want to have your bone density checked.

If anything suggests that the cancer might have come back, the doctor will want to do more tests. If cancer does come back, the treatment will depend on the place of the cancer and what treatments you've had before. Treatment could involve surgery, radiation, hormone therapy, or chemo.

It is also important to keep health insurance. While you hope your cancer won't come back, it could happen. If it does, you don't want to have to worry about paying for treatment. Should your cancer come back, our document *When Your Cancer Comes Back: Cancer Recurrence* helps you manage and cope with this phase of your treatment.

Lymphedema after breast cancer

Lymphedema is a swelling of the arm and/or caused by fluid build-up. It can occur any time after treatment for breast cancer, either right after surgery or months, or even years later. There is no way to know who will and will not develop lymphedema.

With care, lymphedema can often be avoided or kept under control. Injury or infection of the arm on the affected side can cause lymphedema or make it worse. Tell your doctor right away about any swelling, tightness, or injury to the hand or arm. There are ways to help prevent problems. For instance, most doctors suggest that women avoid having blood drawn from or blood pressures taken on the arm on the side of the lymph node surgery or radiation. To learn more, see our document, *Lymphedema: What Every Woman With Breast Cancer Should Know*.

Quality of life after breast cancer

Women who have had treatment for breast cancer should know that they can have a normal quality of life after treatment is over. Many studies have proven this. But women who have had chemo may notice a slight decrease in certain areas of function.

Some studies suggest that younger women tend to have more problems with the stresses of breast cancer and its treatment. Some feel isolated. Also, chemo may cause early menopause which needs to be managed. There may be sexual problems, too. These

women might benefit from counseling and support groups directed at younger breast cancer survivors.

Emotional aspects of breast cancer

You may have been going through so much during treatment that you could not focus on anything else. Once your treatment ends, you might find yourself overwhelmed by emotions. This happens to a lot of women. This is an ideal time to seek out support. You need people you can turn to for strength and comfort. Support can come in many forms: family, friends, cancer support groups, church or spiritual groups, online support groups, or individual counselors. The cancer journey can feel very lonely, but you don't have to go it alone. If you aren't sure who can help, call us and we can put you in touch with a group or other resource.

Body image after breast cancer

A woman's choice of treatment is likely influenced by her age, the image she has of herself and her body, and her hopes and fears. For example, some women may choose breast-conserving surgery with radiation over a mastectomy for body image reasons. On the other hand, some women choose mastectomy despite the effect on their body image. They may be more concerned about the effects of radiation than how the breast will look after treatment.

Many women with breast cancer also find themselves dealing with the fact that treatment changed the way they look. Some changes may be short term, such as hair loss. But even short-term changes can have a major effect on how a woman feels about herself. A number of options are available to help women cope with hair loss, including wigs, hats, scarves, and more. For a list of some companies that sell wigs and other hair accessories, call the American Cancer Society 1-800-227-2345 and ask for our document, *Breast Protheses and Hair Loss Accessories List*. On the other hand, some women may choose to show off their baldness as a way to identify themselves as breast cancer survivors.

Whatever the changes you may face, it's important to know that there is advice and support out there to help you cope with these changes. Talking with your doctor or nurse is often a good starting point. There are also many support groups, such as our *Reach to Recovery* program. Call us at 1-800-227-2345 to learn more about programs in your area.

Breast forms and bras vs. breast reconstruction

Some women who have had a mastectomy might choose breast forms instead of reconstruction. Your doctor will tell you when you are ready to be fitted for a form. Prices vary quite a bit. Take time to shop for one that looks good and fits well.

The right bra for you may very well be the one you have always worn. You can often have your usual bra adapted for a breast form. Be sure to check your insurance to see what is covered and how to file a claim. Also, ask your doctor to write prescriptions for

your form and any special bras. When buying the forms or bras, have the bills marked "surgical."

Be aware that if you submit an insurance claim for a breast form or a bra, some companies **will not** also cover reconstruction if you decide you want this procedure in the future. Get all the facts before turning in any claims.

Be sure to call your local ACS Reach to Recovery volunteer about any questions you have. She will give you suggestions, more reading material, and advice. Remember that she's been there and may understand better than most people.

Sexuality after breast cancer

Concerns about sexuality are often very worrisome to a woman with breast cancer. Aside from body image, some treatments for breast cancer, such as chemo, can change a woman's hormone levels and may reduce her sexual interest or response. It can be especially hard if a woman in her 20s or 30s finds she has breast cancer. Choosing a partner and having children are often very important during this period.

A woman's partner can also find the diagnosis distressing. Partners are often worried about how to express their love physically and emotionally after treatment, especially after surgery.

Treatment for breast cancer can affect the pleasure from touching the breast. In a reconstructed breast, the feeling of pleasure from touching the nipple is largely lost because a rebuilt nipple has much less feeling than a natural one. The skin of the breast itself may be less sensitive, too. But some feeling may return over time.

Some women still enjoy being touched around the area of the surgery; others dislike being touched there and may no longer even enjoy having the remaining breast touched. A few women have chronic pain in their chests after radical mastectomy. Supporting these areas with pillows and avoiding positions where your weight rests on your chest or arms during sex may help.

Breast surgery or radiation to the breasts does not physically decrease a woman's sexual desire. Nor does it decrease her ability to have normal intercourse or to reach orgasm. Some good news from recent research is that most women with early stage breast cancer have adjusted well within a year. They report a quality of life much like that of women who never had cancer.

Please remember that every woman reacts in her own way. Your feelings are not right or wrong, they are simply yours. For more information, see *Sexuality for the Woman With Cancer*.

Pregnancy after breast cancer

In the past, many doctors advised breast cancer survivors not to become pregnant for at least 2 years after treatment. Although only a few studies have been done, nearly all have found that pregnancy does not increase the risk of the cancer coming back after

successful treatment. If you are thinking about getting pregnant, be sure to talk to your doctor first. Sometimes counseling can help you sort out the complex issues about motherhood and breast cancer survivorship.

Post-menopausal hormone therapy after breast cancer

In the past doctors have offered PHT (also called hormone replacement therapy or HRT) to women after breast cancer treatment to help with severe symptoms of menopause. But a recent study has shown that women taking PHT after treatment for breast cancer are much more likely to have the cancer come back or to develop a new breast cancer. For this reason, most doctors now feel that it is unwise for women who have been treated for breast cancer to use PHT. Women may want to talk with their doctors about other ways to handle symptoms of menopause.

Seeing a new doctor after breast cancer

At some point after your cancer is found and treated, you may find yourself in the office of a new doctor. It is important that you be able to give your new doctor the exact details of your diagnosis and treatment. Make sure you have this information handy and always keep copies for yourself:

- A copy of your pathology report from any biopsies or surgeries
- If you had surgery, a copy of your operative report
- If you were in the hospital, a copy of the discharge summary that the doctor prepare when you were sent home from the hospital
- If you had radiation treatment, a copy of your treatment summary
- If you had systemic therapy (hormone therapy, chemotherapy, or targeted therapies), a list of your drugs, drug doses, and when you took them

Lifestyle changes after breast cancer

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life — making choices to help you stay healthy and feel as well as you can. This can be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term. Some people even start during cancer treatment.

Make healthier choices

For many people, finding out they have cancer helps them focus on their health in ways they may not have thought much about in the past. Are there things you could do that might make you healthier? Maybe you could try to eat better or get more exercise. Maybe you could cut down on the alcohol, or give up tobacco. Even things like keeping your stress level under control may help. Now is a good time to think about making changes

that can have positive effects for the rest of your life. You will feel better and you will also be healthier.

You can start by working on those things that worry you most. Get help with those that are harder for you. For instance, if you are thinking about quitting smoking and need help, call the American Cancer Society for information and support.

Eating better

Eating right can be hard for anyone, but it can get even tougher during and after cancer treatment. Treatment may change your sense of taste. Nausea can be a problem. You may not feel like eating and lose weight when you don't want to. Or you may have gained weight that you can't seem to lose. All of these things can be very frustrating.

If treatment caused weight changes or eating or taste problems, do the best you can and keep in mind that these problems usually get better over time. You may find it helps to eat small portions every 2 to 3 hours until you feel better. You may also want to ask your cancer team about seeing a dietitian, an expert in nutrition who can give you ideas on how to deal with these treatment side effects.

One of the best things you can do after cancer treatment is put healthy eating habits into place. You may be surprised at the long-term benefits of some simple changes, like increasing the variety of healthy foods you eat. Getting to and staying at a healthy weight, eating a healthy diet, and limiting your alcohol intake may lower your risk for a number of types of cancer, as well as having many other health benefits.

Rest, fatigue, and exercise

Extreme tiredness, called *fatigue*, is very common in people treated for cancer. This is not a normal tiredness, but a "bone-weary" exhaustion that doesn't get better with rest. For some people, fatigue lasts a long time after treatment, and can make it hard for them to exercise and do other things they want to do. But exercise can help reduce fatigue. Studies have shown that patients who follow an exercise program tailored to their personal needs feel better physically and emotionally and can cope better, too.

If you were sick and not very active during treatment, it is normal for your fitness, endurance, and muscle strength to decline. Any plan for physical activity should fit your own situation. An older person who has never exercised will not be able to take on the same amount of exercise as a 20-year-old who plays tennis twice a week. If you haven't exercised in a few years, you will have to start slowly — maybe just by taking short walks.

Talk with your health care team before starting anything. Get their input about your exercise plans. Then, try to find an exercise buddy so you're not doing it alone. Having family or friends involved when starting a new exercise program can give you that extra boost of support to keep you going when the push just isn't there.

If you are very tired, you will need to balance activity with rest. It is OK to rest when you need to. Sometimes it's really hard for people to allow themselves to rest when they are used to working all day or taking care of a household, but this is not the time to push yourself too hard. Listen to your body and rest when you need to. (For more information on dealing with fatigue, please see *Fatigue in People With Cancer* and *Anemia in People With Cancer*.)

Exercise can improve your physical and emotional health.

- It improves your cardiovascular (heart and circulation) fitness.
- Along with a good diet, it will help you get to and stay at a healthy weight.
- It makes your muscles stronger.
- It reduces fatigue.
- It lowers anxiety and depression.
- It can make you feel generally happier.
- It helps you feel better about yourself.

Long term, we know that getting regular physical activity plays a role in helping to lower the risk of some cancers, as well as having other health benefits.

Can I lower my chance of the cancer coming back?

The role of exercise in reducing the risk of breast cancer coming back is less well-defined, although several recent studies suggest that breast cancer survivors who are physically active may have lower rates of recurrence and death than those who are inactive.

If treatment for breast cancer stops working

When a person has had many different treatments and the cancer has not been cured, over time the cancer tends to resist all treatment. At this time you may have to weigh the possible benefits of a new treatment against the downsides, like treatment side effects and clinic visits.

This is likely to be the hardest time in your battle with cancer — when you have tried everything within reason and it's just not working anymore. Your doctor may offer you new treatment, but you will need to talk about whether the treatment is likely to improve your health or change your outlook for survival.

No matter what you decide to do, it is important for you to feel as good as possible. Make sure you are asking for and getting treatment for pain, nausea, or any other problems you may have. This type of treatment is called "palliative" treatment. It helps relieve symptoms but is not meant to cure the cancer.

At some point you may want to think about hospice care. Most of the time, it is given at home. Your cancer may be causing symptoms or problems that need to be treated. Hospice focuses on your comfort. You should know that having hospice care doesn't mean you can't have treatment for the problems caused by your cancer or other health issues. It just means that the purpose of your care is to help you live life as fully as possible and to feel as well as you can. You can learn more about hospice in our document called *Hospice Care*.

Staying hopeful is important, too. Your hope for a cure may not be as bright, but there is still hope for good times with family and friends — times that are filled with joy and meaning. Pausing at this time in your cancer treatment gives you a chance to focus on the most important things in your life. Now is the time to do some things you've always wanted to do and to stop doing the things you no longer want to do. Though the cancer may be beyond your control, there are still choices you can make.

What's new in breast cancer research?

Research into the causes, prevention, and treatment of breast cancer is going on in many medical centers throughout the world.

Causes of breast cancer

Studies continue to find lifestyle factors and habits that alter breast cancer risk. Some studies are looking at the effect of exercise, weight gain or loss, and diet on breast cancer risk. We are also learning more about how genes influence breast cancer. This should happen more quickly now that the human genome has been mapped out.

A large, long-term study is now going on to help find the causes of breast cancer. It is known as the Sister Study and it will follow 50,000 women whose sisters (not they themselves) have had breast cancer. Over 10 years, information will be gathered on many factors that might cause breast cancer. An offshoot of the Sister Study, the Two Sister Study, is designed to look at possible causes of early onset breast cancer. If you want to find out more about these studies, you can call 1-877-4-SISTER (1-877-474-7837) or visit the Web site at www.sisterstudy.org.

Chemoprevention

Studies have suggested that drugs like tamoxifen and raloxifene may lower breast cancer risk in women with certain breast cancer risk factors. But so far, many women don't want to take these drugs because they are concerned about possible side effects.

Newer studies are looking at whether aromatase inhibitors can reduce the risk of developing breast cancer in post-menopausal women. These drugs are already being used to help prevent breast cancer recurrences, but none of them are approved for reducing breast cancer risk at this time.

Fenretinide, a drug related to vitamin A, is also being studied as a way to reduce the risk of breast cancer. In a small study, this drug reduced breast cancer risk as much as tamoxifen. Other drugs are also being studied to reduce the risk of breast cancer. For more information, see our document, *Medicines to Reduce Breast Cancer Risk*.

New lab tests

Gene studies

One of the problems with early stage breast cancer is that doctors cannot always tell which women have a higher risk of cancer coming back after treatment. That is why almost every woman gets some sort of adjuvant treatment after surgery. To try to better decide out who will best benefit from adjuvant therapy, researchers have looked at many aspects of breast cancers.

In recent years, scientists have been able to link certain patterns of genes with more aggressive cancers — those that tend to come back and spread to distant sites. Some lab tests based on these findings are already available, but doctors are still trying to figure out the best way to use them. Other tests are being developed, too.

Tumor cells in the blood

Researchers have found that in many women with breast cancer, cells may break away from the tumor and enter the blood. These tumor cells can be found with sensitive lab tests. These tests are not yet ready for general use, but in the future they may be helpful in learning whether treatment like chemo is working in patients with metastatic breast cancer.

Newer imaging tests

Some newer imaging methods are being studied to see how they can be used to look at areas of change in the breast that might be cancer. You can find out more about these methods in our document, *Mammograms and Other Breast Imaging Procedures*.

Computer-aided detection and diagnosis (CAD) was developed to help find suspicious changes on mammograms. In this method, computers help doctors find abnormal areas on a mammogram by acting as a second set of eyes. This can be done with standard film mammograms or with digital mammograms. For standard mammograms, the film is fed into a machine which converts the image into a digital signal that is then analyzed by the computer.

The method can also be applied to a digital mammogram. The computer then displays the image on a video screen, with markers pointing to places that should be checked closely.

Although some doctors find CAD helpful, the results of 2 large studies found that it did not find more cancers or find cancers earlier. But it did increase the number of women

who needed to come back for more tests and/or have breast biopsies. Whether CAD will continue to be used in the future is not clear.

Treatment

Oncoplastic surgery

Sometimes after breast surgery the breasts can be different sizes or shapes. Some doctors are trying to address this problem by combining cancer surgery and plastic surgery. This is called oncoplastic surgery. It involves reshaping the breast at the time of the breast-conserving surgery, and may mean operating on the other breast as well to make them look more alike. This approach is still fairly new, and not all doctors are comfortable with it. The main concern is whether or not oncoplastic surgery might be more likely to leave tumor tissue behind.

Breast reconstruction surgery

Advances in re-attaching blood vessels (microvascular surgery) have led to improvements in breast reconstruction.

Research has shown that women who have breast implants used for breast reconstruction do not have any greater risk for immune system diseases than women who have not had this surgery. Also, breast implants have not been shown to increase the risk of the breast cancer coming back or of a new cancer forming. To learn more about the types of reconstructive surgery now available, see the American Cancer Society document, *Breast Reconstruction After Mastectomy*.

Radiation treatment

Doctors are comparing giving larger daily doses of radiation over fewer days to the standard radiation schedule. Studies have shown that giving radiation over 3 weeks seems to work about as well as the standard 5-week course. Other studies are looking at giving even larger daily doses over an even shorter time, such as a week.

For women who need radiation after lumpectomy, a method called APBI (accelerated partial breast irradiation) may offer an easier way to get it (as opposed to the standard daily radiation treatments that take many weeks to complete). There are several types of APBI now being studied. These techniques are being studied to see if they work as well as standard radiation in helping to prevent cancer from coming back.

New chemo drugs

Because advanced breast cancers are often hard to treat, researchers are looking for newer, better drugs. A drug class has been developed that targets cancers caused by BRCA mutations. This class of drugs is called PARP inhibitors and they have shown promise in clinical trials treating breast, ovarian, and prostate cancers that had spread and

were resistant to other treatments. Further studies are being done to see if this drug can help patients without BRCA mutations.

Targeted therapies

Targeted therapies are a group of newer drugs that take advantage of gene changes in cells that cause cancer.

Drugs that target HER2: There are 2 drugs approved for use that target excess HER2 protein: trastuzumab (Herceptin) and lapatinib (Tykerb). Studies are being done to see which of these is best for treating early breast cancer. Other drugs that target the HER2 protein are being tested in clinical trials. Researchers are also looking at using a vaccine to target the HER2 protein.

Anti-angiogenesis drugs: In order for cancers to grow, blood vessels must be made to feed the cancer cells. Some studies have found that breast cancers with many new, small blood vessels are likely to spread more quickly. Bevacizumab (Avastin) is an example of anti-angiogenesis drug. Although bevacizumab does not seem to be very helpful in the treatment of breast cancer, clinical trials are currently testing several other anti-angiogenesis drugs.

New drugs are being made that may be useful in stopping breast cancer growth by keeping new blood vessels from forming. Some of these drugs are now being tested in clinical trials.

Drugs that target EGFR: The epidermal growth factor receptor (EGFR) is another protein found in high amounts on the surfaces of some cancer cells. Some drugs that target EGFR, such as cetuximab (Erbix[®]) and erlotinib (Tarceva[®]), are already used to treat other types of cancers. Other anti-EGFR drugs are still considered experimental. Studies are now under way to see if these drugs might work against breast cancers.

Other targeted drugs: Everolimus (Afinitor[®]) is a new type of targeted therapy drug that is approved to treat kidney cancer. In one study, this drug was found to help shrink tumors before surgery when given along with the drug, letrozole. More studies using this drug for breast cancer are planned.

Many other potential targets for new breast cancer drugs have been identified in recent years. Drugs based on these targets are now being studied, but most are still in the early stages of clinical trials.

Bisphosphonates

Bisphosphonates are drugs that are used to help strengthen and reduce the risk of fractures in bones that have been weakened by metastatic breast cancer. In some studies, they seemed to help lower the chance of the cancer coming back when they were given to women with early breast cancer, but this was not seen in other studies. More studies are needed to find out if bisphosphonates should become part of standard treatment for early breast cancer.

Denosumab

Denosumab (Xgeva, Prolia) can also be used to help strengthen and reduce the risk of fractures in bones that have been weakened by metastatic breast cancer. It is being studied in early breast cancer patients to see if it can help adjuvant treatments work better.

Vitamin D

A recent study found that women with early stage breast cancer who had low levels of vitamin D were more likely to have their cancer come back in a distant part of the body and had a poorer outlook. More research is needed to confirm this finding, and it is not yet clear if taking vitamin D supplements would be helpful. Still, you may want to talk to your doctor about testing your vitamin D level to see if it is in the healthy range.

More information about breast cancer

From your American Cancer Society

The following information may also be helpful to you. These materials may be ordered from our toll-free number, 1-800-227-2345.

Breast Cancer Detailed Guide (also in Spanish)

After Diagnosis: A Guide for Patients and Families (also available in Spanish)

Bone Metastasis

Breast Cancer Dictionary (also available in Spanish)

Breast Cancer: Early Detection (also available in Spanish)

Breast Cancer Prosthesis and Hair Loss Accessory List

Breast Reconstruction After Mastectomy (also available in Spanish)

Chemo Brain

Clinical Trials: What You Need to Know

DES Exposure: Questions and Answers

Exercises After Breast Surgery (also available in Spanish)

Fatigue in People With Cancer

Genetic Testing: What You Need to Know

Inflammatory Breast Cancer

Is Abortion Linked to Breast Cancer?

Living With Uncertainty: The Fear of Cancer Recurrence

Lymphedema: What Every Woman With Breast Cancer Should Know

Mammograms and Other Breast Imaging Procedures

Medicines to Reduce Breast Cancer Risk

Non-cancerous Breast Conditions (also available in Spanish)

Pregnancy and Breast Cancer

Sexuality for the Woman With Cancer (also available in Spanish)

Talking With Your Doctor (also available in Spanish)

Understanding Chemotherapy: A Guide for Patients and Families (also available in Spanish)

Understanding Radiation Therapy: A Guide for Patients and Families (also available in Spanish)

When Cancer Doesn't Go Away

When Your Cancer Comes Back: Cancer Recurrence

Books

The following books are available from the American Cancer Society. Call our toll-free number to ask about costs or to place your order.

Breast Cancer Clear and Simple

American Cancer Society Complete Guide to Family Caregiving

Couples Confronting Cancer

Lymphedema: Understanding and Managing Lymphedema After Cancer Treatment

National organizations and Web sites*

Along with the American Cancer Society, other sources of information and support include:

National Breast Cancer Coalition

Toll-free number: 1-800-622-2838

Web site: www.stopbreastcancer.org

National Cancer Institute

Toll-free number: 1-800-4-CANCER (1-800-422-6237)

Web site: www.cancer.gov

Susan G. Komen for the Cure

Toll-free number: 1-877-465-6636

Web site: www.komen.org

Y-Me National Breast Cancer Organization (formerly Breast Cancer Network of Strength)

Toll-free number: 1-800-221-2141

Toll-free number in Spanish: 1-800-986-9505

Web site: www.networkofstrength.org

Centers for Disease Control and Prevention (CDC)

Toll-free number: 1-800-232-4636

Web site: www.cdc.gov

**Inclusion on this list does not imply endorsement by the American Cancer Society.*

No matter who you are, we can help. Contact us anytime, day or night, for information and support. Call us at 1-800-227-2345 or visit www.cancer.org.

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For additional assistance please contact your American Cancer Society
1 · 800 · ACS-2345 or www.cancer.org