**What is Breast Cancer?**

**Breast cancer** is the most common cancer occurring in women (excluding cancers of the skin) and the second most common cause of death from cancer in women, after lung cancer. Men can also develop breast cancer, but **male breast cancer** is rare, accounting for less than 1% of all breast cancer cases. If diagnosed at an early stage, breast cancer has a hopeful cure rate. Up to approximately 97% of women diagnosed with localized breast cancer will be alive five years after their diagnosis.

Note: Estimated new cases and deaths from breast cancer (women only) in the United States in 2004:

- **New cases:** 215,990.
- **Deaths:** 40,110.

The breast is comprised mainly of fatty tissue. Within this tissue is a network of lobes, which are made up of many tiny lobules that contain milk glands. Tiny ducts connect the glands, lobules, and lobes and carry the milk from the lobes to the nipple, located in the middle of the areola. Blood and lymph vessels run throughout the breast; the blood nourishes the cells, and the lymph drains the waste.

About 90% of all breast cancers occur in the ducts or lobes, with almost 75% of all breast cancers beginning in the cells lining the milk ducts. These cancers are called ductal carcinomas. Cancers that begin in the lobes are called lobular carcinoma and are more likely to be found in both breasts.

If the disease has spread away from its place of origin, it is called invasive or infiltrating ductal or lobular carcinoma. Disease that has not spread is called in situ, meaning "in place." The course of in situ disease, as well as its treatment, varies, depending on its place of origin. Currently, oncologists recommend that ductal carcinoma in situ (DCIS), which accounts for the majority of in situ breast cancers, be surgically removed to prevent progression to invasive disease.

**Breast cancers** grow at different rates, but some oncologists estimate the average tumor doubles in size every 100 days. Since cancers start with one irregular cell, even with this doubling time, they may not be palpable (able to be felt) for years. Mammography can find tumors that are too small to be felt, but even so, the tumors have probably been growing for years before they are large enough to be visible on a mammogram.
Breast cancer cells migrate to the lymph nodes under the arm (axillary), in the neck (cervical), or those just below the collarbone (supra-clavicular). The most common sites of metastasis, or spread, of breast cancer are skin, distant lymph nodes, bone, lung, and liver.

As we well know, there are many kinds of cancer; unfortunately they all come about because of the out-of-control growth of abnormal cells.

**Healthy Cells vs. Cancer Cells**

Healthy cells are like a cat. They need structure to determine the size of bones and shape of the body, tail and whiskers. The DNA in genes and chromosomes determine this. They need energy to play and prowl and sustain life. This is derived from chemicals in food. Cats need a system to deliver chemicals (food nutrients like amino acids, carbohydrates, fats, vitamins and minerals) to all parts of their body. These are the blood vessels. Growth factors take a kitten into a lazy old cat, all the while helping it to function normally.

The body and its cells are mostly made up of protein. The building blocks of proteins are substances called amino acids that in the form of enzymes and hormones literally control every chemical reaction within the cells. When these are modified, different messages are sent to a complex control system that can alter their function. There are twenty different kinds of amino acids that are essential to life. Twelve of these can be synthesized within the body however; eight must be supplied by the daily diet.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Normal Cells</th>
<th>Cancer Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNA in genes and chromosomes go about their business in a normal way.</td>
<td>Cancer cells develop a different DNA or gene structure or acquire abnormal numbers of chromosomes.</td>
<td></td>
</tr>
<tr>
<td>Cells divide in an orderly way to produce more cells only when the body needs them.</td>
<td>Cells continue to be created without control or order. If not needed, a mass of tissue is formed which is called a tumor.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Energy</th>
<th>Normal Cells</th>
<th>Cancer Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cells derive 70% of their energy from a system called the “Krebs Cycle.”</td>
<td>Cells have a defective “Krebs Cycle” and derive little or no energy from it.</td>
<td></td>
</tr>
<tr>
<td>Cells derive only 20% of their energy from a system called “Glycolosis.”</td>
<td>Cancer cells derive almost all their energy from “Glycolosis.”</td>
<td></td>
</tr>
<tr>
<td>Cells derive most of their energy with the use of oxygen.</td>
<td>Cells derive most of their energy in the absence of oxygen.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blood Vessels</th>
<th>Normal Cells</th>
<th>Cancer Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cells have a built-in blood vessel system.</td>
<td>Cells do not have a built-in blood vessel system. They require more of certain amino acids to grow.</td>
<td></td>
</tr>
</tbody>
</table>
Growth Factors

<table>
<thead>
<tr>
<th>Normal Cells</th>
<th>Cancer Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>While similar to cancer cells, the amount of them is more in balance to produce a more normal level of activity.</td>
<td>These cells have over produced, require more chemicals (food) and are over active.</td>
</tr>
</tbody>
</table>

Functions

<table>
<thead>
<tr>
<th>Normal Cells</th>
<th>Cancer Cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>The enzymes and hormones go about business in a normal balanced manner.</td>
<td>The enzymes and hormones are either over active or under active.</td>
</tr>
</tbody>
</table>

Tumors are Different

<table>
<thead>
<tr>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign tumors are not cancerous. They do not invade nearby tissues nor spread to other parts of the body. They can be removed and are not a threat to life.</td>
<td>Malignant tumors are cancerous. They can invade and damage nearby tissues and organs and they can break away and enter the blood stream to form new tumors in other parts of the body. The spread of cancer is called metastasis.</td>
</tr>
</tbody>
</table>

Age and health history can affect the risk of developing breast cancer.

Anything that increases your chance of getting a disease is called a risk factor. Risk factors for breast cancer include the following:

- Older age.
- Menstruating at an early age.
- Older age at first birth or never having given birth.
- A personal history of breast cancer or benign (noncancer) breast disease.
- A mother or sister with breast cancer.
- Treatment with radiation therapy to the breast/chest.
- Breast tissue that is dense on a mammogram.
- Hormone use (such as estrogen and progesterone).
- Drinking alcoholic beverages.
- Being white.

Breast cancer is sometimes caused by inherited gene mutations (changes).

The genes in cells carry the hereditary information that is received from a person’s parents. Hereditary breast cancer makes up approximately 5% to 10% of all breast cancer. Some altered genes related to breast cancer are more common in certain ethnic groups.

Women who have an altered gene related to breast cancer and who have had breast cancer in one breast have an increased risk of developing breast cancer in the other breast. These women also have an increased risk of developing ovarian cancer, and may have an increased risk of developing other cancers. Men who have an altered gene related to breast cancer also have an increased risk of developing this disease.

Tests that examine the breasts are used to detect (find) and diagnose breast cancer.
A doctor should be seen if changes in the breast are noticed. The following tests and procedures may be used:

- **Mammogram**: An x-ray of the breast.
- **Biopsy**: The removal of cells or tissues so they can be viewed under a microscope to check for signs of cancer. If a lump in the breast is found, the doctor may need to cut out a small piece of the lump. A pathologist views the tissue under a microscope to look for cancer cells. Four types of biopsies are as follows:
  - Excisional biopsy: The removal of an entire lump or suspicious tissue.
  - Incisional biopsy: The removal of part of a lump or suspicious tissue.
  - Core biopsy: The removal of part of a lump or suspicious tissue using a wide needle.
  - Needle biopsy or fine-needle aspiration biopsy: The removal of part of a lump, suspicious tissue, or fluid, using a thin needle.
- **Estrogen and progesterone receptor test**: A test to measure the amount of estrogen and progesterone (hormones) receptors in cancer tissue. If cancer is found in the breast, tissue from the tumor is examined in the laboratory to find out whether estrogen and progesterone could affect the way cancer grows. The test results show whether hormone therapy may stop the cancer from growing.

Certain factors affect prognosis (chance of recovery) and treatment options.

The **prognosis** (chance of recovery) and treatment options depend on the following:

- The stage of the cancer (whether it is in the breast only or has spread to lymph nodes or other places in the body).
- The type of breast cancer.
- Estrogen-receptor and progesterone-receptor levels in the tumor tissue.
- A woman's age, general health, and menopausal status (whether a woman is still having menstrual periods).
- Whether the cancer has just been diagnosed or has recurred (come back).

After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body.

The process used to find out whether the cancer has spread within the breast or to other parts of the body is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment.

The following stages are used for breast cancer:

**Stage 0 (carcinoma in situ)**

There are 2 types of breast carcinoma in situ:

- **Ductal carcinoma in situ** (DCIS) is 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, DCIS 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.

- Lobular carcinoma in situ (LCIS) is a condition in which abnormal cells are found in the lobules of the breast. This condition seldom becomes invasive cancer; however, having lobular carcinoma in situ in one breast increases the risk of developing breast cancer in either breast.

**Stage I**

In stage I, the tumor is 2 centimeters or smaller and has not spread outside the breast.

**Stage IIA**

In stage IIA:

- no tumor is found in the breast, but cancer is found in the axillary lymph nodes (the lymph nodes under the arm); or
- the tumor is 2 centimeters or smaller and has spread to the axillary lymph nodes; or
- the tumor is between 2 and 5 centimeters but has not spread to the axillary lymph nodes.

**Stage IIB**

In stage IIB, the tumor is either:

- between 2 and 5 centimeters and has spread to the axillary lymph nodes; or
- larger than 5 centimeters but has not spread to the axillary lymph nodes.

**Stage IIIA**

In stage IIIA:

- no tumor is found in the breast, but cancer is found in axillary lymph nodes that are attached to each other or to other structures; or
- the tumor is 5 centimeters or smaller and has spread to axillary lymph nodes that are attached to each other or to other structures; or
- the tumor is larger than 5 centimeters and has spread to axillary lymph nodes that may or may not be attached to each other or to other structures.

**Stage IIIB**

In stage IIIB, the cancer may be any size and:

- has spread to tissues near the breast (the skin or chest wall, including the ribs and muscles in the chest); and
- may have spread to lymph nodes within the breast or under the arm.
Stage IIIC

In stage IIIC, the cancer:

- has spread to lymph nodes beneath the collarbone and near the neck; and
- may have spread to lymph nodes within the breast or under the arm and to tissues near the breast.

Stage IIIC breast cancer is divided into operable and inoperable stage IIIC.

In operable stage IIIC, the cancer:

- is found in 10 or more of the lymph nodes under the arm; or
- is found in the lymph nodes beneath the collarbone and near the neck on the same side of the body as the breast with cancer; or
- is found in lymph nodes within the breast itself and in lymph nodes under the arm.

In inoperable stage IIIC breast cancer, the cancer has spread to the lymph nodes above the collarbone and near the neck on the same side of the body as the breast with cancer.

Stage IV

In stage IV, the cancer has spread to other organs of the body, most often the bones, lungs, liver, or brain.

Recurrent Breast Cancer

Recurrent breast cancer is cancer that has recurred (come back) after it has been treated. The cancer may come back in the breast, in the chest wall, or in other parts of the body.

There are different types of treatment for patients with breast cancer.

Different types of treatment are available for patients with breast cancer. Some treatments are standard (the currently used treatment), and some are being tested in clinical trials. Before starting treatment, patients may want to think about taking part in a clinical trial. A treatment clinical trial is a research study meant to help improve current treatments or obtain information on new treatments for patients with cancer. When clinical trials show that a new treatment is better than the standard treatment, the new treatment may become the standard treatment.

Four types of standard treatment are used:

1. Surgery

Most patients with breast cancer have surgery to remove the cancer from the breast. Some of the lymph nodes under the arm are usually taken out and looked at under a microscope to see if they contain cancer cells.
Breast-conserving surgery, an operation to remove the cancer but not the breast itself, includes the following:

- **Lumpectomy:** A surgical procedure to remove a tumor (lump) and a small amount of normal tissue around it.
- **Partial mastectomy:** A surgical procedure to remove the part of the breast that contains cancer and some normal tissue around it. This procedure is also called a segmental mastectomy.

Patients who are treated with breast-conserving surgery may also have some of the lymph nodes under the arm removed for biopsy. This procedure is called lymph node dissection. It may be done at the same time as the breast-conserving surgery or after. Lymph node dissection is done through a separate incision.

Other types of surgery include the following:

- **Total mastectomy:** A surgical procedure to remove the whole breast that contains cancer. This procedure is also called a simple mastectomy. Some of the lymph nodes under the arm may be removed for biopsy at the same time as the breast surgery or after. This is done through a separate incision.
- **Modified radical mastectomy:** A surgical procedure to remove the whole breast that contains cancer, many of the lymph nodes under the arm, the lining over the chest muscles, and sometimes, part of the chest wall muscles.
- **Radical mastectomy:** A surgical procedure to remove the breast that contains cancer, chest wall muscles under the breast, and all of the lymph nodes under the arm. This procedure is sometimes called a Halsted radical mastectomy.

Even if the doctor removes all of the cancer that can be seen at the time of surgery, the patient may be given radiation therapy, chemotherapy, or hormone therapy after surgery to try to kill any cancer cells that may be left. Treatment given after surgery to increase the chances of a cure is called adjuvant therapy.

If a patient is going to have a mastectomy, breast reconstruction (surgery to rebuild a breast's shape after a mastectomy) may be considered. Breast reconstruction may be done at the time of the mastectomy or at a future time. The reconstructed breast may be made with the patient's own (nonbreast) tissue or by using implants filled with saline or silicone gel. The Food and Drug Administration (FDA) has decided that breast implants filled with silicone gel may be used only in clinical trials. Before the decision to get an implant is made, patients can call the FDA’s Center for Devices and Radiologic Health at 1-888-INFO-FDA (1-888-463-6332) for more information.

2. Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells. There are two types of radiation therapy. External radiation therapy uses a machine outside the body to send radiation toward the cancer. Internal radiation therapy uses a radioactive substance sealed in needles, seeds, wires, or catheters that are placed directly into or near the cancer. The way the radiation therapy is given depends on the type and stage of the cancer being treated.
3. Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping the cells from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy). When chemotherapy is placed directly into the spinal column, an organ, or a body cavity such as the abdomen, the drugs mainly affect cancer cells in those areas (regional chemotherapy). The way the chemotherapy is given depends on the type and stage of the cancer being treated.

Ductal Carcinoma In Situ (DCIS)

Treatment of ductal carcinoma in situ (DCIS) may include the following:

- Breast-conserving surgery with or without radiation therapy or hormone therapy.
- Total mastectomy with or without hormone therapy.
- Clinical trials testing breast-conserving surgery and hormone therapy with or without radiation therapy.

Lobular Carcinoma In Situ (LCIS)

Treatment of lobular carcinoma in situ (LCIS) may include the following:

- Biopsy to diagnose the LCIS followed by regular examinations and regular mammograms to find any changes as early as possible. This is referred to as observation.
- Tamoxifen to reduce the risk of developing breast cancer.
- Bilateral prophylactic mastectomy. This treatment choice is sometimes used in women who have a high risk of getting breast cancer. Most surgeons believe that this is a more aggressive treatment than is needed.
- Clinical trials testing cancer prevention drugs.

Treatment Options for Inflammatory Breast Cancer

Treatment of inflammatory breast cancer may include the following:

- Systemic chemotherapy.
- Systemic chemotherapy followed by surgery (breast-conserving surgery or total mastectomy), with lymph node dissection followed by radiation therapy. Additional systemic therapy (chemotherapy, hormone therapy, or both) may be given.
- Clinical trials testing new anticancer drugs, new drug combinations, and new ways of giving treatment.
Treatment Options for Recurrent Breast Cancer

Treatment of recurrent breast cancer (cancer that has come back after treatment) in the breast or chest wall may include the following:

- Surgery (radical or modified radical mastectomy), radiation therapy, or both.
- Systemic chemotherapy or hormone therapy.

In the United States, a woman who lives to be 90 years old has a 1 in 8 risk of being diagnosed with breast cancer. With 215,990 cases expected, breast cancer will be the most frequently diagnosed nonskin malignancy in US women in 2004. In the same year, breast cancer will kill approximately 40,110 women, second only to lung cancer as a cause of cancer mortality in women. Breast cancer also occurs in men, and there will be about 1,450 new cases in 2004. Despite a prior long-term trend of gradually increasing breast cancer incidence, data from the Surveillance, Epidemiology, and End Results (SEER) Program show that from 1989 to 1992 there was a 5% decrease in breast cancer mortality.

Diet and Vitamins

A low-fat diet might influence breast cancer risk through hormonal mechanisms. Ecologic studies show a positive correlation between international age-adjusted breast cancer mortality rates and the estimated per capita consumption of dietary fat. When case-control studies have been used to evaluate the hypothesis that dietary fat is related to breast cancer risk, the results have been mixed. A pooled analysis of results from 7 cohort studies has addressed these issues and concluded that there is no evidence for an association between total dietary fat intake and breast cancer risk.

Fruit and vegetable consumption (or specific fruits or vegetables) may be associated with reduced breast cancer risk. However, a pooled analysis of adult dietary data from 8 cohort studies, which included 351,823 women in whom 7,377 incident cases of breast cancer occurred, provides little support for an association. When examining the dietary data treated as continuous variables (based on grams of intake/day), there was no association. Comparing highest to lowest quartiles of intake, the pooled multivariate RRs of breast cancer were 0.93 (95% CI, 0.86-1.00) for total fruits, 0.96 (95% CI, 0.89-1.04) for total vegetables, and 0.93 (95% CI, 0.86-1.00) for total fruit and vegetables combined. Likewise, there was no statistically significant association between any of the specific fruits and vegetables examined and breast cancer risk. This analysis was subject to limitations common to attempts to combine dietary data across studies that have collected information using different food frequency questionnaires. However, it suggests that if there is any decreased risk of breast cancer associated with consumption of fruits and vegetables, the association is probably weak.

Micronutrient intake may also play a role. Case-control studies show an inverse association between dietary beta-carotene intake and breast cancer risk. High intake of foods containing folate, beta-carotene, and vitamins A and C may also reverse the increased risk associated with alcohol use. In the Women’s Health Study, in which 39,876 women were assigned to take beta-carotene or placebo, cancer incidence was unaffected at 2 years. Fenretinide is a vitamin A analogue that has been shown to reduce breast carcinogenesis in preclinical studies. A phase III Italian trial compared the efficacy of a 5-year intervention with fenretinide versus no treatment in 2,972 women, aged 30 to
70 years, with surgically-removed stage I breast cancer or DCIS. At a median observation time of 97 months, there were no statistically significant differences in the occurrence of contralateral breast cancer (P=.642) or ipsilateral breast cancer (P=.177) between the 2 arms. There were no statistically significant differences between the 2 arms in tumors in other organs, incidence of distant metastases, and all-cause mortality.

Date reviewed: 10/04/2004

**Probability of Breast Cancer in American Women**

Estimates state that 13.4 percent of women born now in the United States will develop breast cancer at some time in their lives. This estimate is based on cancer statistics for the years 1999 through 2001.

This estimate means that, if the current rate stays the same, women born now have an average risk of 13.4 percent (often expressed as “1 in 7”) of being diagnosed with breast cancer at some time in their lives. On the other hand, the chance that they will never have breast cancer is 86.6 percent (expressed as “6 in 7”).

In the 1970s, the lifetime risk of being diagnosed with breast cancer in the United States was just under 10 percent (often expressed as “1 in 10”). Since then, the estimated lifetime risk has risen gradually.

- 13.2 percent for 1996 through 1998 (“1 in 7.55,” often expressed as “1 in 8”)
- 13.4 percent for 1997 through 1999 (“1 in 7.45,” often expressed as “1 in 7”)
- 13.5 percent for 1998 through 2000 (“1 in 7.40,” often expressed as “1 in 7”)
- 13.4 percent for 1999 through 2001 (“1 in 7.47,” often expressed as “1 in 7”)

Because of rounding up or down to the nearest whole number, a small change in the actual risk (an increase from “1 in 7.55” to “1 in 7.47”) led to the change from “1 in 8” to “1 in 7.”

This slight increase may be explained by a variety of factors. Experts believe the rise is partly due to better detection tools, which find more cases, and partly to the fact that women are living to an older age, when their risk increases (2). In addition, statistical methods have changed as statisticians work to improve the way they do these calculations. Also, the geographic areas where statistics are collected have expanded, resulting in more complete information. It is also possible that changes over the years in the lifestyle of American women (for example, having their first pregnancy at an older age, having fewer children, and using hormonal therapy to treat symptoms of menopause) may have increased the chance of developing breast cancer.

The estimated probability of being diagnosed with breast cancer for specific age groups and for specific time periods is generally more informative than lifetime probabilities. Estimates by decade of life are less influenced by changes in life expectancy and incidence rates. The SEER report estimates the risk of developing breast cancer in 10-year age intervals (1). The calculations factor in the proportion of women who live to each age. In other words, they take into account that not all women live to older ages, when breast cancer risk becomes the greatest. A woman’s chance of being diagnosed with breast cancer is:
• from age 30 to age 40 . . . . . . 0.44 percent (often expressed as “1 in 227”)
• from age 40 to age 50 . . . . . . 1.49 percent (often expressed as “1 in 67”)
• from age 50 to age 60 . . . . . . 2.79 percent (often expressed as “1 in 36”)
• from age 60 to age 70 . . . . . . 3.38 percent (often expressed as “1 in 26”)

These probabilities are averages for the whole population. An individual woman’s breast cancer risk may be higher or lower, depending on a variety of factors, including her family history, reproductive history, race/ethnicity, and other factors that are not yet fully understood.

A team of physicians who specialize in breast cancer will be involved in your care, specifically surgical oncologists, medical oncologists and radiation oncologists. An important concept to keep in mind as you consider treatment options is the difference between local and systemic treatments. Local treatments are procedures performed on the breast and surrounding areas, such as surgery and radiation oncology. Systemic treatments, such as chemotherapy and hormone therapy, are used to treat breast cancer cells that may have spread to other parts of the body. Local and systemic treatments are often combined to ensure the best outcome possible, and your priorities are an essential part of making the best treatment choice.

Surgery

The first step in treating the most common types of breast cancer is surgery, and your first decision will probably include a fundamental choice between breast conservation and removal of the breast. The surgical procedures are: lumpectomy (also called wide excision or partial mastectomy) with axillary lymph node dissection, total or simple mastectomy, and modified radical mastectomy, which includes axillary dissection. Lumpectomy is considered a partial mastectomy and conserves varying degrees of breast tissue. Total mastectomy removes the entire breast. Modified radical mastectomy removes the entire breast and some axillary lymph nodes, but the pectoralis (chest) muscle stays in place.

Before surgery, tests such as a chest X-ray, a complete blood chemistry, and a urinalysis must be performed to determine your body's ability to tolerate surgery and anesthesia.

Surgical Treatment

Lumpectomy and Axillary Lymph Node Dissection, plus Radiation

If your cancer is diagnosed at an early stage, a lumpectomy or wide excision with axillary lymph node dissection may be offered as a treatment choice. The goal of this surgery is to remove the entire lump and some normal tissue surrounding the lump, but preserve the breast. Radiation follows lumpectomy and axillary lymph node dissection and is an integral part of breast conserving treatment. The two treatments combined, surgery and radiation, have proven to be as effective as the modified radical mastectomy.

Not all women, however, are candidates for breast conserving treatment; acceptable cosmetic results may not be possible for women whose breast cancers are multicentric (found in more than one area of the breast) or who have a large breast cancer and
relatively small breasts. Also, it is extremely important for candidates who choose breast conservation to accept that radiation is integral to successful treatment. Willingness to accept radiation treatment following lumpectomy and axillary node dissection, and an understanding that regular follow-up is a lifetime commitment, are essential elements for making this choice. For women who choose not to have radiation, modified radical mastectomy is the treatment of choice.

Lumpectomy is removal of the cancer with surrounding normal tissue. This normal tissue is called the “margin.” After the lumpectomy, surgeons check the pathology report to be sure that the margins, or edges, of the lumpectomy are clear of cancer cells. If the margin is not clear, a re-excision will be scheduled. Cancer cells on the margin are more likely in women with invasive lobular cancer, because of the finger-like projections, and in women who have ductal carcinoma in situ, because the surgeon cannot feel the cancer cells. Breast surgeons at Continuum Cancer Centers of New York aim for five millimeter to 10 millimeter margin widths.

Mastectomy is the removal of all the breast tissue. In the case of an invasive cancer (not in the case of ductal carcinoma in situ), both lumpectomy and mastectomy are accompanied by either sentinel node biopsy, or a full axillary node dissection (see below).

Lumpectomy is almost always followed by radiation. The purpose of the radiation is to decrease the recurrence of breast cancer in the remaining breast tissue. A 2002 New England Journal of Medicine report* discussed the 20-year follow-up of a trial comparing mastectomy, lumpectomy, and lumpectomy plus radiation. The authors found that the recurrence rate of breast cancer in the affected breast after lumpectomy and radiation was 14 percent, whereas if no radiation was given, it was 39 percent. When a recurrence is found, a mastectomy is usually performed. In some cases, however, a second lumpectomy is done. Mastectomy has a very small local recurrence rate (about 4 percent). This is because some breast tissue may remain on the skin when the breast tissue is removed from under it.

Although the local recurrence rates are different between lumpectomy and mastectomy, the survival rate for women undergoing either of these procedures is the same. The New England Journal report showed that the 20-year survival for women undergoing mastectomy, lumpectomy, or lumpectomy with radiation was exactly the same. This conclusion has been supported many times in other reports, including another 20-year follow-up from Italy.**

Lymph nodes are small lima bean-shaped structures which contain white blood cells called lymphocytes. There are lymph nodes in many locations in the body, including the axilla (or armpit), which contains about 30 lymph nodes. In the past 10-15 years, lymph nodes were removed from the axilla to check for spread of the breast cancer. However, a new technique called sentinel node biopsy is now used, which checks for the spread of cancer by removing only one or two nodes. The sentinel node is the first or primary node to receive lymphatic drainage from the breast. The surgeon finds this lymph node by using a radioactive compound called Technicium. Technicium is injected into the skin of the breast, over the area of the cancer, on either the day before or the morning of surgery. The lymphatics of the breast carry the Technicium to the sentinel node, and the surgeon finds the node by using a Geiger counter. In a lumpectomy, the sentinel node is
removed through a small incision in the axilla. In a mastectomy, the sentinel node is removed through the mastectomy incision.

The sentinel node is often tested by frozen section during surgery. If the sentinel node is clear of cancer cells, no other lymph nodes will be removed from the axilla. If the sentinel node contains cancer cells, a full-node dissection will be performed, since more nodes may be affected. Approximately 10 percent of sentinel nodes found to be negative by the pathologist on the frozen section will contain cancer cells on the final pathology report. If this occurs, further surgery to remove additional nodes may be required, and will be scheduled as soon as possible.

**Making Choices**

The choice that most women with breast cancer face is to undergo either breast conserving treatment (only the lump is removed followed by radiation) or modified radical mastectomy. Research involving thousands of women over many years has shown that for women with early stage breast cancers, there is no difference in survival between these two options. Sometimes breast cancers do recur in the lumpectomy breast, but mastectomy can be performed at that time. For most women who undergo breast conserving treatment, the outcome is the same as those who had mastectomy in the first place.

Nonetheless, making a decision between breast conserving treatment, lumpectomy with axillary lymph node dissection plus radiation, or modified radical mastectomy is a very personal one. If you choose a mastectomy, or our oncologist recommends that you have a mastectomy, then you may wish to consider reconstructive surgery. Reconstruction can be performed immediately, it can be delayed, or you may not wish to undergo reconstruction at all.

It is important to remember that no decision must be made overnight. You need to give yourself a chance to discuss these options with family members, with your physicians and with friends. When you have additional questions, please contact the surgeon and other members of the interdisciplinary healthcare team during your decision-making process.

**After Surgery**

**After a Lumpectomy with Sentinel Node Biopsy**
Lumpectomies with axillary node dissection are usually performed with local anesthesia and sedation. Patients are usually sent home the same or next day after surgery, once the effects of the anesthetic have worn off. A followup appointment will be scheduled within 7 to 10 days after your surgery.

**After a Total Mastectomy and Sentinel Node Biopsy**
If you have a Total Mastectomy and Sentinel Node Biopsy, two drainage tubes will be in place to drain fluids that may collect in the operative areas--one to drain the chest area and the other to drain where the sentinel node was removed. Should the drainage tube(s) not be removed during your hospital stay, you and a family member or friend will receive simple instructions before you are discharged on how to care for the tubes at home. After you wake up from a Sentinel Node Biopsy, you may experience some
discomfort around your chest and under your arm. Your doctor will order pain medication that will control your discomfort. You'll be encouraged to get out of bed the same day as surgery, as soon as the anesthetic has worn off, and at that time you should be able to eat regular food. Expect to stay in the hospital overnight. If you are having breast reconstruction, the stay is two to four nights.

Prior to leaving the hospital, we will give you a temporary prosthesis, or breast form. It provides symmetry without putting pressure on the surgical area. Once you have healed, usually 4-6 weeks after your surgery, we will give you a prescription to purchase a permanent prosthesis or breast form.

A followup appointment will be scheduled within 7 to 10 days after your surgery to remove the drainage tube under your arm. At this visit, the surgeon will provide information on your pathology and future treatments.

Adjuvant Therapy

After the primary tumor has been treated, we then consider adjuvant therapy. Adjuvant means "in addition to," and these therapies are given in addition to surgery, or surgery plus radiation, to decrease the risk of the breast cancer returning. Our intent is to choose an adjuvant therapy that has the best chance to kill any breast cancer cells lingering throughout the body, or to block the hormonal receptors of either the remaining cancer cells or normal breast cells. We determine the therapy that best kills the cancer cells, while preventing as much as possible the onset of disrupting side effects. Adjuvant therapies include radiation, chemotherapy, and hormonal therapies.

Radiation Oncology

Advanced Breast Cancer

Continuum Cancer Centers of New York uses an interdisciplinary approach to advanced breast cancer. When cancer begins, it is a single, genetically abnormal cell. The cell divides and becomes two cells, which divide into four cells, then eight cells, and so on. Eventually, the single cell becomes a mass of cells and develops a blood supply to nourish its continued growth. At some point, cells break off from the primary mass and move through the blood supply or nearby lymph system to other parts of the body, a complicated process called metastasis.

For some women, we diagnose breast cancers and treat before metastasis occurs. For other women, we plan treatment knowing that the breast cancer has metastasized. Generally, as the tumor grows, the chance of metastasis increases. Based on research, oncologists estimate that fewer than 10 percent of women diagnosed with breast cancers smaller than one centimeter in diameter will have metastases at the time of diagnosis. That number rises to 80 percent if the cancer is diagnosed when it is larger than five centimeters in diameter.

We know that breast cancer most often spreads through the blood or lymphatic systems to areas that are nourished by those systems. Breast cancer may spread to bones, liver, lung, and brain, but also to the opposite breast, adrenal glands, spleen, and ovaries. Generally, a recurrence of the disease is detected when symptoms are apparent. Even though there are tests that may detect a metastatic recurrence before the onset of
symptoms, research has shown that they do not improve the response to treatments used for advanced disease, nor do they prolong life.

Once metastatic disease is detected, in our interdisciplinary approach we may recommend that a woman undergo surgery to remove the metastases, or have chemotherapy or radiation to control it. Signs and symptoms of a recurrence may include:

- a lump under the arm or around the surgical area;
- bone pain or fractures, which may signal bone metastases;
- headaches or seizures, which may signal brain metastases;
- chronic coughing or wheezing, which may signal lung metastases.

Other symptoms may be related to the location of metastases and may include changes in vision, an alteration in energy levels, a feeling of "unwellness," or extreme fatigue.

Our overall goal in caring for women with more advanced disease is to achieve a remission or slow the growth of the tumor, which we know can improve symptoms, quality of life, and overall survival. Since metastatic breast cancer is not considered curable, the patient and our physicians must find a balance between treating the disease and achieving a good quality of life. It should be noted that some women live years after a recurrence of breast cancer and may undergo treatment many more times before dying from the disease. For some women, we approach breast cancer as a chronic disease.

*Source: A.P. John Institute for Cancer Research*

When considering any type of complementary cancer treatment or alternative cancer treatment, always consult with your physician first, as possible interactions could reduce your treatment protocol's efficacy.