National Cancer Institute

What You Need To Know About™

Breast Cancer

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
National Institutes of Health

This booklet is about breast cancer. The Cancer Information Service can help you learn more about this disease. The staff can talk with you in English or Spanish.

The number is 1–800–4–CANCER (1–800–422–6237). The number for callers with TTY equipment is 1–800–332–8615. Your call is free.

Este folleto es acerca del cáncer de seno. Llame al Servicio de Información sobre el Cáncer para saber más sobre esta enfermedad. Este servicio tiene personal que habla español.

El número a llamar es el 1–800–4–CANCER (1–800–422–6237). Personas con equipo TTY pueden llamar al 1–800–332–8615. Su llamada es gratis.

Contents

U.S. DEPARTMENT OF HEALTH AND
HUMAN SERVICES
National Institutes of Health
National Cancer Institute

What You Need To Know About™ Breast Cancer

This National Cancer Institute (NCI) booklet has important information about breast *cancer*.* Breast cancer is the most common type of cancer among women in this country (other than skin cancer). Each year, more than 211,000 American women learn they have this disease.

You will read about possible causes, screening, symptoms, diagnosis, treatment, and supportive care. You will also find ideas about how to cope with the disease.

Breast Cancer in Men

Each year, about 1,700 men in this country learn they have breast cancer. Most information in this booklet applies to men with breast cancer. However, more specific information about breast cancer in men is available on NCI's Web site at **http://www.cancer.gov** and from NCI's Cancer Information Service at 1–800–4–CANCER.

Scientists are studying breast cancer to find out more about its causes. And they are looking for better ways to prevent, find, and treat it.

NCI provides information about cancer, including the publications mentioned in this booklet. You can order these materials by telephone or on the Internet.

*Words that may be new to readers appear in *italics*. The "Dictionary" section explains these terms. Some words in the "Dictionary" have a "sounds-like" spelling to show how to pronounce them.

You can also read them online and print your own copy.

- **Telephone (1–800–4–CANCER)**: Information Specialists at NCI's Cancer Information Service can answer your questions about cancer. They also can send NCI booklets, fact sheets, and other materials.
- **Internet (http://www.cancer.gov)**: You can use NCI's Web site to find a wide range of up-to-date information. For example, you can find many NCI booklets and fact sheets at **http://www.cancer.gov/publications**. People in the United States and its territories may use this Web site to order printed copies. This Web site also explains how people outside the United States can mail or fax their requests for NCI booklets.

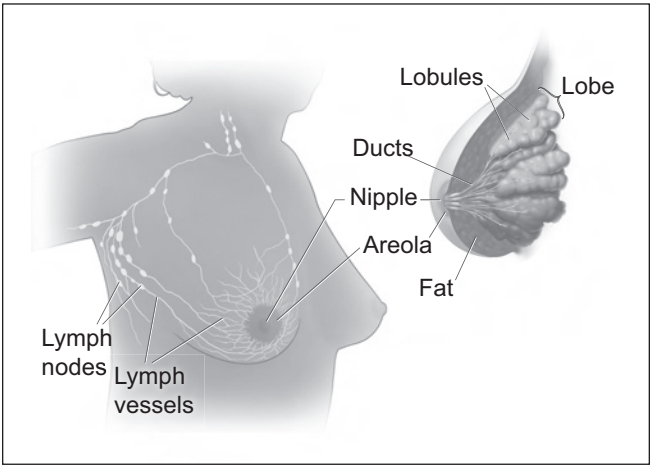
  You can ask questions online and get help right away from Information Specialists through ***LiveHelp***. (Click on "Need Help?" at **http://www.cancer.gov**. Then click on "Connect to LiveHelp.")

The Breasts

The *breasts* sit on the chest muscles that cover the ribs. Each breast is made of 15 to 20 *lobes*. Lobes contain many smaller *lobules*. Lobules contain groups of tiny *glands* that can produce milk. Milk flows from the lobules through thin tubes called *ducts* to the *nipple*. The nipple is in the center of a dark area of skin called the *areola*. Fat fills the spaces between the lobules and ducts.

The breasts also contain *lymph vessels*. These vessels lead to small, round *organs* called *lymph nodes*.

Groups of lymph nodes are near the breast in the *axilla* (underarm), above the collarbone, in the chest behind the breastbone, and in many other parts of the body. The lymph nodes trap *bacteria*, cancer *cells*, or other harmful substances.



These pictures show the parts of the breast and the lymph nodes and lymph vessels near the breast.

Understanding Cancer

Cancer begins in cells, the building blocks that make up *tissues*. Tissues make up the organs of the body.

Normally, cells grow and divide to form new cells as the body needs them. When cells grow old, they die, and new cells take their place.

Sometimes, this orderly process goes wrong. New cells form when the body does not need them, and old cells do not die when they should. These extra cells can form a mass of tissue called a growth or *tumor*.

Tumors can be *benign* or *malignant*:

- **Benign tumors** are not cancer:
  - —Benign tumors are rarely life-threatening.
  - —Generally, benign tumors can be removed. They usually do not grow back.
  - —Cells from benign tumors do not invade the tissues around them.
  - —Cells from benign tumors do not spread to other parts of the body.
- **Malignant tumors** are cancer:
  - —Malignant tumors are generally more serious than benign tumors. They may be life-threatening.
  - —Malignant tumors often can be removed. But sometimes they grow back.
  - —Cells from malignant tumors can invade and damage nearby tissues and organs.
  - —Cells from malignant tumors can spread (*metastasize*) to other parts of the body. Cancer cells spread by breaking away from the original (*primary*) tumor and entering the bloodstream or *lymphatic system*. The cells invade other organs and form new tumors that damage these organs. The spread of cancer is called *metastasis*.

When breast cancer cells spread, the cancer cells are often found in lymph nodes near the breast. Also, breast cancer can spread to almost any other part of the body. The most common are the bones, liver, lungs, and brain. The new tumor has the same kind of abnormal cells and the same name as the primary tumor. For example, if breast cancer spreads to the bones, the cancer cells in the bones are actually breast cancer cells. The disease is metastatic breast cancer, not bone cancer. For that reason, it is treated as breast cancer, not bone cancer. Doctors call the new tumor "distant" or metastatic disease.

Risk Factors

No one knows the exact causes of breast cancer. Doctors often cannot explain why one woman develops breast cancer and another does not. They do know that bumping, bruising, or touching the breast does not cause cancer. And breast cancer is not contagious. You cannot catch it from another person.

Research has shown that women with certain *risk factors* are more likely than others to develop breast cancer. A risk factor is something that may increase the chance of developing a disease.

Studies have found the following risk factors for breast cancer:

- **Age**: The chance of getting breast cancer goes up as a woman gets older. Most cases of breast cancer occur in women over 60. This disease is not common before *menopause*.
- **Personal history of breast cancer**: A woman who had breast cancer in one breast has an increased risk of getting cancer in her other breast.
- **Family history**: A woman's risk of breast cancer is higher if her mother, sister, or daughter had breast cancer. The risk is higher if her family member got breast cancer before age 40. Having other relatives with breast cancer (in either her mother's or father's family) may also increase a woman's risk.
- **Certain breast changes**: Some women have cells in the breast that look abnormal under a microscope. Having certain types of abnormal cells (*atypical hyperplasia* and *lobular carcinoma in situ* [LCIS]) increases the risk of breast cancer.

- ***Gene* changes**: Changes in certain genes increase the risk of breast cancer. These genes include *BRCA1, BRCA2*, and others. Tests can sometimes show the presence of specific gene changes in families with many women who have had breast cancer. Health care providers may suggest ways to try to reduce the risk of breast cancer, or to improve the detection of this disease in women who have these changes in their genes. NCI offers publications on gene testing.
- **Reproductive and menstrual history:**
  - —The older a woman is when she has her first child, the greater her chance of breast cancer.
  - —Women who had their first *menstrual period* before age 12 are at an increased risk of breast cancer.
  - —Women who went through menopause after age 55 are at an increased risk of breast cancer.
  - —Women who never had children are at an increased risk of breast cancer.
  - —Women who take *menopausal hormone therapy* with *estrogen* plus *progestin* after menopause also appear to have an increased risk of breast cancer.
  - —Large, well-designed studies have shown no link between abortion or miscarriage and breast cancer.
- **Race**: Breast cancer is diagnosed more often in white women than Latina, Asian, or African American women.

- ***Radiation therapy* to the chest**: Women who had radiation therapy to the chest (including breasts) before age 30 are at an increased risk of breast cancer. This includes women treated with radiation for *Hodgkin's lymphoma*. Studies show that the younger a woman was when she received radiation treatment, the higher her risk of breast cancer later in life.
- **Breast density**: Breast tissue may be dense or fatty. Older women whose *mammograms* (breast *x-rays*) show more dense tissue are at increased risk of breast cancer.
- **Taking *DES* (diethylstilbestrol)**: DES was given to some pregnant women in the United States between about 1940 and 1971. (It is no longer given to pregnant women.) Women who took DES during pregnancy may have a slightly increased risk of breast cancer. The possible effects on their daughters' risk for breast cancer are under study.
- **Being *overweight* or *obese* after menopause**: The chance of getting breast cancer after menopause is higher in women who are overweight or obese.
- **Lack of physical activity**: Women who are physically inactive throughout life may have an increased risk of breast cancer. Being active may help reduce risk by preventing weight gain and obesity.
- **Drinking alcohol**: Studies suggest that the more alcohol a woman drinks, the greater her risk of breast cancer.

Other possible risk factors are under study. Researchers are studying the effect of diet, physical activity, and genetics on breast cancer risk. They are also studying whether certain substances in the environment can increase the risk of breast cancer.

Many risk factors can be avoided. Others, such as family history, cannot be avoided. Women can help protect themselves by staying away from known risk factors whenever possible.

But it is also important to keep in mind that most women who have known risk factors do not get breast cancer. Also, most women with breast cancer do not have a family history of the disease. In fact, except for growing older, most women with breast cancer have no clear risk factors.

If you think you may be at risk, you should discuss this concern with your doctor. Your doctor may be able to suggest ways to reduce your risk and can plan a schedule for checkups.

Screening

Screening for breast cancer before there are *symptoms* can be important. Screening can help doctors find and treat cancer early. Treatment is more likely to work well when cancer is found early.

Your doctor may suggest the following screening tests for breast cancer:

- *Screening mammogram*
- *Clinical breast exam*
- *Breast self-exam*

You should ask your doctor about when to start and how often to check for breast cancer.

Screening Mammogram

To find breast cancer early, NCI recommends that:

- Women in their 40s and older should have mammograms every 1 to 2 years. A mammogram is a picture of the breast made with x-rays.
- Women who are younger than 40 and have risk factors for breast cancer should ask their health care provider whether to have mammograms and how often to have them.

Mammograms can often show a breast lump before it can be felt. They also can show a cluster of tiny specks of *calcium*. These specks are called *microcalcifications*. Lumps or specks can be from cancer, *precancerous* cells, or other conditions. Further tests are needed to find out if abnormal cells are present.

If an abnormal area shows up on your mammogram, you may need to have more x-rays. You also may need a *biopsy*. A biopsy is the only way to tell for sure if cancer is present. (The "Diagnosis" section on page 13 has more information on biopsy.)

Mammograms are the best tool doctors have to find breast cancer early. However, mammograms are not perfect:

- A mammogram may miss some cancers. (The result is called a "false negative.")
- A mammogram may show things that turn out not to be cancer. (The result is called a "false positive.")
- Some fast-growing tumors may grow large or spread to other parts of the body before a mammogram detects them.

Mammograms (as well as dental x-rays, and other routine x-rays) use very small doses of radiation. The risk of any harm is very slight, but repeated x-rays could cause problems. The benefits nearly always outweigh the risk. You should talk with your health care provider about the need for each x-ray. You should also ask for shields to protect other parts of your body.

Clinical Breast Exam

During a clinical breast exam, your health care provider checks your breasts. You may be asked to raise your arms over your head, let them hang by your sides, or press your hands against your hips.

Your health care provider looks for differences in size or shape of your breasts. The skin of your breasts is checked for a rash, dimpling, or other abnormal signs. Your nipples may be squeezed to check for fluid.

Using the pads of the fingers to feel for lumps, your health care provider checks your entire breast, underarm, and collarbone area. A lump is generally the size of a pea before anyone can feel it. The exam is done on one side, then the other. Your health care provider checks the lymph nodes near the breast to see if they are enlarged.

A thorough clinical breast exam may take about 10 minutes.

Breast Self-Exam

You may perform monthly breast self-exams to check for any changes in your breasts. It is important to remember that changes can occur because of aging, your *menstrual cycle*, pregnancy, menopause, or taking birth control pills or other *hormones*. It is normal for breasts to feel a little lumpy and uneven. Also, it is common for your breasts to be swollen and tender right before or during your menstrual period.

You should contact your health care provider if you notice any unusual changes in your breasts.

Breast self-exams cannot replace regular screening mammograms and clinical breast exams. Studies have not shown that breast self-exams alone reduce the number of deaths from breast cancer.

You may want to ask the doctor the following questions about screening:

- Which tests do you recommend for me? Why?
- Do the tests hurt? Are there any risks?
- How much do mammograms cost? Will my health insurance pay for them?
- How soon after the mammogram will I learn the results?
- If the results show a problem, how will you learn if I have cancer?

Symptoms

Common symptoms of breast cancer include:

- **A change in how the breast or nipple feels**
  - —A lump or thickening in or near the breast or in the underarm area
  - —Nipple tenderness
- **A change in how the breast or nipple looks**
  - —A change in the size or shape of the breast
  - —A nipple turned inward into the breast
  - —The skin of the breast, areola, or nipple may be scaly, red, or swollen. It may have ridges or pitting so that it looks like the skin of an orange.
- ***Nipple discharge*** (fluid)

Early breast cancer usually does not cause pain. Still, a woman should see her health care provider about breast pain or any other symptom that does not go away. Most often, these symptoms are not due to cancer. Other health problems may also cause them. Any woman with these symptoms should tell her provider so that problems can be diagnosed and treated as early as possible.

Diagnosis

If you have a symptom or screening test result that suggests cancer, your doctor must find out whether it is due to cancer or to some other cause. Your doctor may ask about your personal and family medical history. You may have a physical exam. Your doctor also may order a mammogram or other *imaging procedure*. These tests make pictures of tissues inside the breast. After the tests, your doctor may decide no other exams are needed. Your doctor may suggest that you have a follow-up exam later on. Or you may need to have a biopsy to look for cancer cells.

Clinical Breast Exam

Your health care provider feels each breast for lumps and looks for other problems. If you have a lump, your health care provider will feel its size, shape, and texture. Your health care provider will also check to see if it moves easily. Benign lumps often feel different from cancerous ones. Lumps that are soft, smooth, round, and movable are likely to be benign. A hard, oddly shaped lump that feels firmly attached within the breast is more likely to be cancer.

Diagnostic Mammogram

Diagnostic mammograms are x-ray pictures of the breast. They take clearer, more detailed images of areas that look abnormal on a screening mammogram. Doctors use them to learn more about unusual breast changes, such as a lump, pain, thickening, nipple discharge, or change in breast size or shape. Diagnostic mammograms may focus on a specific area of the breast. They may involve special techniques and more views than screening mammograms.

Ultrasound

An *ultrasound* device sends out sound waves that people cannot hear. The waves bounce off tissues. A computer uses the echoes to create a picture. Your doctor can view these pictures on a monitor. The pictures may show whether a lump is solid or filled with fluid. A *cyst* is a fluid-filled sac. Cysts are not cancer. But a solid mass may be cancer. After the test, your doctor can store the pictures on video or print them out. This exam may be used along with a mammogram.

Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) uses a powerful magnet linked to a computer. MRI makes detailed pictures of breast tissue. Your doctor can view these pictures on a monitor or print them on film. MRI may be used along with a mammogram.

Biopsy

Your doctor may refer you to a *surgeon* or breast disease specialist for a biopsy. Fluid or tissue is removed from your breast to help find out if there is cancer.

Some suspicious areas can be seen on a mammogram but cannot be felt during a clinical breast exam. Doctors can use imaging procedures to help see the area and remove tissue. Such procedures include *ultrasound-guided, needle-localized*, or *stereotactic biopsy*.

Doctors can remove tissue from the breast in different ways:

- ***Fine-needle aspiration***: Your doctor uses a thin needle to remove fluid from a breast lump. If the fluid appears to contain cells, a *pathologist* at a lab checks them for cancer with a microscope. If the fluid is clear, it may not need to be checked by a lab.
- ***Core biopsy***: Your doctor uses a thick needle to remove breast tissue. A pathologist checks for cancer cells. This procedure is also called a needle biopsy.

- **Surgical biopsy**: Your surgeon removes a sample of tissue. A pathologist checks the tissue for cancer cells.
  - —An *incisional biopsy* takes a sample of a lump or abnormal area.
  - —An *excisional biopsy* takes the entire lump or area.

If cancer cells are found, the pathologist can tell what kind of cancer it is. The most common type of breast cancer is ductal *carcinoma*. Abnormal cells are found in the lining of the ducts. Lobular carcinoma is another type. Abnormal cells are found in the lobules.

You may want to ask the doctor the following questions before having a biopsy:

- What kind of biopsy will I have? Why?
- How long will it take? Will I be awake? Will it hurt? Will I have *anesthesia*? What kind?
- Are there any risks? What are the chances of infection or bleeding after the biopsy?
- How soon will I know the results?
- If I do have cancer, who will talk with me about the next steps? When?

Additional Tests

If you are diagnosed with cancer, your doctor may order special lab tests on the breast tissue that was removed. These tests help your doctor learn more about the cancer and plan treatment:

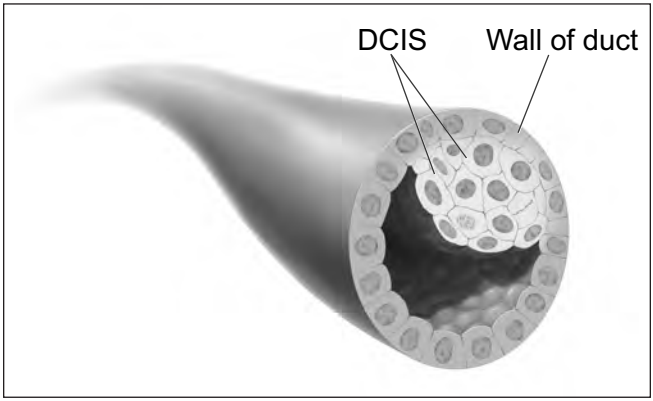
- ***Hormone receptor test***: This test shows whether the tissue has certain hormone receptors. Tissue with these receptors needs hormones (estrogen or *progesterone*) to grow.
- ***HER2* test**: This test shows whether the tissue has a protein called human epidermal growth factor receptor-2 (HER2) or the *HER2/neu gene*. Having too much protein or too many copies of the gene in the tissue may increase the chance that the breast cancer will come back after treatment.

Staging

To plan your treatment, your doctor needs to know the extent (*stage*) of the disease. The stage is based on the size of the tumor and whether the cancer has spread. *Staging* may involve x-rays and lab tests. These tests can show whether the cancer has spread and, if so, to what parts of your body. When breast cancer spreads, cancer cells are often found in lymph nodes under the arm (*axillary lymph nodes*). The stage often is not known until after *surgery* to remove the tumor in your breast and the lymph nodes under your arm.

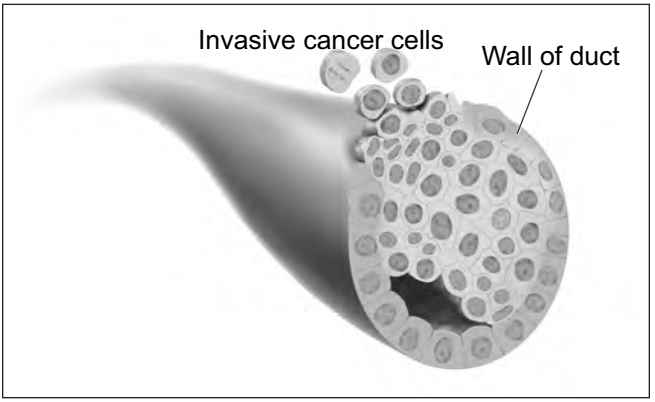
These are the stages of breast cancer:

- Stage 0 is *carcinoma in situ*.
  - —***Lobular carcinoma in situ* (LCIS)**: Abnormal cells are in the lining of a lobule. (See picture of lobule on page 3.) LCIS seldom becomes *invasive cancer*. However, having LCIS in one breast increases the risk of cancer for both breasts.
  - —***Ductal carcinoma in situ* (DCIS)**: Abnormal cells are in the lining of a duct. DCIS is also called *intraductal carcinoma*. The abnormal cells have not spread outside the duct. They have not invaded the nearby breast tissue. DCIS sometimes becomes invasive cancer if not treated.



This picture shows ductal carcinoma in situ.

- Stage I is an early stage of invasive breast cancer. The tumor is no more than 2 centimeters (three-quarters of an inch) across. Cancer cells have not spread beyond the breast.



This picture shows cancer cells spreading outside the duct. The cancer cells are invading nearby breast tissue.

- Stage II is one of the following:
  - —The tumor in the breast is no more than 2 centimeters (three-quarters of an inch) across. The cancer has spread to the lymph nodes under the arm.
  - —The tumor is between 2 and 5 centimeters (three-quarters of an inch to 2 inches). The cancer may have spread to the lymph nodes under the arm.
  - —The tumor is larger than 5 centimeters (2 inches). The cancer has not spread to the lymph nodes under the arm.

- Stage III may be a large tumor, but the cancer has not spread beyond the breast and nearby lymph nodes. It is *locally advanced cancer*.
  - —Stage IIIA is one of the following:
    - The tumor in the breast is smaller than 5 centimeters (2 inches). The cancer has spread to underarm lymph nodes that are attached to each other or to other structures.
    - The tumor is more than 5 centimeters across. The cancer has spread to the underarm lymph nodes.
  - —Stage IIIB is one of the following:
    - The tumor has grown into the chest wall or the skin of the breast.
    - The cancer has spread to lymph nodes behind the breastbone.
    - *Inflammatory breast cancer* is a rare type of Stage IIIB breast cancer. The breast looks red and swollen because cancer cells block the lymph vessels in the skin of the breast.
  - —Stage IIIC is a tumor of any size. It has spread in one of the following ways:
    - The cancer has spread to the lymph nodes behind the breastbone and under the arm.
    - The cancer has spread to the lymph nodes under or above the collarbone.
- Stage IV is distant metastatic cancer. The cancer has spread to other parts of the body.
- *Recurrent cancer* is cancer that has come back (recurred) after a period of time when it could not be detected. It may recur locally in the breast or chest wall. Or it may recur in any other part of the body, such as the bone, liver, or lungs.

Treatment

Many women with breast cancer want to take an active part in making decisions about their medical care. It is natural to want to learn all you can about your disease and treatment choices. Knowing more about breast cancer helps many women cope.

Shock and stress after the diagnosis can make it hard to think of everything you want to ask your doctor. It often helps to make a list of questions before an appointment. To help remember what the doctor says, you may take notes or ask whether you may use a tape recorder. You may also want to have a family member or friend with you when you talk to the doctor—to take part in the discussion, to take notes, or just to listen.

You do not need to ask all your questions at once. You will have other chances to ask your doctor or nurse to explain things that are not clear and to ask for more details.

Your doctor may refer you to a specialist, or you may ask for a referral. Specialists who treat breast cancer include *surgeons, medical oncologists*, and *radiation oncologists*. You also may be referred to a *plastic surgeon*.

Getting a Second Opinion

Before starting treatment, you might want a second opinion about your diagnosis and treatment plan. Many insurance companies cover a second opinion if you or your doctor requests it. It may take some time and effort to gather medical records and arrange to see another doctor. You may have to gather your mammogram films, biopsy slides, pathology report, and proposed treatment plan. Usually it is not a problem to take several weeks to get a second opinion. In most cases, the delay in starting treatment will not make treatment less effective. To make sure, you should discuss this delay with your doctor. Some women with breast cancer need treatment right away.

There are a number of ways to find a doctor for a second opinion:

- Your doctor may refer you to one or more specialists. At cancer centers, several specialists often work together as a team.
- NCI's Cancer Information Service, at 1–800–4–CANCER, can tell you about nearby treatment centers. Information Specialists also can provide online assistance through ***LiveHelp*** at **http://www.cancer.gov**.
- A local or state medical society, a nearby hospital, or a medical school can usually provide the names of specialists.
- The American Board of Medical Specialties (ABMS) has a list of doctors who have had training and passed exams in their specialty. You can find this list in the *Official ABMS Directory of Board Certified Medical Specialists*. This Directory is in most public libraries. Also, ABMS offers this information at **http://www.abms.org**. (Click on "Who's Certified.")
- NCI provides a helpful fact sheet called "How To Find a Doctor or Treatment Facility If You Have Cancer."

Treatment Methods

Women with breast cancer have many treatment options. These include *surgery*, *radiation therapy*, *chemotherapy, hormone therapy*, and *biological therapy*. These options are described on pages 26 through 38. Many women receive more than one type of treatment.

The choice of treatment depends mainly on the stage of the disease. Treatment options by stage are described on pages 39 through 42.

Your doctor can describe your treatment choices and the expected results. You may want to know how treatment may change your normal activities. You may

want to know how you will look during and after treatment. You and your doctor can work together to develop a treatment plan that reflects your medical needs and personal values.

Cancer treatment is either *local therapy* or *systemic therapy*:

- **Local therapy**: Surgery and radiation therapy are local treatments. They remove or destroy cancer in the breast. When breast cancer has spread to other parts of the body, local therapy may be used to control the disease in those specific areas.
- **Systemic therapy**: Chemotherapy, hormone therapy, and biological therapy are systemic treatments. They enter the bloodstream and destroy or control cancer throughout the body. Some women with breast cancer have systemic therapy to shrink the tumor before surgery or radiation. Others have systemic therapy after surgery and/or radiation to prevent the cancer from coming back. Systemic treatments also are used for cancer that has spread.

Because cancer treatments often damage healthy cells and tissues, *side effects* are common. Side effects depend mainly on the type and extent of the treatment. Side effects may not be the same for each woman, and they may change from one treatment session to the next.

Before treatment starts, your health care team will explain possible side effects and suggest ways to help you manage them. NCI provides helpful booklets about cancer treatments and coping with side effects. These include *Radiation Therapy and You, Chemotherapy and You, Biological Therapy*, and *Eating Hints for Cancer Patients*.

At any stage of disease, *supportive care* is available to control pain and other symptoms, to relieve the side effects of treatment, and to ease emotional concerns. Information about such care is available on NCI's Web

site at **http://www.cancer.gov/cancertopics/coping** and from Information Specialists at 1–800–4–CANCER or ***LiveHelp***.

You may want to talk to your doctor about taking part in a *clinical trial*, a research study of new treatment methods. The section on "The Promise of Cancer Research" on page 50 has more information about clinical trials.

You may want to ask your doctor these questions before your treatment begins:

- What did the hormone receptor test show? What did other lab tests show?
- Do any lymph nodes show signs of cancer?
- What is the stage of the disease? Has the cancer spread?
- What is the goal of treatment? What are my treatment choices? Which do you recommend for me? Why?
- What are the expected benefits of each kind of treatment?
- What are the risks and possible side effects of each treatment? How can side effects be managed?
- What can I do to prepare for treatment?
- Will I need to stay in the hospital? If so, for how long?
- What is the treatment likely to cost? Will my insurance cover the cost?
- How will treatment affect my normal activities?
- Would a clinical trial be appropriate for me?

Surgery

Surgery is the most common treatment for breast cancer. There are several types of surgery. (See pictures on pages 27 and 28.) Your doctor can explain each type, discuss and compare the benefits and risks, and describe how each will change the way you look.

- ***Breast-sparing surgery***: An operation to remove the cancer but not the breast is breast-sparing surgery. It is also called *breast-conserving surgery, lumpectomy, segmental mastectomy*, and *partial mastectomy*. Sometimes an excisional biopsy serves as a lumpectomy because the surgeon removes the whole lump.

  The surgeon often removes the underarm lymph nodes as well. A separate incision is made. This procedure is called an *axillary lymph node dissection*. It shows whether cancer cells have entered the lymphatic system.

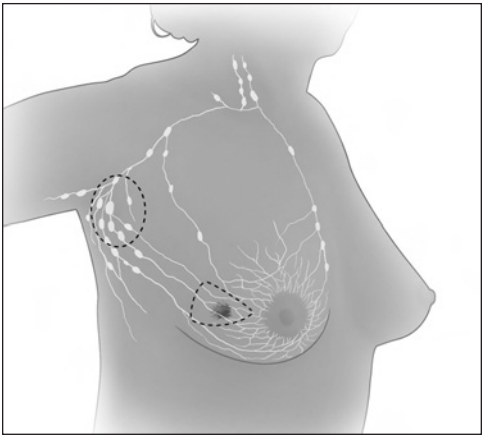
  After breast-sparing surgery, most women receive radiation therapy to the breast. This treatment destroys cancer cells that may remain in the breast.

- ***Mastectomy***: An operation to remove the breast (or as much of the breast tissue as possible) is a mastectomy. In most cases, the surgeon also removes lymph nodes under the arm. Some women have radiation therapy after surgery.

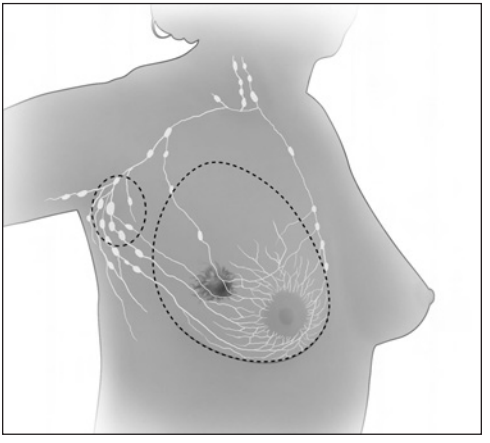
Studies have found equal survival rates for breast-sparing surgery (with radiation therapy) and mastectomy for Stage I and Stage II breast cancer.

Sentinel lymph node biopsy is a new method of checking for cancer cells in the lymph nodes. A surgeon removes fewer lymph nodes, which causes fewer side effects. (If the doctor finds cancer cells in the axillary lymph nodes, an axillary lymph node dissection usually is done.) Information about ongoing studies of sentinel lymph node biopsy is on page 53 in

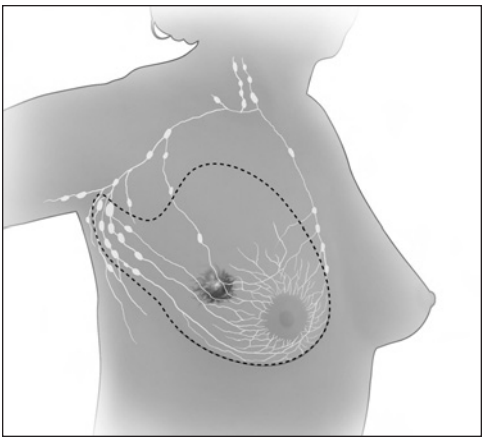
the section on "The Promise of Cancer Research." These studies will learn the lasting effects of removing fewer lymph nodes.



In breast-sparing surgery, the surgeon removes the tumor in the breast and some tissue around it. The surgeon may also remove lymph nodes under the arm. The surgeon sometimes removes some of the lining over the chest muscles below the tumor.



In *total* (simple) *mastectomy*, the surgeon removes the whole breast. Some lymph nodes under the arm may also be removed.



In *modified radical mastectomy*, the surgeon removes the whole breast, and most or all of the lymph nodes under the arm. Often, the lining over the chest muscles is removed. A small chest muscle also may be taken out to make it easier to remove the lymph nodes.

You may choose to have *breast reconstruction*. This is *plastic surgery* to rebuild the shape of the breast. It may be done at the same time as a mastectomy or later. If you are considering reconstruction, you may wish to talk with a plastic surgeon before having a mastectomy. More information is on page 43 in the "Breast Reconstruction" section.

The time it takes to heal after surgery is different for each woman. Surgery causes pain and tenderness. Medicine can help control the pain. Before surgery, you should discuss the plan for pain relief with your doctor or nurse. After surgery, your doctor can adjust the plan if you need more relief. Any kind of surgery also carries a risk of infection, bleeding, or other problems. You should tell your health care provider right away if you develop any problems.

You may feel off balance if you've had one or both breasts removed. You may feel more off balance if you have large breasts. This imbalance can cause

discomfort in your neck and back. Also, the skin where your breast was removed may feel tight. Your arm and shoulder muscles may feel stiff and weak. These problems usually go away. The doctor, nurse, or *physical therapist* can suggest exercises to help you regain movement and strength in your arm and shoulder. Exercise can also reduce stiffness and pain. You may be able to begin gentle exercises within days of surgery.

Because nerves may be injured or cut during surgery, you may have numbness and tingling in your chest, underarm, shoulder, and upper arm. These feelings usually go away within a few weeks or months. But for some women, numbness does not go away.

Removing the lymph nodes under the arm slows the flow of *lymph* fluid. The fluid may build up in your arm and hand and cause swelling. This swelling is *lymphedema*. Lymphedema can develop right after surgery or months to years later.

You will need to protect your arm and hand on the treated side for the rest of your life:

- Avoid wearing tight clothing or jewelry on your affected arm
- Carry your purse or luggage with the other arm
- Use an electric razor to avoid cuts when shaving under your arm
- Have shots, blood tests, and blood pressure measurements on the other arm
- Wear gloves to protect your hands when gardening and when using strong detergents
- Have careful manicures and avoid cutting your cuticles
- Avoid burns or sunburns to your affected arm and hand

You should ask your doctor how to handle any cuts, insect bites, sunburn, or other injuries to your arm or hand. Also, you should contact the doctor if your arm or hand is injured, swells, or becomes red and warm.

If lymphedema occurs, the doctor may suggest raising your arm above your heart whenever you can. The doctor may show you hand and arm exercises. Some women with lymphedema wear an elastic sleeve to improve lymph circulation. Medication, manual lymph drainage (massage), or use of a machine that gently compresses the arm may also help. You may be referred to a physical therapist or another specialist.

More information about lymphedema is available on NCI's Web site at **http://www.cancer.gov** and from Information Specialists at 1–800–4–CANCER or ***LiveHelp***.

You may want to ask your doctor these questions before having surgery:

- What kinds of surgery can I consider? Is breast-sparing surgery an option for me? Which operation do you recommend for me? Why?
- Will my lymph nodes be removed? How many? Why?
- How will I feel after the operation? Will I have to stay in the hospital?
- Will I need to learn how to take care of myself or my incision when I get home?
- Where will the scars be? What will they look like?
- If I decide to have plastic surgery to rebuild my breast, how and when can that be done? Can you suggest a plastic surgeon for me to contact?
- Will I have to do special exercises to help regain motion and strength in my arm and shoulder? Will a physical therapist or nurse show me how to do the exercises?
- Is there someone I can talk with who has had the same surgery I'll be having?

Radiation Therapy

Radiation therapy (also called radiotherapy) uses high-energy rays to kill cancer cells. Most women receive radiation therapy after breast-sparing surgery. Some women receive radiation therapy after a mastectomy. Treatment depends on the size of the tumor and other factors. The radiation destroys breast cancer cells that may remain in the area.

Some women have radiation therapy before surgery to destroy cancer cells and shrink the tumor. Doctors use this approach when the tumor is large or may be hard to remove. Some women have chemotherapy or hormone therapy before surgery.

Doctors use two types of radiation therapy to treat breast cancer. Some women receive both types:

- ***External radiation***: The radiation comes from a large machine outside the body. Most women go to a hospital or clinic for treatment. Treatments are usually 5 days a week for several weeks.
- ***Internal radiation (implant radiation)***: Thin plastic tubes (implants) that hold a *radioactive* substance are put directly in the breast. The implants stay in place for several days. A woman stays in the hospital while she has implants. Doctors remove the implants before she goes home.

Side effects depend mainly on the dose and type of radiation and the part of your body that is treated.

It is common for the skin in the treated area to become red, dry, tender, and itchy. Your breast may feel heavy and tight. These problems will go away over time. Toward the end of treatment, your skin may become moist and "weepy." Exposing this area to air as much as possible can help the skin heal.

Bras and some other types of clothing may rub your skin and cause soreness. You may want to wear loose-fitting cotton clothes during this time. Gentle skin care also is important. You should check with your doctor before using any deodorants, lotions, or creams on the treated area. These effects of radiation therapy on the skin will go away. The area gradually heals once treatment is over. However, there may be a lasting change in the color of your skin.

You are likely to become very tired during radiation therapy, especially in the later weeks of treatment. Resting is important, but doctors usually advise patients to try to stay as active as they can.

Although the side effects of radiation therapy can be distressing, your doctor can usually relieve them.

You may want to ask your doctor these questions before having radiation therapy:

- How will radiation be given?
- When will treatment start? When will it end? How often will I have treatments?
- How will I feel during treatment? Will I be able to drive myself to and from treatment?
- How will we know the treatment is working?
- What can I do to take care of myself before, during, and after treatment?
- Will treatment affect my skin?
- How will my chest look afterward?
- Are there any long-term effects?
- What is the chance that the cancer will come back in my breast?
- How often will I need checkups?

Chemotherapy

Chemotherapy uses anticancer drugs to kill cancer cells. Chemotherapy for breast cancer is usually a combination of drugs. The drugs may be given as a pill or by *injection* into a vein (*IV*). Either way, the drugs enter the bloodstream and travel throughout the body.

Women with breast cancer can have chemotherapy in an outpatient part of the hospital, at the doctor's office, or at home. Some women need to stay in the hospital during treatment.

Side effects depend mainly on the specific drugs and the dose. The drugs affect cancer cells and other cells that divide rapidly:

- **Blood cells**: These cells fight infection, help your blood to clot, and carry oxygen to all parts of the body. When drugs affect your blood cells, you are more likely to get infections, bruise or bleed easily, and feel very weak and tired. Years after chemotherapy, some women have developed leukemia (cancer of the blood cells).
- **Cells in hair roots**: Chemotherapy can cause hair loss. Your hair will grow back, but it may be somewhat different in color and texture.
- **Cells that line the *digestive tract***: Chemotherapy can cause poor appetite, nausea and vomiting, diarrhea, or mouth and lip sores.

Your doctor can suggest ways to control many of these side effects.

Some drugs used for breast cancer can cause tingling or numbness in the hands or feet. This problem usually goes away after treatment is over. Other problems may not go away. In some women, the drugs used for breast cancer may weaken the heart.

Some anticancer drugs can damage the *ovaries*. The ovaries may stop making hormones. You may have symptoms of menopause such as hot flashes and vaginal dryness. Your menstrual periods may no longer be regular or may stop. Some women become *infertile* (unable to become pregnant). For women over the age of 35, *infertility* is likely to be permanent.

On the other hand, you may remain *fertile* during chemotherapy and be able to become pregnant. The effects of chemotherapy on an unborn child are not known. You should talk to your doctor about birth control before treatment begins.

Hormone Therapy

Some breast tumors need hormones to grow. Hormone therapy keeps cancer cells from getting or using the natural hormones they need. These hormones are estrogen and progesterone. Lab tests can show if a breast tumor has hormone receptors. If you have this kind of tumor, you may have hormone therapy.

This treatment uses drugs or surgery:

- **Drugs**: Your doctor may suggest a drug that can block the natural hormone. One drug is *tamoxifen*, which blocks estrogen. A drug called an *aromatase inhibitor* prevents the body from making the female hormone *estradiol*. Estradiol is a form of estrogen. If you have not gone through menopause, your doctor may give you a drug that stops the ovaries from making estrogen.

- **Surgery**: If you have not gone through menopause, you may have surgery to remove your ovaries. The ovaries are the main source of the body's estrogen. A woman who has gone through menopause does not need surgery. (The ovaries produce less estrogen after menopause.)

The side effects of hormone therapy depend largely on the specific drug or type of treatment. Tamoxifen is the most common hormone treatment. In general, the side effects of tamoxifen are similar to some of the symptoms of menopause. The most common are hot flashes and vaginal discharge. Other side effects are irregular menstrual periods, headaches, fatigue, nausea, vomiting, vaginal dryness or itching, irritation of the skin around the vagina, and skin rash. Not all women who take tamoxifen have side effects.

It is possible to become pregnant when taking tamoxifen. Tamoxifen may harm the unborn baby. If you are still menstruating, you should discuss birth control methods with your doctor.

Serious side effects of tamoxifen are rare. However, it can cause blood clots in the veins. Blood clots form most often in the legs and in the lungs. Women have a slight increase in their risk of stroke.

Tamoxifen can cause cancer of the uterus. Your doctor should perform regular pelvic exams. You should tell your doctor about any unusual vaginal bleeding between exams.

When the ovaries are removed, menopause occurs at once. The side effects are often more severe than those caused by natural menopause. Your health care provider can suggest ways to cope with these side effects.

Biological Therapy

Biological therapy helps the *immune system* fight cancer. The immune system is the body's natural defense against disease.

Some women with breast cancer that has spread receive a biological therapy called Herceptin® (*trastuzumab*). It is a *monoclonal antibody*. It is made in the laboratory and binds to cancer cells.

Herceptin is given to women whose lab tests show that a breast tumor has too much of a specific protein known as HER2. By blocking HER2, it can slow or stop the growth of the cancer cells.

Herceptin is given by vein. It may be given alone or with chemotherapy.

The first time a woman receives Herceptin, the most common side effects are fever and chills. Some women also have pain, weakness, nausea, vomiting, diarrhea, headaches, difficulty breathing, or rashes. Side effects usually become milder after the first treatment.

Herceptin also may cause heart damage. This may lead to heart failure. Herceptin can also affect the lungs. It can cause breathing problems that require a doctor at once. Before you receive Herceptin, your doctor will check your heart and lungs. During treatment, your doctor will watch for signs of lung problems.

You may want to ask your doctor these questions before having chemotherapy, hormone therapy, or biological therapy:

- What drugs will I be taking? What will they do?
- If I need hormone treatment, would you recommend drugs or surgery to remove my ovaries?
- When will treatment start? When will it end? How often will I have treatments?
- Where will I go for treatment? Will I be able to drive home afterward?
- What can I do to take care of myself during treatment?
- How will we know the treatment is working?
- Which side effects should I tell you about?
- Will there be long-term effects?

Treatment Choices by Stage

Your treatment options depend on the stage of your disease and these factors:

- The size of the tumor in relation to the size of your breast
- The results of lab tests (such as whether the breast cancer cells need hormones to grow)
- Whether you have gone through menopause
- Your general health

On the following pages are brief descriptions of common treatments for each stage. Other treatments may be appropriate for some women. Clinical trials

can be an option at all stages of breast cancer. “The Promise of Cancer Research” section on page 50 has information about clinical trials.

Stage 0

Stage 0 breast cancer refers to lobular carcinoma in situ (LCIS) or ductal carcinoma in situ (DCIS):

- **LCIS**: Most women with LCIS do not have treatment. Instead, the doctor may suggest regular checkups to watch for signs of breast cancer.

  Some women take tamoxifen to reduce the risk of developing breast cancer. Others may take part in studies of promising new preventive treatments.

  Having LCIS in one breast increases the risk of cancer for both breasts. A very small number of women with LCIS try to prevent cancer with surgery to remove both breasts. This is a *bilateral prophylactic mastectomy*. The surgeon usually does not remove the underarm lymph nodes.
- **DCIS**: Most women with DCIS have breast-sparing surgery followed by radiation therapy. Some women choose to have a total mastectomy. Underarm lymph nodes are not usually removed. Women with DCIS may take tamoxifen to reduce the risk of developing invasive breast cancer.

Stages I, II, IIIA, and Operable IIIC

Women with Stages I, II, IIIA, and operable (can treat with surgery) IIIC breast cancer may have a combination of treatments. Some may have breast-sparing surgery followed by radiation therapy to the breast. This choice is common for women with Stage I or II breast cancer. Others decide to have a mastectomy.

With either approach, women (especially those with Stage II or IIIA breast cancer) often have lymph nodes under the arm removed. The doctor may suggest radiation therapy after mastectomy if cancer cells are found in 1 to 3 lymph nodes under the arm, or if the tumor in the breast is large. If cancer cells are found in more than 3 lymph nodes under the arm, the doctor usually will suggest radiation therapy after mastectomy.

The choice between breast-sparing surgery (followed by radiation therapy) and mastectomy depends on many factors:

- The size, location, and stage of the tumor
- The size of the woman's breast
- Certain features of the cancer
- How the woman feels about saving her breast
- How the woman feels about radiation therapy
- The woman's ability to travel to a radiation treatment center

Some women have chemotherapy before surgery. This is *neoadjuvant therapy* (treatment before the main treatment). Chemotherapy before surgery may shrink a large tumor so that breast-sparing surgery is possible. Women with large Stage II or IIIA breast tumors often choose this treatment.

After surgery, many women receive *adjuvant therapy*. Adjuvant therapy is treatment given after the main treatment to increase the chances of a cure. Radiation treatment can kill cancer cells in and near the breast. Women also may have systemic treatment such as chemotherapy, hormone therapy, or both. This treatment can destroy cancer cells that remain anywhere in the body. It can prevent the cancer from coming back in the breast or elsewhere.

Stages IIIB and Inoperable IIIC

Women with Stage IIIB (including inflammatory breast cancer) or inoperable Stage IIIC breast cancer usually have chemotherapy. (Inoperable cancer means it cannot be treated with surgery.)

If the chemotherapy shrinks the tumor, the doctor then may suggest further treatment:

- **Mastectomy**: The surgeon removes the breast. In most cases, the lymph nodes under the arm are removed. After surgery, a woman may receive radiation therapy to the chest and underarm area.
- **Breast-sparing surgery**: The surgeon removes the cancer but not the breast. In most cases, the lymph nodes under the arm are removed. After surgery, a woman may receive radiation therapy to the breast and underarm area.
- **Radiation therapy instead of surgery**: Some women have radiation therapy but no surgery. The doctor also may recommend more chemotherapy, hormone therapy, or both. This therapy may help prevent the disease from coming back in the breast or elsewhere.

Stage IV

In most cases, women with Stage IV breast cancer have hormone therapy, chemotherapy, or both. Some also may have biological therapy. Radiation may be used to control tumors in certain parts of the body. These treatments are not likely to cure the disease, but they may help a woman live longer.

Many women have supportive care along with anticancer treatments. Anticancer treatments are given to slow the progress of the disease. Supportive care helps manage pain, other symptoms, or side effects (such as nausea). It does not aim to extend a woman's

life. Supportive care can help a woman feel better physically and emotionally. Some women with advanced cancer decide to have only supportive care.

Recurrent Breast Cancer

Recurrent cancer is cancer that has come back after it seemed to be gone. Treatment for the recurrent disease depends mainly on the location and extent of the cancer. Another main factor is the type of treatment the woman had before.

If breast cancer comes back only in the breast after breast-sparing surgery, the woman may have a mastectomy. Chances are good that the disease will not come back again.

If breast cancer recurs in other parts of the body, treatment may involve chemotherapy, hormone therapy, or biological therapy. Radiation therapy may help control cancer that recurs in the chest muscles or in certain other areas of the body.

Treatment can seldom cure cancer that recurs outside the breast. Supportive care is often an important part of the treatment plan. Many patients have supportive care to ease their symptoms and anticancer treatments to slow the progress of the disease. Some receive only supportive care to improve their *quality of life*.

Breast Reconstruction

Some women who plan to have a mastectomy decide to have breast reconstruction. Other women prefer to wear a breast form (*prosthesis*). Others decide to do nothing. All of these options have pros and cons. What is right for one woman may not be right for another. What is important is that nearly every woman treated for breast cancer has choices.

Breast reconstruction may be done at the same time as the mastectomy, or later on. If you are thinking about breast reconstruction, you should talk to a plastic surgeon before the mastectomy, even if you plan to have your reconstruction later on.

There are many ways to reconstruct the breast. Some women choose to have implants. Implants may be made of saline or silicone. The safety of silicone breast implants has been under review by the Food and Drug Administration (FDA) for several years. If you are thinking about having silicone implants, you may want to talk with your doctor about the FDA findings. Your doctor can tell you if silicone implants are an option. You also can read information from the FDA on breast implants at **http://www.fda.gov/cdrh/breastimplants**.

You also may have breast reconstruction with tissue that the plastic surgeon moves from another part of your body. Skin, muscle, and fat can come from your lower abdomen, back, or buttocks. The surgeon uses this tissue to create a breast shape.

Which type of reconstruction is best depends on your age, body type, and the type of surgery you had. The plastic surgeon can explain the risks and benefits of each type of reconstruction.

You may want to ask your doctor these questions about breast reconstruction:

- What is the latest information about the safety of silicone breast implants?
- Which type of surgery would give me the best results? How will I look afterward?
- When can my reconstruction begin?
- How many surgeries will I need?
- What are the risks at the time of surgery? Later?
- Will I have scars? Where? What will they look like?
- If tissue from another part of my body is used, will there be any permanent changes where the tissue was removed?
- What activities should I avoid? When can I return to my normal activities?
- Will I need follow-up care?
- How much will reconstruction cost? Will my health insurance pay for it?

Complementary and Alternative Medicine

Some women with breast cancer use *complementary and alternative medicine* (CAM):

- An approach is generally called complementary medicine when it is used along with standard treatment.
- An approach is called alternative medicine when it is used instead of standard treatment.

Acupuncture, massage therapy, herbal products, vitamins or special diets, visualization, meditation, and spiritual healing are types of CAM.

Many women say that CAM helps them feel better. However, some types of CAM may change the way standard treatment works. These changes could be harmful. And some types of CAM could be harmful even if used alone.

Some types of CAM are expensive. Health insurance may not cover the cost.

NCI offers a fact sheet called "Complementary and Alternative Medicine in Cancer Treatment: Questions and Answers."

You also may request materials from the Federal Government's National Center for Complementary and Alternative Medicine. You can reach their clearinghouse toll-free at 1–888–644–6226 (voice) and 1–866–464–3615 (TTY). In addition, you can visit the Center's Web site at **http://www.nccam.nih.gov**, or send an email to info@nccam.nih.gov.

You may want to ask the doctor these questions before you decide to use CAM:

- What benefits can I expect from this therapy?
- What are its risks?
- Do the expected benefits outweigh the risks?
- What side effects should I watch for?
- Will the therapy change the way my cancer treatment works? Could this be harmful?
- Is this therapy under study in a clinical trial? If so, who sponsors the trial?
- Will my health insurance pay for this therapy?

Nutrition and Physical Activity

It is important for women with breast cancer to take care of themselves. Taking care of yourself includes eating well and staying as active as you can.

You need the right amount of calories to maintain a good weight. You also need enough protein to keep up your strength. Eating well may help you feel better and have more energy.

Sometimes, especially during or soon after treatment, you may not feel like eating. You may be uncomfortable or tired. You may find that foods do not taste as good as they used to. In addition, the side effects of treatment (such as poor appetite, nausea, vomiting, or mouth sores) can make it hard to eat well. Your doctor, dietitian, or other health care provider can suggest ways to deal with these problems. Also, the NCI booklet *Eating Hints for Cancer Patients* has many useful ideas and recipes.

Many women find they feel better when they stay active. Walking, yoga, swimming, and other activities can keep you strong and increase your energy. Exercise may reduce nausea and pain and make treatment easier to handle. It also can help relieve stress.

Whatever physical activity you choose, be sure to talk to your doctor before you start. If your activity causes you pain or other problems, be sure to let your doctor or nurse know. You may want to try a different exercise instead.

Follow-up Care

Follow-up care after treatment for breast cancer is important. Recovery is different for each woman. Your recovery depends on your treatment, whether the disease has spread, and other factors.

Even when the cancer seems to have been completely removed or destroyed, the disease sometimes returns because undetected cancer cells remained somewhere in the body after treatment. Your doctor will monitor your recovery and check for recurrence of the cancer.

You should report any changes in the treated area or in your other breast to the doctor right away. Tell your doctor about any health problems, such as pain, loss of appetite or weight, changes in menstrual cycles, unusual vaginal bleeding, or blurred vision. Also talk to your doctor about headaches, dizziness, shortness of breath, coughing or hoarseness, backaches, or digestive problems that seem unusual or that don't go away. Such problems may arise months or years after treatment. They may suggest that the cancer has returned, but they can also be symptoms of other health problems. It is important to share your concerns with your doctor so problems can be diagnosed and treated as soon as possible.

Follow-up exams usually include the breasts, chest, neck, and underarm areas. Since you are at risk of getting cancer again, you should have mammograms of your preserved breast and your other breast. You probably will not need a mammogram of a reconstructed breast or if you had a mastectomy without reconstruction. Your doctor may order other imaging procedures or lab tests.

Facing Forward Series: Life After Cancer Treatment is an NCI booklet for people who have completed their treatment. It answers questions about follow-up care and other concerns. It has tips for making the best use of medical visits. It also suggests ways to talk with the doctor about creating a plan of action for recovery and future health.

Sources of Support

Learning you have breast cancer can change your life and the lives of those close to you. These changes can be hard to handle. It is normal for you, your family, and your friends to have many different and sometimes confusing feelings.

You may worry about caring for your family, keeping your job, or continuing daily activities. Concerns about treatments and managing side effects, hospital stays, and medical bills are also common. Doctors, nurses, and other members of the health care team can answer questions about treatment, working, or other activities. Meeting with a social worker, counselor, or member of the clergy can be helpful if you want to talk about your feelings or concerns. Often, a social worker can suggest resources for financial aid, transportation, home care, or emotional support.

Friends and relatives can be very supportive. Also, you may find it helps to discuss your concerns with others who have cancer. Women with breast cancer often get together in support groups to share what they have learned about coping with their disease and the effects of their treatment. It is important to keep in mind, however, that each woman is different. Ways that one woman deals with cancer may not be right for

another. You may want to ask your health care provider about advice you receive from other women with breast cancer.

Several organizations offer special programs for women with breast cancer. Women who have had the disease serve as trained volunteers. They may talk with or visit women with breast cancer, provide information, and lend emotional support. They often share their experiences with breast cancer treatment, breast reconstruction, and recovery.

You may be afraid that changes to your body will affect not only how you look but also how other people feel about you. You may worry that breast cancer and its treatment will affect your sexual relationships. Many couples find it helps to talk about their concerns. Some find that counseling or a couples' support group can be helpful.

Information Specialists at 1–800–4–CANCER and at ***LiveHelp*** (**http://www.cancer.gov**) can help you locate programs, services, and publications. Also, you may want to read the NCI fact sheets "National Organizations That Offer Services to People With Cancer and Their Families."

The Promise of Cancer Research

Doctors all over the country are conducting many types of clinical trials (research studies in which people volunteer to take part). They are studying new ways to prevent, detect, diagnose, and treat breast cancer. Some are also studying therapies that may improve the quality of life for women during or after cancer treatment.

Clinical trials are designed to answer important questions and to find out whether new approaches are safe and effective. Research already has led to advances and researchers continue to search for more effective methods for dealing with cancer.

Women who join clinical trials may be among the first to benefit if a new approach is effective. And even if people in a trial do not benefit directly, they still make an important contribution by helping doctors learn more about breast cancer and how to control it. Although clinical trials may pose some risks, researchers do all they can to protect their patients.

If you are interested in being part of a clinical trial, talk with your doctor. Trials are available for all stages of breast cancer. You may want to read the NCI booklet *Taking Part in Clinical Trials: What Cancer Patients Need To Know* or *Taking Part in Clinical Trials: Cancer Prevention Studies*. NCI also offers an

easy-to-read brochure called *If You Have Cancer… What You Should Know About Clinical Trials*. These NCI publications describe how clinical trials are carried out and explain their possible benefits and risks.

NCI's Web site includes a section on clinical trials at **http://www.cancer.gov/clinical_trials**. It has general information about clinical trials as well as detailed information about specific ongoing studies of breast cancer. Information Specialists at 1–800–4–CANCER or at ***LiveHelp*** at **http://www.cancer.gov** can answer questions and provide information about clinical trials.

Research on Prevention

Scientists are looking for drugs that may prevent breast cancer. For example, they are testing several different drugs that lower hormone levels or prevent a hormone's effect on breast cells.

In one large study, the drug tamoxifen reduced the number of new cases of breast cancer among women who were at an increased risk of the disease. Doctors are studying whether the drug raloxifene is as effective as tamoxifen. This study is called STAR (Study of Tamoxifen and Raloxifene). Results will be available in late 2006.

Research on Detection, Diagnosis, and Staging

At this time, mammograms are the most effective tool we have to detect changes in the breast that may be cancer. In women at high risk of breast cancer, researchers are studying the combination of mammograms and ultrasound. Researchers are also exploring *positron emission tomography* (PET) and other ways to make detailed pictures of breast tissue.

In addition, researchers are studying *tumor markers*. Tumor markers may be found in blood, in urine, or in fluid from the breast (nipple *aspirate*). High amounts of these substances may be a sign of cancer. Some markers may be used to check breast cancer patients for signs of disease after treatment. At this time, however, no tumor marker test is reliable enough to be used routinely to detect breast cancer.

Ductal lavage also is under study. This technique collects cells from breast ducts. A liquid flows through a catheter (very thin, flexible tube) into the opening of a milk duct on the nipple. The liquid and breast cells are withdrawn through the tube. A pathologist checks the cells for cancer or changes that may suggest an increased risk of cancer.

Research on Treatment

Researchers are studying many types of treatment and their combinations:

- **Surgery**: Different types of surgery are being combined with other treatments.
- **Radiation therapy**: Doctors are studying whether radiation therapy can be used instead of surgery to treat cancer in lymph nodes. They are looking at the effectiveness of radiation therapy to a larger area around the breast. In women with early breast cancer, doctors are studying whether radiation therapy to a smaller part of the breast may be helpful.
- **Chemotherapy**: Researchers are testing new anticancer drugs and doses. They are working with drugs and combinations of drugs. They are looking at new drug combinations before surgery. They are also looking at new ways of combining chemotherapy with hormone therapy or radiation therapy.

- **Hormone therapy**: Researchers are testing several types of hormone therapy, including aromatase inhibitors.
- **Biological therapy**: New biological treatments also are under study. For example, researchers are studying cancer *vaccines* that help the immune system kill cancer cells.

In addition, researchers are looking at ways to lessen the side effects from treatment, such as lymphedema from surgery. They are looking at ways to reduce pain and improve quality of life. One method under study is sentinel lymph node biopsy. Today, surgeons have to remove many lymph nodes under the arm and check each of them for cancer. Researchers are studying whether checking only the node to which cancer is most likely to spread (sentinel lymph node) will allow them to predict whether cancer has spread to other nodes. If this new procedure works as well as standard treatment, surgeons may be able to remove fewer lymph nodes. This could reduce lymphedema for many patients.

Dictionary

Acupuncture (AK-yoo-PUNK-cher): The technique of inserting thin needles through the skin at specific points on the body to control pain and other symptoms. It is a type of complementary and alternative medicine.

Adjuvant therapy (AD-joo-vant): Treatment given after the primary treatment to increase the chances of a cure. Adjuvant therapy may include chemotherapy, radiation therapy, hormone therapy, or biological therapy.

Anesthesia (an-es-THEE-zha): Drugs or substances that cause loss of feeling or awareness. Local anesthetics cause loss of feeling in a part of the body. General anesthetics put the person to sleep.

Areola (a-REE-o-la): The area of dark-colored skin on the breast that surrounds the nipple.

Aromatase inhibitor (a-ROW-ma-tays in-HIB-it-er): A drug that prevents the formation of estradiol, a female hormone, by interfering with an aromatase enzyme. Aromatase inhibitors are used as a type of hormone therapy for postmenopausal women who have hormone-dependent breast cancer.

Aspirate (AS-pi-rit): Fluid withdrawn from a lump (often a cyst) or a nipple.

Atypical hyperplasia (AY-TIP-i-kul hy-per-PLAY-zha): A benign (noncancerous) condition in which cells look abnormal under a microscope and are increased in number.

Axilla (ak-SIL-a): The underarm or armpit.

Axillary lymph node (AK-suh-LAIR-ee): A lymph node in the armpit region that drains lymph channels from the breast.

Axillary lymph node dissection (AK-suh-LAIR-ee… dis-EK-shun): Surgery to remove lymph nodes found in the armpit region. Also called axillary dissection.

Bacteria (bak-TEER-ee-uh): A large group of single-cell microorganisms. Some cause infections and disease in animals and humans. The singular of bacteria is bacterium.

Benign (beh-NINE): Not cancerous. Benign tumors do not spread to tissues around them or to other parts of the body.

Bilateral prophylactic mastectomy (by-LAT-uh-ral pro-fi-LAK-tik mas-TEK-tuh-mee): Surgery to remove both breasts in order to reduce the risk of developing breast cancer. Also called preventive mastectomy.

Biological therapy (by-oh-LAH-jih-kul THER-ah-pee): Treatment to stimulate or restore the ability of the immune system to fight infections and other diseases. Also used to lessen certain side effects that may be caused by some cancer treatments. Also called immunotherapy, biotherapy, or biological response modifier (BRM) therapy.

Biopsy (BY-op-see): The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue. When only a sample of tissue is removed, the procedure is called an incisional biopsy. When an entire lump or suspicious area is removed, the procedure is called an excisional biopsy. When a sample of tissue or fluid is removed with a needle, the procedure is called a needle biopsy, core biopsy, or fine-needle aspiration.

BRCA1: A gene on chromosome 17 that normally helps to suppress cell growth. A person who inherits an altered version of the BRCA1 gene has a higher risk of getting breast, ovarian, or prostate cancer.

BRCA2: A gene on chromosome 13 that normally helps to suppress cell growth. A person who inherits an altered version of the BRCA2 gene has a higher risk of getting breast, ovarian, or prostate cancer.

Breast: Glandular organ located on the chest. The breast is made up of connective tissue, fat, and breast tissue that contains the glands that can make milk. Also called mammary gland.

Breast reconstruction: Surgery to rebuild the shape of the breast after a mastectomy.

Breast self-exam: An exam by a woman of her breasts to check for lumps or other changes.

Breast-conserving surgery or ***breast-sparing surgery***: An operation to remove the breast cancer but not the breast itself. Types of breast-conserving and breast-sparing surgery include lumpectomy (removal of the lump), quadrantectomy (removal of one quarter, or quadrant, of the breast), and segmental mastectomy (removal of the cancer as well as some of the breast tissue around the tumor and the lining over the chest muscles below the tumor).

Calcium (KAL-see-um): A mineral found in teeth, bones, and other body tissues.

Cancer: A term for diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissues and can spread through the bloodstream and lymphatic system to other parts of the body. There are several main types of cancer. Carcinoma is cancer that begins in the skin or in tissues that line or cover internal organs. Sarcoma is cancer that begins in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue. Leukemia is cancer that starts in blood-forming tissue such as the bone marrow, and causes large numbers of abnormal blood

cells to be produced and enter the bloodstream. Lymphoma and multiple myeloma are cancers that begin in the cells of the immune system.

Carcinoma (KAR-si-NO-ma): Cancer that begins in the skin or in tissues that line or cover internal organs.

Carcinoma in situ (KAR-si-NO-ma in SYE-too): Cancer that involves only cells in the tissue in which it began and that has not spread to nearby tissues.

Cell: The individual unit that makes up the tissues of the body. All living things are made up of one or more cells.

Chemotherapy (kee-moh-THER-ah-pee): Treatment with drugs that kill cancer cells.

Clinical breast exam: An exam of the breast performed by a health care provider to check for lumps or other changes.

Clinical trial: A type of research study that uses volunteers to test new methods of screening, prevention, diagnosis, or treatment of a disease. Also called a clinical study.

Complementary and alternative medicine: CAM. Forms of treatment that are used in addition to (complementary) or instead of (alternative) standard treatments. These practices generally are not considered standard medical approaches. CAM may include dietary supplements, megadose vitamins, herbal preparations, special teas, acupuncture, massage therapy, magnet therapy, spiritual healing, and meditation.

Core biopsy: The removal of a tissue sample with a needle for examination under a microscope.

Cyst (sist): A sac or capsule in the body. It may be filled with fluid or other material.

DES: Diethylstilbestrol (dye-ETH-ul-stil-BES-trol). A synthetic form of the hormone estrogen that was prescribed to pregnant women between about 1940 and 1971 because it was thought to prevent miscarriages. DES may increase the risk of uterine, ovarian, or breast cancer in women who took it. DES also has been linked to an increased risk of clear cell carcinoma of the vagina or cervix in daughters exposed to DES before birth.

Diagnostic mammogram: X-ray of the breasts used to check for breast cancer after a lump or other sign or symptom of breast cancer has been found.

Digestive tract (dy-JES-tiv): The organs through which food and liquids pass when they are swallowed, digested, and eliminated. These organs are the mouth, esophagus, stomach, small and large intestines, and rectum and anus.

Duct (dukt): In medicine, a tube or vessel of the body through which fluids pass.

Ductal carcinoma in situ (DUK-tal KAR-si-NO-ma in SYE-too): DCIS. A noninvasive, precancerous condition in which abnormal cells are found in the lining of a breast duct. The abnormal cells have not spread outside the duct to other tissues in the breast. In some cases, ductal carcinoma in situ may become invasive cancer and spread to other tissues, although it is not known at this time how to predict which lesions will become invasive. Also called intraductal carcinoma.

Ductal lavage (DUK-tal luh-VAHZ): A method used to collect cells from milk ducts in the breast. A hair-size catheter (tube) is inserted into the nipple, and a small amount of salt water is released into the duct. The water picks up breast cells, and is removed. The cells

are checked under a microscope. Ductal lavage may be used in addition to clinical breast examination and mammography to detect breast cancer.

Estradiol (es-trah-DIE-awl): A form of the hormone estrogen.

Estrogen (ES-tro-jin): A hormone that promotes the development and maintenance of female sex characteristics.

Excisional biopsy (ek-SI-zhun-al BY-op-see): A surgical procedure in which an entire lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope.

External radiation (ray-dee-AY-shun): Radiation therapy that uses a machine to aim high-energy rays at the cancer. Also called external-beam radiation.

Fertile (FER-tul): Able to produce children.

Fine-needle aspiration (as-per-AY-shun): The removal of tissue or fluid with a needle for examination under a microscope. Also called needle biopsy.

Gene: The functional and physical unit of heredity passed from parent to offspring. Genes are pieces of DNA, and most genes contain the information for making a specific protein.

Gland: An organ that makes one or more substances, such as hormones, digestive juices, sweat, tears, saliva, or milk. Endocrine glands release the substances directly into the bloodstream. Exocrine glands release the substances into a duct or opening to the inside or outside of the body.

HER2: Human epidermal growth factor receptor 2. The HER2/neu protein is involved in the growth of some cancer cells. Also called c-erbB-2.

HER2/neu gene: The gene that makes the human epidermal growth factor receptor 2. The protein produced is HER2/neu, which is involved in the growth of some cancer cells. Also called c-erbB-2.

Hodgkin's lymphoma: A malignant disease of the lymphatic system that is characterized by painless enlargement of lymph nodes, the spleen, or other lymphatic tissue. Other symptoms may include fever, weight loss, fatigue, or night sweats. Also called Hodgkin's disease.

Hormone: A chemical made by glands in the body. Hormones circulate in the bloodstream and control the actions of certain cells or organs. Some hormones can also be made in a laboratory.

Hormone receptor test: A test to measure the amount of certain proteins, called hormone receptors, in cancer tissue. Hormones can attach to these proteins. A high level of hormone receptors may mean that hormones help the cancer grow.

Hormone therapy: Treatment that adds, blocks, or removes hormones. For certain conditions (such as diabetes or menopause), hormones are given to adjust low hormone levels. To slow or stop the growth of certain cancers (such as prostate and breast cancer), synthetic hormones or other drugs may be given to block the body's natural hormones. Sometimes surgery is needed to remove the gland that makes hormones. Also called hormonal therapy, hormone treatment, or endocrine therapy.

Imaging procedure: A method of producing pictures of areas inside the body.

Immune system (im-YOON): The complex group of organs and cells that defends the body against infections and other diseases.

Implant radiation (ray-dee-AY-shun): A procedure in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near a tumor. Also called brachytherapy, internal radiation, or interstitial radiation.

Incisional biopsy (in-SIH-zhun-al BY-op-see): A surgical procedure in which a portion of a lump or suspicious area is removed for diagnosis. The tissue is then examined under a microscope.

Infertile: Unable to produce children.

Infertility: The inability to produce children.

Inflammatory breast cancer: A type of breast cancer in which the breast looks red and swollen and feels warm. The skin of the breast may also show the pitted appearance called peau d'orange (like the skin of an orange). The redness and warmth occur because the cancer cells block the lymph vessels in the skin.

Injection: Use of a syringe and needle to push fluids or drugs into the body; often called a "shot."

Internal radiation (ray-dee-AY-shun): A procedure in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near a tumor. Also called brachytherapy, implant radiation, or interstitial radiation therapy.

Intraductal carcinoma (in-tra-DUK-tal KAR-si-NO-ma): A noninvasive, precancerous condition in which abnormal cells are found in the lining of a breast duct. The abnormal cells have not spread outside the duct to other tissues in the breast. In some cases, intraductal carcinoma may become invasive cancer and spread to other tissues, although it is not known at this time how to predict which lesions will become invasive. Also called ductal carcinoma in situ.

Invasive cancer: Cancer that has spread beyond the layer of tissue in which it developed and is growing into surrounding, healthy tissues. Also called infiltrating cancer.

IV: Intravenous (in-tra-VEE-nus). Injected into a blood vessel.

Lobe: A portion of an organ, such as the liver, lung, breast, thyroid, or brain.

Lobular carcinoma in situ (LOB-yoo-lar KAR-si-NO-ma in SYE-too): LCIS. A condition in which abnormal cells are found in the lobules of the breast. LCIS seldom becomes invasive cancer; however, having lobular carcinoma in situ in one breast increases the risk of developing breast cancer in either breast.

Lobule (LOB-yule): A small lobe or a subdivision of a lobe.

Local therapy: Treatment that affects cells in the tumor and the area close to it.

Locally advanced cancer: Cancer that has spread only to nearby tissues or lymph nodes.

Lumpectomy (lump-EK-toe-mee): Surgery to remove the tumor and a small amount of normal tissue around it.

Lymph (limf): The clear fluid that travels through the lymphatic system and carries cells that help fight infections and other diseases. Also called lymphatic fluid.

Lymph node (limf node): A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph (lymphatic fluid), and they store lymphocytes (white blood cells). They are located along lymphatic vessels. Also called a lymph gland.

Lymph vessel (limf): A thin tube that carries lymph (lymphatic fluid) and white blood cells through the lymphatic system. Also called lymphatic vessel.

Lymphatic system (lim-FAT-ik SIS-tem): The tissues and organs that produce, store, and carry white blood cells that fight infections and other diseases. This system includes the bone marrow, spleen, thymus, lymph nodes, and lymphatic vessels (a network of thin tubes that carry lymph and white blood cells). Lymphatic vessels branch, like blood vessels, into all the tissues of the body.

Lymphedema (LIMF-eh-DEE-ma): A condition in which excess fluid collects in tissue and causes swelling. It may occur in the arm or leg after lymph vessels or lymph nodes in the underarm or groin are removed or treated with radiation.

Magnetic resonance imaging (mag-NET-ik REZ-o-nans IM-a-jing): MRI. A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the body. These pictures can show the difference between normal and diseased tissue. MRI makes better images of organs and soft tissue than other scanning techniques, such as CT or x-ray. MRI is especially useful for imaging the brain, spine, the soft tissue of joints, and the inside of bones. Also called nuclear magnetic resonance imaging.

Malignant (ma-LIG-nant): Cancerous. Malignant tumors can invade and destroy nearby tissue and spread to other parts of the body.

Mammogram (MAM-o-gram): An x-ray of the breast.

Mastectomy (mas-TEK-toe-mee): Surgery to remove the breast (or as much of the breast tissue as possible).

Medical oncologist (MEH-dih-kul on-KOL-oh-jist): A doctor who specializes in diagnosing and treating cancer using chemotherapy, hormonal therapy, and biological therapy. A medical oncologist often is the main health care provider for someone who has cancer. A medical oncologist also gives supportive care and may coordinate treatment given by other specialists.

Menopausal hormone therapy: Hormones (estrogen, progesterone, or both) given to women after menopause to replace the hormones no longer produced by the ovaries. Also called hormone replacement therapy or HRT.

Menopause (MEN-o-pawz): The time of life when a woman's menstrual periods stop. A woman is in menopause when she has not had a period for 12 months in a row. Also called "change of life."

Menstrual cycle (MEN-stroo-al): The monthly cycle of hormonal changes from the beginning of one menstrual period to the beginning of the next.

Menstrual period (MEN-stroo-al PEER-ee-od): The periodic discharge of blood and tissue from the uterus. From puberty until menopause, menstruation occurs about every 28 days, but does not occur during pregnancy.

Metastasis (meh-TAS-ta-sis): The spread of cancer from one part of the body to another. A tumor formed by cells that have spread is called a "metastatic tumor" or a "metastasis." The metastatic tumor contains cells that are like those in the original (primary) tumor. The plural form of metastasis is metastases (meh-TAS-ta-seez).

Metastasize (meh-TAS-ta-size): To spread from one part of the body to another. When cancer cells metastasize and form secondary tumors, the cells in the metastatic tumor are like those in the original (primary) tumor.

Microcalcification (MY-krow-kal-si-fi-KAY-shun): A tiny deposit of calcium in the breast that cannot be felt but can be detected on a mammogram. A cluster of these very small specks of calcium may indicate that cancer is present.

Modified radical mastectomy (mas-TEK-toe-mee): Surgery for breast cancer in which the breast, most or all of the lymph nodes under the arm, and the lining over the chest muscles are removed. Sometimes the surgeon also removes part of the chest wall muscles.

Monoclonal antibody (MAH-no-KLO-nul AN-tih-BAH-dee): A laboratory-produced substance that can locate and bind to cancer cells wherever they are in the body. Many monoclonal antibodies are used in cancer detection or therapy; each one recognizes a different protein on certain cancer cells. Monoclonal antibodies can be used alone, or they can be used to deliver drugs, toxins, or radioactive material directly to a tumor.

Needle-localized biopsy: A procedure that uses very thin needles or guide wires to mark the location of an abnormal area of tissue so it can be surgically removed. An imaging device is used to place the wire in or around the abnormal area. Needle localization is used when the doctor cannot feel the mass of abnormal tissue.

Neoadjuvant therapy (NEE-o-AD-joo-vant): Treatment given before the primary treatment. Examples of neoadjuvant therapy include chemotherapy, radiation therapy, and hormone therapy.

Nipple: In anatomy, the small raised area in the center of the breast through which milk can flow to the outside.

Nipple discharge: Fluid coming from the nipple.

Obese: Having an abnormally high, unhealthy amount of body fat.

Organ: A part of the body that performs a specific function. For example, the heart is an organ.

Ovary (O-va-ree): One of a pair of female reproductive glands in which the ova, or eggs, are formed. The ovaries are located in the pelvis, one on each side of the uterus.

Overweight: Being too heavy for one's height. Excess body weight can come from fat, muscle, bone, and/or water retention. Being overweight does not always mean being obese.

Partial mastectomy (mas-TEK-toe-mee): The removal of cancer as well as some of the breast tissue around the tumor and the lining over the chest muscles below the tumor. Usually some of the lymph nodes under the arm are also taken out. Also called segmental mastectomy.

Pathologist (pa-THOL-o-jist): A doctor who identifies diseases by studying cells and tissues under a microscope.

Physical therapist: A health professional who teaches exercises and physical activities that help condition muscles and restore strength and movement.

Plastic surgeon: A surgeon who specializes in reducing scarring or disfigurement that may occur as a result of accidents, birth defects, or treatment for diseases.

Plastic surgery: An operation that restores or improves the appearance of body structures.

Positron emission tomography scan: PET scan. A procedure in which a small amount of radioactive glucose (sugar) is injected into a vein and a scanner is used to make detailed, computerized pictures of areas inside the body where the glucose is used. Because cancer cells often use more glucose than normal cells, the pictures can be used to find cancer cells in the body.

Precancerous (pre-KAN-ser-us): A term used to describe a condition that may (or is likely to) become cancer. Also called premalignant.

Primary tumor: The original tumor.

Progesterone (pro-JES-ter-own): A female hormone.

Progestin (pro-JES-tin): Any natural or laboratory-made substance that has some or all of the biologic effects of progesterone, a female hormone.

Prosthesis (pros-THEE-sis): A device, such as an artificial leg, that replaces a part of the body.

Quality of life: The overall enjoyment of life. Many clinical trials assess the effects of cancer and its treatment on the quality of life. These studies measure aspects of an individual's sense of well-being and ability to carry out various activities.

Radiation oncologist (ray-dee-AY-shun on-KOL-o-jist): A doctor who specializes in using radiation to treat cancer.

Radiation therapy (ray-dee-AY-shun THER-ah-pee): The use of high-energy radiation from x-rays, gamma rays, neutrons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body near cancer cells (internal radiation therapy, implant radiation, or brachytherapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that circulates throughout the body. Also called radiotherapy.

Radioactive (RAY-dee-o-AK-tiv): Giving off radiation.

Recurrent cancer: Cancer that has returned after a period of time during which the cancer could not be detected. The cancer may come back to the same place as the original (primary) tumor or to another place in the body. Also called recurrence.

Risk factor: Something that may increase the chance of developing a disease. Some examples of risk factors for cancer include age, a family history of certain cancers, use of tobacco products, certain eating habits, obesity, exposure to radiation or other cancer-causing agents, and certain genetic changes.

Screening: Checking for disease when there are no symptoms.

Screening mammogram: X-rays of the breasts taken to check for breast cancer in the absence of signs or symptoms.

Segmental mastectomy (mas-TEK-toe-mee): The removal of cancer as well as some of the breast tissue around the tumor and the lining over the chest muscles below the tumor. Usually some of the lymph nodes under the arm are also taken out. Also called partial mastectomy.

Sentinel lymph node biopsy: Removal and examination of the sentinel node(s) (the first lymph node[s] to which cancer cells are likely to spread from a primary tumor). To identify the sentinel lymph node(s), the surgeon injects a radioactive substance, blue dye, or both near the tumor. The surgeon then uses a scanner to find the sentinel lymph node(s) containing the radioactive substance or looks for the lymph node(s) stained with dye. The surgeon then removes the sentinel node(s) to check for the presence of cancer cells.

Side effect: A problem that occurs when treatment affects healthy tissues or organs. Some common side effects of cancer treatment are fatigue, pain, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

Stage: The extent of a cancer within the body. If the cancer has spread, the stage describes how far it has spread from the original site to other parts of the body.

Staging (STAY-jing): Performing exams and tests to learn the extent of the cancer within the body, especially whether the disease has spread from the original site to other parts of the body. It is important to know the stage of the disease in order to plan the best treatment.

Stereotactic biopsy (STAYR-ee-oh-TAK-tik BY-op-see): A biopsy procedure that uses a computer and a 3-dimensional scanning device to find a tumor site and guide the removal of tissue for examination under a microscope.

Supportive care: Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of supportive care is to prevent or treat as early as possible the symptoms of the disease, side effects caused by treatment of the disease, and psychological, social, and spiritual problems related to the disease or its treatment. Also called palliative care, comfort care, and symptom management.

Surgeon: A doctor who removes or repairs a part of the body by operating on the patient.

Surgery (SER-juh-ree): A procedure to remove or repair a part of the body or to find out whether disease is present. An operation.

Symptom: An indication that a person has a condition or disease. Some examples of symptoms are headache, fever, fatigue, nausea, vomiting, and pain.

Systemic therapy (sis-TEM-ik THER-ah-pee): Treatment using substances that travel through the bloodstream, reaching and affecting cells all over the body.

Tamoxifen (ta-MOK-si-FEN): A drug used to treat breast cancer, and to try to prevent it in women who are at a high risk of developing breast cancer. Tamoxifen blocks the effects of the hormone estrogen in the breast. It belongs to the family of drugs called antiestrogens.

Tissue (TISH-oo): A group or layer of cells that works together to perform a specific function.

Total mastectomy (mas-TEK-toe-mee): Removal of the breast. Also called simple mastectomy.

Trastuzumab (tras-TOO-zuh-mab): A type of monoclonal antibody used to detect or treat some types of cancer. Monoclonal antibodies are laboratory-produced substances that can locate and bind to cancer cells. Trastuzumab blocks the effects of the growth factor protein HER2, which transmits growth signals to breast cancer cells. Also called Herceptin.

Tumor (TOO-mer): An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumors may be benign (not cancerous), or malignant (cancerous). Also called neoplasm.

Tumor marker: A substance sometimes found in the blood, other body fluids, or tissues. A high level of tumor marker may mean that a certain type of cancer is in the body. Examples of tumor markers include CA 125 (ovarian cancer), CA 15-3 (breast cancer), CEA (ovarian, lung, breast, pancreas, and gastrointestinal tract cancers), and PSA (prostate cancer). Also called biomarker.

Ultrasound: A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echo patterns are shown on the screen of an ultrasound machine, forming a picture of body tissues called a sonogram. Also called ultrasonography.

Ultrasound-guided biopsy (BY-op-see): A biopsy procedure that uses an ultrasound imaging device to find an abnormal area of tissue and guide its removal for examination under a microscope.

Vaccine: A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses. A vaccine can help the body recognize and destroy cancer cells or microorganisms.

X-ray: A type of high-energy radiation. In low doses, x-rays are used to diagnose diseases by making pictures of the inside of the body. In high doses, x-rays are used to treat cancer.

National Cancer Institute Information Resources

You may want more information for yourself, your family, and your health care provider. The following National Cancer Institute (NCI) services are available to help you.

Telephone

The NCI's Cancer Information Service (CIS) provides accurate, up-to-date information on cancer to patients and their families, health professionals, and the general public. Information Specialists translate the latest scientific information into understandable language and respond in English, Spanish, or on TTY equipment. Calls to the CIS are free.

Telephone: 1–800–4–CANCER (1–800–422–6237)

TTY: 1–800–332–8615

Internet

The NCI's Web site (**http://www.cancer.gov**) provides information from numerous NCI sources. It offers current information on cancer prevention, screening, diagnosis, treatment, genetics, supportive care, and ongoing clinical trials. It has information about NCI's research programs and funding opportunities, cancer statistics, and the Institute itself. Information Specialists provide live, online assistance through ***LiveHelp***. (Click on "Need Help?" Then click on "Connect to LiveHelp.")

National Cancer Institute Publications

National Cancer Institute (NCI) publications can be ordered by writing to the address below:

Publications Ordering Service
National Cancer Institute
Suite 3035A
6116 Executive Boulevard, MSC 8322
Bethesda, MD 20892–8322

Many NCI publications can be viewed, downloaded, and ordered from **http://www.cancer.gov/publications** on the Internet. In addition, people in the United States and its territories may order these and other NCI publications by calling the NCI's Cancer Information Service at 1–800–4–CANCER.

Publications About Breast Changes and Breast Cancer

- *What You Need To Know About™ Breast Cancer* (also available in Spanish: *Lo que usted necesita saber sobre™ el cáncer de seno*)
- *Understanding Breast Changes: A Health Guide for Women*
- "Cambios en el seno y el riesgo de desarrollar cancer"

Publications About Cancer Treatment and Support

- *Surgery Choices for Women with Early-Stage Breast Cancer*
- *Radiation Therapy and You: A Guide to Self-Help During Cancer Treatment* (also available in Spanish: *La radioterapia y usted: Una guía de autoayuda durante el tratamiento del cáncer*)

- *Chemotherapy and You: A Guide to Self-Help During Cancer Treatment* (also available in Spanish: *La quimioterapia y usted: Una guía de autoayuda durante el tratamiento del cáncer)*
- *Helping Yourself During Chemotherapy: 4 Steps for Patients*
- *Biological Therapy: Treatments That Use Your Immune System to Fight Cancer*
- *Eating Hints for Cancer Patients: Before, During & After Treatment* (also available in Spanish: *Consejos de alimentación para pacientes con cáncer: Antes, durante y después del tratamiento*)
- *Understanding Cancer Pain* (also available in Spanish: *El dolor relacionado con el cáncer*)
- *Pain Control: A Guide for People with Cancer and Their Families* (also available in Spanish: *Control del dolor: Guía para las personas con cáncer y sus familias*)
- *Get Relief from Cancer Pain*
- "Complementary and Alternative Medicine in Cancer Treatment: Questions and Answers" (also available in Spanish: "La medicina complementaria y alternativa en el tratamiento del cáncer: preguntas y respuestas")
- "Biological Therapies for Cancer: Questions and Answers" (also available in Spanish: "Terapias biológicas: el uso del sistema inmune para tratar el cáncer")
- "How To Find a Doctor or Treatment Facility If You Have Cancer" (also available in Spanish: "Cómo encontrar a un doctor o un establecimiento de tratamiento si usted tiene cáncer")

- "National Organizations That Offer Services to People With Cancer and Their Families" (also available in Spanish: "Organizaciones nacionales que brindan servicios a las personas con cáncer y a sus familias")

Publications About Living With Cancer

- *Advanced Cancer: Living Each Day*
- *Facing Forward Series: Life After Cancer Treatment* (also available in Spanish: *Siga adelante: la vida después del tratamiento del cáncer*)
- *Facing Forward Series: Ways You Can Make a Difference in Cancer*
- *Taking Time: Support for People with Cancer and the People Who Care About Them*
- *When Cancer Recurs: Meeting the Challenge*

Publications About Clinical Trials

- *Taking Part in Clinical Trials: What Cancer Patients Need To Know* (also available in Spanish: *La participación en los estudios clínicos: Lo que los pacientes de cáncer deben saber*)
- *If You Have Cancer...What You Should Know About Clinical Trials* (also available in Spanish: *Si tiene cáncer...lo que debería saber sobre estudios clínicos*)
- *Taking Part in Clinical Trials: Cancer Prevention Studies: What Participants Need To Know* (also available in Spanish: *La participación en los estudios clínicos: estudios para la prevención del cáncer*)

The National Cancer Institute (NCI) is part of the National Institutes of Health. NCI conducts and supports basic and clinical research in the search for better ways to prevent, diagnose, and treat cancer. NCI also supports the training of scientists and is responsible for communicating its research findings to the medical community and the public.

NATIONAL® CANCER INSTITUTE

NIH Publication No. 05–1556
Revised May 2005
Printed September 2005