Breast Cancer Surgery

Staff of the following programs provided information for this handbook:
Comprehensive Cancer Center Breast Care Center
Patient Education, Surgical Oncology, Physical Therapy,
Plastic and Reconstructive Surgery, Medical Oncology
and Radiation Oncology
# Breast Cancer Surgery: A Patient’s Guide

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Introduction

The doctors and nurses at the University of Michigan Breast Care Center created this booklet to help explain the different surgical treatment options available to you. Your medical team is available to help answer questions about this material and to help you decide which treatment is right for you. Do not hesitate to contact us as you make your treatment decisions. Resource phone numbers are listed on the back cover of this booklet.

The information in this booklet will be reviewed and discussed throughout your treatment.

Please bring this booklet with you to all appointments.

You will find blank pages at the back of the book to use for questions, appointments or other notes.
Breast Anatomy

Understanding the normal anatomy of the breast is an important first step to understanding breast cancer and how it is treated.

The purpose of the female breast is to produce milk. The breast is made up of lobules, which are milk glands that produce the milk, and ducts, which carry the milk from the lobule to the nipple during lactation (when milk is being produced). Breast cancer can form either in the lobules or in the ducts. A cancer that forms in the lobules is known as “lobular carcinoma” while a cancer that forms in the ducts is known as “ductal carcinoma”.

The ducts and lobules are connected like branches on a tree trunk, forming a closed system. The only openings out of the system are at the nipple. Thus, a breast cancer that is contained within this closed system is said to be “in-situ” or “non-invasive”. A breast cancer that has spread outside of the closed duct-lobule system and has entered the surrounding breast tissue is called “invasive”. The ducts and lobules are surrounded by fatty breast tissue. (See Figure 1).

The nipple is centered in the areola, a dark area of skin in the middle of the breast. There is no muscle within the breast, but muscle does lie underneath the breast, covering the ribs (the pectoralis muscle, or "pecs").

Lymph is the fluid carried through the lymph node chains. It bathes the tissue of the breast, and then passes through the lymph nodes, where it is filtered, and eventually travels back into the blood stream. There are several areas or chains of lymph nodes that drain the breast. They are located on both sides of your chest bone (internal mammary chain), under your arms (axillary chain), and above your collarbone (supraclavicular chain).
Most of the breast is drained into the axillary lymph node chain under the arm. But occasionally they drain to the other chains of lymph nodes.

Lymph drains the breast tissue and is carried through the lymph nodes. Here it is filtered of foreign material (like bacteria) before it can reach the bloodstream. Lymph nodes are an important part of the body’s defense against infection.

Breast cancer cells can break off from the initial tumor and travel to other parts of the body through the lymph fluid (or the blood stream). Once in the lymph fluid, they pass through the lymph nodes and can get trapped. The presence of cancer cells in lymph nodes is an indication that the cancer has the ability to spread and is a more aggressive type of breast cancer. However, some patients (as many as 30%) with lymph nodes testing negative for cancer may have cancer that has spread to another organ (bones, liver, lung etc.) and some patients with lymph nodes testing positive (up to 25%) do not have tumor spread anywhere else. For this reason, examining the lymph nodes for breast cancer is an important step in the evaluation of breast cancer.
Treatment of Breast Cancer

Local and Systemic Therapy

Both local therapy and systemic therapy are used to treat breast cancer. Local therapy is intended to treat the tumor in the breast only. Surgery and radiation therapy are examples of local therapies. Systemic therapy is given by mouth or directly into the bloodstream to reach cancer cells that may have spread beyond the breast. Examples of systemic therapy include chemotherapy or hormonal therapy.

Usually, the first decision in the treatment of breast cancer is which type of surgery to pursue. This decision is made after careful examination of a number of factors, including the following:

- Tumor type: invasive or non-invasive? aggressive? what cell type is it?
- Size of the tumor: size is measured in centimeters and millimeters; one inch equals 2.5 centimeters, 10 millimeters equals one centimeter
- Location of the tumor: where the cancer is located may impact the type of surgical options available to remove it, such as tumors close to the nipple, near the chest wall muscles or near the axillary lymph nodes
- Patient priorities: will reconstruction be considered? how do you feel about each surgical option?
- Cure: which surgery offers the best chance for cure
- Patient’s health: impairments in health may affect recovery after surgery or the ability to receive further treatment after surgery. Smoking history greatly impacts surgical decisions. Your doctor can discuss methods to help you quit smoking. You should stop smoking as soon as possible.

- Cosmetic results

These and other factors are important considerations for making surgical decisions. Surgical decisions have an impact on the type of therapy you will receive later. Some surgeries are followed by radiation therapy, some by chemotherapy or hormonal therapy. Therefore, the surgical decision is made in combination with other specialists who will decide how best to treat your cancer after surgery. These specialists include radiation oncologists, medical oncologists and plastic surgeons.

Your medical team will review each of these factors in their discussions with you. As a team, you will decide the best surgical method to treat your breast cancer.

The remaining information in this booklet deals primarily with the local therapies: surgery and radiation therapy. Your doctor will explain more about systemic therapy at a later date.

**Clinical Trials**

Your doctor may suggest that you consider participating in a clinical trial (a research study or *protocol*) for the treatment of breast cancer. Clinical trials are one very important reason that the University of Michigan Comprehensive Cancer Center is able to offer our patients access to the latest cancer treatments.
Clinical trials are used to test new treatments. The goal of trials is to find ways to improve therapy or decrease side effects. While a trial or study is active or in-progress, we will not know whether any potential improvement has been achieved. The trial must be closed and the research analyzed before the treatment being studied can be made widely available to patients.

There may be some risks associated with research. Your doctor will discuss both the potential risks and benefits in detail with you and obtain your written permission before starting you on a research protocol.

Oversight committees at the University of Michigan Medical Center conduct an extensive review of all clinical trials. These committees include an “institution review board” or IRB made up of other cancer doctors, doctors in other specialties and lay people. The IRB reviews all protocols before they are available to patients and again at different times during the research to be sure the protocol remains appropriate and safe for patients.

All patients on a protocol receive the best care possible, and their reactions to the treatment are watched very closely. If the treatment doesn’t seem to be helping, a doctor can take a patient out of a study. Also, the patient may choose to leave the study at any time. If a patient leaves a study for any reason, standard care and treatment will be initiated.

Clinical trials are voluntary. Your breast cancer will be treated whether you decide to join a protocol or not.
Types of Breast Cancer Surgery

The standard treatment for breast cancer 40 years ago was called a radical mastectomy. This surgical procedure involves the removal of the breast, the underlying muscles of the chest wall, most of the lymph node chains that drain the breast and the skin over the breast. This approach results in significant deformity and had many side effects, and is rarely utilized today. More conservative procedures such as the modified radical mastectomy and lumpectomy have been found to be equally effective for treating breast cancer.

Lumpectomy

Recently, many patients have been opting for breast conservation surgery, rather than traditional mastectomy surgery. Up to two thirds of women diagnosed with invasive tumors are electing to have their breast preserved with lumpectomy and radiation therapy in many top breast cancer centers throughout the country.

A lumpectomy refers to the removal of the tumor in the breast with a rim of normal breast tissue called a clear margin. All cancer operations aim to have a clear margin, therefore some normal tissue must be removed all around the tumor.

The surgeon will remove the cancer by making a one to three inch incision on the breast and surgically removing the tumor with a margin of normal breast tissue. (See Figure 2).
The lumpectomy is then followed by post-operative radiation therapy to the breast. The recurrence rate after breast conservation therapy is roughly 4% to 20% at eight to ten years. If the cancer does return, you will require a mastectomy at that time. Results from large research trials performed many years ago found that the chances of cure are the same whether a woman has a mastectomy or breast conservation therapy.

What if the margin around the cancer is not negative/clear?
It is important to obtain clear margins around the cancer. The chance of a cancer recurring is much higher if the margins around the cancer are not clear.

It is difficult to tell in the operating room whether or not the margins are clear as cancer can spread microscopically through tissue. The pathologist will determine if a margin is clear by examining the tissue under a microscope. This will then be reported in the pathology report.
You will be given an appointment to return to see your surgeon in 10 to 14 days. At this visit, your surgeon will examine your surgical site and discuss the pathology report with you.

If the pathology report shows the margin is not clear, you may need to return to the operating room to have a larger or “wider” margin removed around the site of your cancer. This procedure is called a re-excision lumpectomy. Sometimes a mastectomy may be the only way to achieve a clear margin. Your surgeon will discuss your options with you and will schedule any necessary procedures at that visit.

**Can all women have a lumpectomy?**

Unfortunately, not all women are candidates for a lumpectomy. Women who are not candidates for lumpectomy and would therefore require a mastectomy include:

- Women who have already had radiation therapy to their breast
- Women with two or more cancers in the breast that are far apart
- Women who have had a lumpectomy and a re-excision surgery, but the cancer still has not been completely removed (the margin remains positive)
- Women with certain connective tissue diseases such as scleroderma. These women are very sensitive to the side effects of radiation therapy.
- Women with certain findings on their mammogram, such as diffuse, suspicious-appearing microcalcifications
- Pregnant women who cannot receive radiation while still pregnant
- Women with a cancer that is large compared to a small breast
What are the side effects of a lumpectomy?
The possible side effects of a lumpectomy include:
- Infection of the surgical area
- Accumulation of blood in the surgical area (hematoma)
- Accumulation of clear fluid in the surgical area (seroma)

If a lumpectomy is performed in combination with an axillary lymph node dissection, the primary side effect may be lymphedema or swelling of the arm. Some of the other complications associated with this type of lymph node removal during a lumpectomy include:
- Temporary or permanent limitations in arm and shoulder movement after surgery
- Numbness of the upper inner arm skin

What will happen the day of the surgery?
Your lumpectomy will be performed in an operating room of the University Hospital (Level 1) or at the East Ann Arbor Surgical Center.

You will report to the preoperative area one hour prior to your surgery. Once in the operating room, the surgeon will perform the lumpectomy and then any additional breast cancer surgery as necessary (such as axillary lymph node dissection or sentinel lymph node mapping). You will spend time recovering from the surgery in the surgical observation unit next to the main operating room. You will be able to have 1-2 visitors in the area while you recover from the anesthesia.

You can go home from the hospital that day, as long as you are feeling okay. Some women do stay overnight and go home the next day.

Some women have cancers that require locating the tumor by inserting a wire in the breast prior to surgery. This procedure is done in the Breast Imaging...
Department at the East Ann Arbor Breast Center or on Level B2 of the Cancer Center PRIOR to surgery. It is called a “Wire Localization Lumpectomy”. (See Figure 3)

If a wire placement procedure is necessary prior to lumpectomy, you should report to the Breast Imaging Department first on the day of surgery.

Figure 3: Wire Localization Lumpectomy

**What is radiation therapy?**

After the lumpectomy procedure and recovery are complete, the remainder of the breast is treated with additional (or adjuvant) radiation therapy. This usually begins 3-4 weeks after the lumpectomy surgery.

Radiation therapy consists of approximately 28 treatments over a 6-week period. This is usually given daily, Monday through Friday, with a rest over the weekend. The initial planning visits may take several hours and can require several appointments to plan the radiation treatment area. Once this is completed, the treatments themselves may take only a few minutes. Many patients continue to work during this phase of the treatment.
If adjuvant chemotherapy is recommended, it is usually given before the radiation therapy to the rest of the breast.

**What are the side effects of radiation therapy?**
Complications of radiation therapy to the breast include fatigue, some "sun-burning" and even some swelling of the breast skin that can usually be controlled with lotions and the timing of the treatment.

**Can I have a lumpectomy without the radiation therapy?**
It is possible, but it is usually not recommended. Without radiation therapy, the chance of the cancer returning in the breast is 40% or higher (as compared to 4% to 20% with the radiation). This means that almost half of the patients having lumpectomy without radiation therapy would have the cancer return and need additional surgery.

Some patients with a small area of non-invasive breast cancer (ductal carcinoma in situ) may be able to have a lumpectomy without radiation therapy. There is a national research study in progress to answer that question, and you may be a part of that protocol at the University of Michigan. Your doctors will tell you more about this and other clinical trials.

**Mastectomy**

**What is a mastectomy?**
The standard surgical treatment for breast cancer for the past 30 years has been a **modified radical mastectomy (MRM)**. This involves the complete removal of the breast, along with the thin covering overlying the pectoralis muscles, and most of the lymph nodes located underneath the arm. The incision typically measures 15-20 cm (6-9 inches) and is made in a transverse (side-to-side or horizontal) fashion unless the tumor is located high in the breast. The chest
wall muscles are **not** removed and are left intact. The nipple and areola are removed but most of the skin is left intact. (See Figure 4)

![Figure 4: Modified Radical Mastectomy](image)

*Figure 4: Modified Radical Mastectomy*
*(removal of breast tissue and lymph nodes)*

The chance of the cancer returning at the site where the breast was after this kind of treatment is 2% to 9% at 8 to 10 years after the surgery. Another way to say this is that within 10 years after a modified radical mastectomy for breast cancer, about 2 to 9 women in 100 will have the cancer come back in the area.

For some patients undergoing reconstruction by a plastic surgeon, the procedure can sometimes be performed through a minimal incision (2-3 inches) centered around the nipple-areola complex. This is called a **skin sparing mastectomy**. The advantage of this technique is that more skin is preserved for possible later reconstruction and the reconstruction looks more natural.

A **simple** or **total mastectomy** means that the surgeon will remove the entire breast, but does not remove lymph nodes from underneath the arm. (See Figure 5). Your doctor may recommend this if you have a non-invasive breast cancer (ductal carcinoma in situ or DCIS). If you have invasive breast cancer, it may be combined with a sentinel lymph node biopsy.
If I have a mastectomy, can I have plastic surgery for breast reconstruction?
Yes. Breast reconstruction can be performed immediately after mastectomy or in a delayed fashion after any chemotherapy or radiation therapy is performed.

What are the side effects of a mastectomy?
The possible side effects of a mastectomy include:

- Infection of the surgical area
- Accumulation of blood in the surgical area (hematoma)
- Accumulation of clear fluid in the surgical area (seroma)
- A rare complication occurring when the skin flaps do not heal properly (called flap necrosis). Smoking increases your risk of flap necrosis.

If a modified radical mastectomy is performed, complications can occur due to the removal of the lymph nodes. One of the main complications of an axillary lymph node dissection (removal of the lymph nodes) is a swelling of the arm called lymphedema. Some of the other complications associated with this type of lymph node removal during a modified radical mastectomy include:

- Temporary or permanent limitations in arm and shoulder movement after surgery
- Numbness of the upper inner arm skin
What will happen the day of the surgery?

Your mastectomy will be performed in an operating room of the University Hospital, which is located on Level 1, or in the East Ann Arbor Surgical Center.

You will report to the admitting lounge at least one hour prior to your surgery (you will be notified in advance of the exact time to arrive). The admitting area is located next to the operating rooms on the first floor of University Hospital or directly inside the main doors at the East Ann Arbor Center.

Once in the operating room, the surgeon will perform the mastectomy. After the procedure is complete you will be taken to the recovery room.

You will be admitted to the hospital from the recovery room. Most women stay one night and are well enough to go home the following day.

If I have a mastectomy, does that mean I won't need radiation therapy?

Not necessarily. Tumors that are close to the chest wall may require radiation therapy treatment, even after a mastectomy. Also, if the cancer is larger than 5 cm and/or is present in more than four lymph nodes, there is a higher chance of the cancer returning after mastectomy. Therefore, we would recommend radiation therapy after mastectomy if four or more lymph nodes were positive.

If cancer is present in one, two or three lymph nodes, radiation therapy may or may not be called for. There is a national clinical trial, or research study, currently in progress to answer that question, and you may participate in that study at the University of Michigan. Your doctors will tell you more about this and other clinical trials.

Lumpectomy versus Mastectomy: Making the Treatment Decision

If I have a choice between a lumpectomy and mastectomy, which is better? The most important thing to remember is that if you are a candidate for breast conservation therapy (lumpectomy and radiation therapy), your survival is the
same whether you choose lumpectomy or mastectomy. This means that the likelihood of you being alive in 10 years is not improved by choosing a mastectomy over breast conservation therapy.

The advantage to breast conservation is obvious – you would not lose your breast. The two main disadvantages include the need for the radiation therapy and the higher chance of the cancer returning in the breast, which would then require a mastectomy. At 10 years after the surgery, the local recurrence rate after mastectomy is 2% to 9% and after breast conservation therapy it is 4% to 20%.

The decision between a lumpectomy and a mastectomy is a very personal one, and very different for each patient. The difference between the recurrence rates for these two treatment options may be extremely important to patients evaluating the best therapeutic option for them. In this case, it is important that the woman and her doctor examine all her risk factors for recurrence. A woman at high personal risk may elect for the more traditional modified radical mastectomy, while a woman at relatively low personal risk may feel comfortable undergoing the conservative or breast conservation approach. Your doctor will talk to you about your personal risk for recurrence after breast conservation therapy.

**Axillary Lymph Node Dissection**

Learning whether or not cancer is present in the lymph nodes under the arm is an important factor in selecting additional therapy. Knowing whether there is cancer in the lymph nodes and how many nodes have cancer in them can help you and your doctor decide whether chemotherapy or radiation therapy may be beneficial, and what type of chemotherapy would be appropriate. In addition, if there is cancer in the lymph nodes, getting rid of that cancer is useful.

Traditionally, if your breast cancer is invasive, your surgeon will recommend an axillary lymph node dissection. During an axillary lymph node dissection, the
surgeon makes an incision under your arm (in your armpit) and removes the fatty tissue where the lymph nodes are located (See Figure 4). When done in combination with a mastectomy (known as a modified radical mastectomy), a second incision is not necessary.

![Figure 6: Lumpectomy with Axillary Lymph Node Dissection](image)

On average, approximately 10 to 15 lymph nodes are removed; however this varies for each patient. In this surgery, an area of tissue is removed that contains the lymph nodes; the lymph nodes themselves are not isolated.

**What will happen the day of the surgery?**

An axillary lymph node dissection usually does not require an overnight stay in the hospital. Since the remaining tissues underneath the arm tend to “leak” some lymph fluid when the lymph nodes are removed, a drain is left in place for the first 2 to 3 weeks after the operation until the area heals. The drain is a flexible plastic tube that exits the skin and is connected to a plastic collection bulb. (See Figure 7). When the drainage diminishes to a certain amount, the drain is removed in the clinic.
You will be given instructions after surgery regarding the exercises we recommend to maintain strength and flexibility in your shoulder while this area heals. The exercises are located in the back portion of this handbook.

**What are the side effects of an axillary lymph node dissection?**
Approximately five to ten percent of the patients who undergo an axillary lymph node dissection experience chronic problems related to the dissection, such as arm swelling (lymphedema), or pain or discomfort in the area of the dissection.

There are nerves that run through this tissue where the lymph nodes are located that provide sensation to the upper inner arm skin. In most cases, these nerves are injured during the surgery, thus many women will have a numbness of the upper inner arm skin. Almost all women will have some residual numbness under the inside of the arm. This does not bother the majority of women, but a small percentage can have a burning or dull pain in this region.
Some of the other complications associated with this type of lymph node removal include:

- Temporary or permanent limitations in arm and shoulder movement after surgery
- Infection of the surgical area
- Accumulation of blood in the surgical area (hematoma)
- Accumulation of clear fluid in the surgical area (seroma)

**Sentinel Lymph Node Mapping**

*(Intra-operative Lymph Node Mapping or IOLM)*

Lymph fluid drains from the site of the tumor to one or two lymph nodes first before going to the other nodes. The “sentinel node” is the first lymph node to which a tumor drains, and therefore is the first place to which cancer is likely to spread.

In breast cancer, the sentinel node is usually located in the axillary nodes, the group of lymph nodes under the arm. However, in a small percentage of cases, the sentinel node is found elsewhere in the lymphatic system of the breast. In some cases, there can be more than one sentinel node.

**How do doctors find the sentinel lymph node?**

There are two methods for finding the sentinel node. One is to inject a blue dye near the breast tumor and track its path through the lymph nodes. The dye accumulates in the sentinel node. The injection of the blue dye is done at the time of the surgery, in the operating room.

In a similar technique, doctors inject a safe, small amount of a weak radioactive solution near the tumor. A hand-held probe (which is like a Geiger counter) is then used to find the "hot-spot," or the node in which the weak radioactive
solution has accumulated. In contrast to the blue dye, the radioactive tracer is injected a day before the surgery (it takes longer for the tracer to get to the lymph node than the blue dye). **NOTE: The radioactive solution is harmless. You can be in contact with others after the injection.**

At the University of Michigan, these two techniques are used together. This increases that chance that the sentinel lymph node will be found.

On the day before the surgery, you will come in at the scheduled time (usually early in the morning) and go to the nuclear medicine department. There they will inject the tracer around the tumor, or around the site where the tumor was removed. Three hours after the injection, they will perform a special x-ray, which will show where the lymph nodes are that took up the tracer. This x-ray may show the sentinel lymph nodes under the arm, under the breastbone, or not at all.

Once in the operating room, the surgeon will make an incision over the area of the sentinel node. The hand-held probe and the blue dye will be used to locate the radioactive/ “hot” node and/or the blue node(s). If the x-ray does not show the sentinel node, the surgeon may still be able to find it with the hand-held probe. The sentinel node is removed once it is located. Figure 8 illustrates the sentinel node procedure done in combination with a lumpectomy.
Once the surgery is complete, you will be taken to the recovery area. Some women may have rapid absorption of the blue dye used in the mapping that causes a blue or discolored appearance in the recovery room. The blue dye will clear rapidly and normal color will appear. This is harmless but may be alarming to patients and their families.

**What are the advantages of a sentinel lymph node biopsy?**
The advantages are many. There is no need to stay overnight in the hospital, there are no drains and physical therapy exercises are usually not necessary. A sentinel lymph node biopsy can lead to a more accurate evaluation of whether the cancer has spread to the lymph nodes. In a traditional axillary lymph node dissection, the pathologist reviews 10 or more lymph nodes and there is no way to tell which one is the sentinel node. When the pathologist receives only 1 or 2 nodes, more cuts can be made through that node to look for cancer. A negative sentinel lymph node indicates a >95% chance that the remaining lymph nodes in the axilla are also cancer free.
Can any woman have a sentinel lymph node biopsy?
Unfortunately, this procedure is not available for all patients with breast cancer. Some of the factors that prevent a sentinel lymph node biopsy are listed below. Your doctor will discuss these with you.

Women who may be unable to have a sentinel lymph node biopsy procedure include those who have:
- Received prior radiation therapy or surgery to their breast or axilla
- Enlarged lymph nodes in their axilla or armpit
- Cancer present in their lymph nodes
- Have already had a mastectomy
- Tumors in more than one area of the breast
- Breast cancer that has not had a primary site identified. This is called an “occult malignancy”

What will happen the day before surgery?
Your breast cancer surgery and sentinel lymph node biopsy will begin in the Nuclear Medicine Department. This appointment is most often on the day before surgery, but it may be scheduled the morning of your surgery.

The nuclear medicine department is located on level B1 of University Hospital (see map at the back of this handbook). They will perform the lymphatic mapping here. This procedure will help the surgeon by providing a map of the lymph nodes. The injection of a weak radioactive solution will make the sentinel node radioactive so the surgeon can find it with a probe when you are in the operating room. You will spend 2-4 hours in the nuclear medicine department. You will be awake throughout this part of the procedure. After the nuclear medicine scan is completed, you will go home.
** Note: most patients will have an injection for the scan on the afternoon or evening before the surgery. The surgical scheduler will provide you with your specific appointment times.

What will happen the day of surgery?

Once in the operating room, the surgeon will perform the sentinel lymph node biopsy and then any additional breast cancer surgery as necessary (such as lumpectomy or mastectomy).

What are the side effects of sentinel lymph node biopsy?

Side effects of sentinel node biopsy can include minor pain or bruising at the biopsy site and the rare possibility of an allergic reaction to the blue dye used in finding the sentinel node.

The blue dye used in the sentinel lymph node mapping is eliminated from your body in your urine. This changes the color of your urine to blue-green for the day after the procedure. This causes no harm. Also, the area of the breast, which is injected with blue dye, will have a blue color to it. Many women described the area as looking like a blue bruise. It will lessen with time, although it will be visible for several weeks to several months after the procedure.

Some women may experience numbness under the arm or lymphedema after the sentinel lymph node procedure, although this is rare.

If I have a sentinel lymph node biopsy, does this mean that I don't need an axillary lymph node dissection?
No. If there is no cancer found in the sentinel node, then our approach is not to perform an axillary dissection. This is because the chance that there may be cancer in another lymph node that wasn’t removed is very small.

However, if the sentinel lymph node does show cancer, there is no way to know whether any other axillary lymph nodes contain cancer. Therefore, the standard of care is to proceed with doing an axillary lymph node dissection. If cancer is found in the sentinel node, the axillary dissection will be scheduled as a second operation.

There are rare occasions when a sentinel lymph node cannot be located and an axillary lymph node dissection may be indicated. Your surgeon will discuss this possibility with you and how it can be managed.

When will I find out if there was cancer in the sentinel lymph node?
Your surgeon will call you 10-14 days after your surgery with the pathology results. This will allow the necessary time for the pathologist to closely examine the sentinel lymph node tissue and prepare a pathology report.

Breast Reconstruction
An entire website has been developed to provide information on breast reconstruction (plastic surgery) following breast cancer surgery. It includes information and illustrations of each of the different reconstruction surgeries available. It can be found at: www.med.umich.edu/surg/breast/recon/. The information on this site can also be printed in a booklet format. Visit the Patient Education Resource Center located on level B2 of the Cancer Center for a print copy.

Breast Reconstruction has progressed dramatically over the past 15 years. With the advent of reliable saline (salt-water filled) implants, as well as the concept of the “musculocutaneous flap”, we are now able to provide the majority of patients with satisfactory cosmetic and functional reconstruction. In making your decision about reconstruction, there are some basic facts you should
know. Whatever your decision, the department of Plastic and Reconstructive Surgery is available to help you.

In the treatment of breast cancer, the most important goal is treatment of the tumor itself. However, once the underlying disease has been treated, the decision about breast reconstruction becomes purely a matter of patient preference. If reconstruction improves self-image and self-esteem, performance of this procedure is more than justified.

In considering reconstruction, several points should be mentioned. First, although newer techniques produce cosmetically superior results, reconstructive surgery cannot exactly duplicate the previous breast. Also, we attempt to match the opposite breast as well as possible; however, a precise, “mirror-image” of the remaining side is usually beyond the scope of even the most up-to-date procedures. Despite these limitations, the vast majority of reconstructive patients are quite pleased with their results.

**Breast reconstruction is classified as either ‘immediate’ or ‘delayed’**.

In immediate reconstruction, the new breast is created immediately following mastectomy. When the surgical oncologist has finished the mastectomy, the plastic surgeon will then begin the reconstruction. If there is any question concerning the safety of immediate reconstruction, we advise patients to postpone this procedure.

The second approach is delayed reconstruction. This operation is conducted usually months or years after the initial mastectomy. Delayed reconstruction uses the same techniques as immediate reconstruction. The cosmetic and functional results of “immediate” and “delayed” reconstruction are usually the same.

**Types of Breast Reconstruction**

In post-mastectomy breast reconstruction, two approaches are most accepted.
Type 1 Tissue Expander – Implant Approach
The first approach initially uses a tissue expander followed in a second operation by a saline reconstructive implant.

Step One: Create the Space for the Implant
In the first stage of the expander-implant approach, a space is created beneath the pectoralis major muscle following mastectomy. The “pec major” constitutes the muscle layer that lies immediately underneath the breast (See Figure 9).

Figure 9: Breast Anatomy

Step Two: Place the Expander
Following creation of the space beneath this muscle, a tissue expander is placed. The tissue expander is merely a silicone-walled balloon, which has a small, disk-like port or valve at one end. The function of the tissue expander is, as its name implies, to enlarge the pocket beneath the pec major, expanding the space created to eventually make room for the implant. The expander accomplishes this goal by actually inducing growth of the overlying skin. At the initial operation, the expander is completely covered by closure of the
overlying muscle and skin. Step one and two take place in the same operation, which lasts approximately 1 to 1½ hours.

**Step Three: Expand the Space**
Over the next few months, the patient visits her plastic surgeon every one to two weeks. During these visits approximately two to four ounces of sterile saline solution are introduced via a needle and syringe into the injection port, gradually inflating the expander. This process is done with little or no discomfort to the patient.
Figure 10: Tissue Expanding Procedure
**Step Four: Remove the Expander and Place the Implant**

When the tissue has been expanded enough (usually in four to six months), the tissue expander is removed, and the saline implant is put in. This would be your second operation. This operation is also called the exchange operation (removal of the expander and placement of the reconstructive implant). The surgery takes approximately 1 to 1½ hours to complete, about the same length of time as the first operation.

Both surgical procedures can be performed as outpatient operations or may require an overnight hospital stay. Disability time following each of the two operations (The step 1 and 2 operation and the step 4 operation) averages three to four weeks.

**Advantages of Tissue Expander-Implant Approach**

The advantages of the tissue expander-implant approach include:

- Shorter operating time
- Shorter hospital stays
- Shorter disability times

Usually, this technique produces good, predictable visual results.

**Disadvantages of the Tissue Expander-Implant Approach**

Like all procedures, the tissue expander-implant option has some disadvantages. These include:

- The time course of the reconstruction is long (4-6 months) and multiple visits are required for expander inflations.
- Requires two operations rather than a single procedure
- Infection
- Extrusion or rupture of the expander or reconstructive implant is possible. Although the risks of expander or reconstructive implant rupture are relatively low (estimates of rupture rates vary widely), patients who select implant reconstruction should be
aware that due to leakage, implant replacement might be necessary.

- Contour irregularities
- Asymmetry
- Capsule or scar tissue formation around reconstructive implants.
- Lack of change in implant size with weight loss or gain.

All artificial implants, when placed in the body, form scar tissue around their edges. In most cases, this is not a problem. However, in approximately 10-15% of patients with saline reconstructive implants beneath the pectoralis major muscle, scar tissue will form and will interfere with the natural feel and contour of the implant. This excessive scar tissue is called a “capsule”. In this 10-15% of implant patients, an additional surgery may be necessary to break up or remove the scar tissue and possibly replace the implant. Capsules can form at any time from several months to several years following implant placement.

#2 The TRAM Flap

The second major approach to breast reconstruction uses the patients’ own tissue. This operation uses a “flap” which consists of skin, fat and muscle. This flap is transferred from an area on the patient's body (a “donor” site) to the area of the mastectomy. Several donor sites have been used, but for the past 10 years the most popular flap has been the “TRAM” flap. This is shorthand for “transverse rectus abdominis musculocutaneous flap”. (Thank goodness for abbreviations!)

The TRAM flap uses a segment of lower abdominal skin, fat and muscle to reconstruct a new breast. The same area of fat and skin is removed in a cosmetic abdominoplasty or “tummy tuck”. The area used is an oblong oval of skin, fat and muscle which lies just above the pubic bone. Once this tissue is
freed, it is turned upward, tunneled beneath the skin along the breastbone, and then brought into the mastectomy site. The skin and fat are sculpted to match the opposite breast as closely as possible. The donor area in the lower abdomen is closed as a “tummy tuck”. The resulting scar on the abdomen runs approximately from the front of one hip to the other and, in most cases, is well concealed beneath a moderately revealing swimsuit. (See Figure 11).

Figure 11: TRAM-Flap Reconstructive Procedure

In the past five years an additional improvement in breast reconstruction has been developed. This newer procedure is called the TRAM “free flap”. With this newer approach, instead of turning the TRAM flap and tunneling upward to the mastectomy site, the lower abdominal tissue is completely freed. A small artery and vein, which supply this tissue, are carefully identified, disconnected, and brought with the flap when it is transferred. The flap is then
placed in the mastectomy site and its artery and vein connected to vessels in the underarm area. This newer technique uses technology called “microsurgery”. The advantages of the TRAM free flap versus the conventional TRAM flap may include improved tissue health, better contour and additional flexibility in sculpting the breast. (See Figure 12).

Hospitalizations following TRAM reconstruction average five to seven days. Disability time averages six to eight weeks.

**Advantages of the TRAM Approach**

Overall, the TRAM approach has several advantages. They include:

- The problem of scar tissue *capsules* with their resulting contour and texture problems is eliminated because the TRAM uses the patient’s own tissue.
- The breast “mound” (that is, the bulk of the breast itself) is constructed at the initial surgery; therefore frequent trips to the doctors’ office are usually eliminated. Although TRAM tissue will shrink slightly following surgery, the breast mound itself is present following the initial operation.
- The flap will change somewhat in size with overall body weight loss or gain unlike the tissue expander-implant approach.

**Disadvantages of the TRAM Approach**

Like all operations, the TRAM flap also has disadvantages. These include:

- Approximately five percent of patients will lose a portion of their flap due to circulation problems. Although this problem usually heals with dressing changes, additional surgery may be necessary to remove areas of tissue or to reposition the
flap. There are rare reports of entire flaps being lost due to the same circulation difficulties. If this were to occur, the flap would have to be removed and an alternative plan suggested.

◆ The TRAM approach requires increased operating time. For the conventional TRAM flap, operative time averages five to six hours. In the newer TRAM free flap approach, operative time is about seven to eight hours. This is a longer operation than that using the expanders-implants. However, given a healthy patient without significant underlying heart, lung or vascular disease, these procedures are routinely done without difficulty.

◆ Approximately 5% of TRAM flap patients later develop a hernia in their abdominal donor site. These hernias usually require an additional operation for repair.

◆ Requires a general anesthetic.
#2 The Latissimus Dorsi Flap

In some cases, tissue reconstruction is performed using tissues from other areas of the body, including the shoulder blade area, the outer thigh, the inner thigh, and the buttocks. This happens when the abdominal tissue is not suitable to be used for reconstruction, or if the abdominal tissue was previously used for reconstruction.

The most commonly used of these other sites is the shoulder blade area, this is called a Latissimus Dorsi Flap. This type of reconstruction involves tunneling the tissue to the front side of the chest. Because there may not be enough “filler” in this area of the back to match the size of the other breast, an implant may also be used. (See Figure 13)
A hospital stay of three to five days may be required for this type of surgery. The recovery time is the same as the TRAM procedure.

**Advantages of the Latissimus Dorsi Flap Approach**

Overall, the advantages of using a latissimus dorsi flap for reconstruction are similar to those of using the TRAM flap. In addition, the tissue area and the blood vessels involved are large, making it likely that the operation will be successful.

**Disadvantages of the Latissimus Dorsi Flap Approach**

Like all operations, the Latissimus Dorsi Flap also has disadvantages. These include:

- Requires a general anesthesia
- You may need to have an implant placed under the flap to create a large enough breast
- The surgery may leave a scar that is 5-7 inches long in a diagonal line on the back. The scar may be easy to see on women wearing back revealing clothes.
Figure 13: Latissimus Dorsi Flap
Which Type of Reconstruction is best for you?

Obviously, both approaches to breast reconstruction have advantages and disadvantages. The vast majority of patients in each group are satisfied with their results. Each patient must examine the pros and cons of each procedure and make the decision for herself.

Depending on the individual case, we may encourage you to choose one approach over the other. For example, smokers are not good candidates for TRAM flaps due to the circulation problems associated with tobacco use. However, we try to be flexible and work with patient preferences.

Nipple – Areola Reconstruction

Like the initial operation, nipple-areolar reconstruction is entirely a matter of patient preference. Although many patients choose to have nipple-areolar reconstruction, some patients do not.

The preceding discussion pertains to the creation of what is called the “breast mound”. Many patients will choose to have nipple-areolar reconstruction in addition to the primary procedure of creating the breast mound.

This secondary operation is usually performed at least three months following creation of the breast mound. The nipple is formed from small skin flaps in the reconstructed breast, which are brought together in the shape of a nipple. This area is then surrounded by a skin graft taken from the underarm or groin. This operation can be performed under local or general anesthesia.

Finally, we occasionally recommend altering the opposite breast. These procedures include reduction, enlargement, or uplifting of the remaining side. For some patients these alternatives represent the most effective approach for achieving symmetry. If such an operation is indicated, it can be performed
either at the time of the breast mound reconstruction or during a later procedure (such as nipple-areolar reconstruction).

Further Information
We hope this information will be helpful to you in making your decision. We would be happy to discuss any and all aspects of these procedures with you. Please feel free to bring your questions with you when you come to visit us.

For questions or to make a clinic appointment, contact the Plastic and Reconstructive Surgery Clinic at:

Domino Farms, Lobby D
24 Frank Lloyd Wright Drive
PO Box 441, Ann Arbor, MI 48106
(734) 998-6022
Preoperative Considerations

Preparing for Surgery

Once you have made your treatment decision all necessary surgeries and appointments can be scheduled. This process involves many different people and departments and is a complex process.

Our surgical scheduler will work with you to make this process as smooth, uncomplicated and quick as possible. She will contact you within 72 hours of your clinic visit with your appointment times and dates. If you need to contact her, she can be reached at (734) 936-6000.

We recognize that waiting for surgery once the decision has been made can be very difficult. Please let us know how we can make this process better for you.

It is important to be in the best possible health for surgery. It is important to eat a well-balanced diet, get exercise and rest. Smoking can greatly impact a patient’s surgical risk and recovery. If you smoke, you must quit. We do not recommend that you simply stop smoking without help (“cold turkey”). This can be harmful to your health as well. Discuss smoking cessation options with your physician.

Some women may receive chemotherapy prior to their surgery. Surgery will be scheduled approximately 3 weeks after the last chemotherapy treatment. A complete blood count is drawn prior to surgery to confirm recovery of blood counts.
Medications & Supplements to Avoid

Many medications have an effect on bleeding or on the anesthesia that is given during surgery or procedures. **It is important that you review all medications and supplements with your doctor or nurse before any procedure is performed.** This includes all medications (prescription and those purchased “over the counter”) as well as any herbal supplement (pills, teas, etc.) or vitamins.

This document contains a list of some of the common aspirin containing medications or those known to affect bleeding. Many medications for colds, flu, headaches and other ailments contain some amount of aspirin. It is important to read the labels for acetylsalicylic acid which is the name for Aspirin. New medications are available daily, so be sure to ask your doctor or pharmacist about medications and supplements not found on this list.

**Drugs that Affect Bleeding**

One (1) week prior to surgery any medication that contains aspirin, aspirin products, ibuprofen and certain herbal products should be discontinued because they promote bleeding. Note, this list is selective and does not include all medications that affect bleeding.

**Products containing aspirin (Do not take for 1 week prior to surgery)**

<table>
<thead>
<tr>
<th>Product</th>
<th>Brand Name</th>
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<tbody>
<tr>
<td>Alka-Seltzer</td>
<td>Anacin</td>
<td>Anexasia w/Codeine</td>
<td>Anodynos</td>
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<tr>
<td>A.S.A.</td>
<td>Ascriptin</td>
<td>Aspergum</td>
<td>Axotal</td>
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<tr>
<td>B-A-C</td>
<td>Bayer</td>
<td>BC Powder</td>
<td>Bexophene</td>
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<tr>
<td>Buffaprin Strength</td>
<td>Bufferin</td>
<td>Buffinol</td>
<td>Cama Arthritis</td>
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<td>Congesprin</td>
<td>Cope</td>
<td>Damason-P</td>
<td>Darvon</td>
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<tr>
<td>Dasin</td>
<td>Dia-Gesic</td>
<td>Dolorn #3 Tablets</td>
<td>Doxaphene</td>
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<tr>
<td>Easprin</td>
<td>Ecotrin</td>
<td>Emagrin Forte</td>
<td>Empirin</td>
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<tr>
<td>Equagesic</td>
<td>Equazine M</td>
<td>Excedrin</td>
<td>Fiogesic</td>
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</tbody>
</table>
Products containing ibuprofen and Non Steroidal Anti-Inflammatory Drugs (NSAID’s). (Do not take for 1 week prior to surgery)

Please note, this list is selective and does not include all medications that affect bleeding.

Herbs and supplement products that may affect bleeding (Do not take for 2-3 weeks prior to surgery):

Notify your doctor of any herb or supplement that you are taking prior to surgery. This list only applies to herbs that are taken in the form of a supplement. You do not need to avoid these herbs in your diet or food. These herbs only affect bleeding in the amounts generally taken as supplements, not in the amounts normally found in food preparations.

Herbs and supplement products that may affect anesthesia (Do not take for 2-3 weeks prior to surgery): St. John’s Wort
**Advanced Directives**

All individuals who are scheduled for surgery are asked whether or not they have an Advanced Directive, Power of Attorney for Health Care, or a Living Will. Written materials are available to educate you on these topics. Ask your doctor or nurse if you need more information or stop by the Patient Education Resource Center for further materials.

If you have an Advanced Directive, a copy will be placed in your medical record. Please bring a copy to the preoperative evaluation or to the admitting lounge on the day of your surgery. Be sure to notify your health care team that you have completed an Advanced Directive document.

**The Preoperative Appointment**

To prepare you for surgery and for the recovery after surgery, you will be scheduled to return for a preoperative appointment. A complete history and physical exam is required of all patients within 30 days of a surgical procedure. This appointment will be scheduled at the Surgical Pre-Operative Center at the Domino Farms complex. Every patient is prepared for surgery differently depending on medical history, type of surgery and postoperative needs. Therefore, some appointments may last 1-2 hours, while others may take 4-6 hours and will include several additional appointments.

Plan to be at the preoperative center in Domino Farms at least 2 hours for this appointment, but expect that additional time may be necessary.
About the Preoperative Appointment:
This appointment includes a complete history and physical examination, an explanation of your surgery and its risks and benefits, and instructions to prepare you for the surgery as well as the recovery period.

You will meet with a nurse practitioner or a physician’s assistant and a nurse the day of your pre-surgery evaluation. Your surgeon does not normally see you the day of your preoperative evaluation. If you have a question regarding your surgery that isn’t answered at the preoperative appointment, please contact his or her office directly.

At this visit you will:

- have a complete history and physical exam including a review of all of your medications and use of supplemental herbs & vitamins.

- sign your consent to have surgery. You will receive a copy of this consent to take home with you.

- complete pre-surgical testing that may include an EKG, X-rays and laboratory tests. These tests will be performed that day.

- receive comprehensive education about your surgery, its risks, benefits and anticipated recovery. The clinic nurse will also review any assistance you may need with equipment, education or resources before, during and after your surgery.

- see the anesthesiologist in the anesthesia clinic. This additional appointment may not be scheduled for all patients. The medical team
will decide if this is indicated at the time of your preoperative appointment.

Please bring the following to your pre-surgical appointment:

- Family member(s) or friend that will be caring for you after surgery.
- A list of your current medications and supplements; their dosages (amounts) and how often you take your medications. Please include all prescription meds, non-prescription (over the counter medications), vitamins, supplements, herbs and homeopathic remedies.
- Any recent (less than one year old) cardiac tests that have been done at a non University of Michigan facility, such as a stress test, or EKG. If you have a cardiac history, you will need your cardiac physician to send a letter of approval to proceed with surgery.
- Any recent (less than one year old) pulmonary tests that have been done at a non-University of Michigan facility, such as a Chest X-ray.
- Physician letter of approval to discontinue any blood thinning medication (such as Coumadin®, Plavix®, Lovenox®).
- The phone number where you (the patient) can be reached the day before surgery. We will need to record this in case of emergency should we need to contact you.

Scheduling the Preoperative Appointment:
The surgery scheduler will be calling you with your appointment times. Please allow at least 72 hours after your clinic visit to receive your appointment dates and times.
What if I need to Reschedule or Cancel the Appointment?
If you need to reschedule or cancel your Pre-Surgery Appointment please call the surgery scheduler @ (734) 936-6000.

Special Considerations:

- If you have a cardiac history (for example a past heart attack, history of angina or heart failure), please bring a letter for “Cardiac Clearance” from your cardiologist or internist. In addition, please bring a copy of your most recent EKG, stress test, and/or echocardiograms to the preoperative appointment.

- If you are on any blood-thinning medications, you will need to bring a letter from the prescribing physician approving discontinuation of this medication for 5-7 days before surgery (these include medications containing aspirin, non-steroidal medications such as Motrin®, Aleve®, and blood thinners such as Coumadin®. A complete list of these medications is available from the surgical oncology clinic staff. If you are uncertain of any medication, you should contact your prescribing physician or pharmacist.

Female patients: this physical exam does not include a pelvic exam or Pap smear. You will need to see your primary doctor when you are due for your annual gynecologic exam.
Blood Donation
Whenever surgery is performed, a certain amount of blood is lost. Patients undergoing surgery for breast cancer do not routinely require blood transfusions. In fact, it is rare and only in emergency situations that a patient would require a blood transfusion.

The University of Michigan Hospital has a blood bank, which works in partnership with the American Red Cross. Together these organizations provide patients with necessary blood and/or blood products. Your safety is top priority. Careful testing is performed to ensure compatibility and to minimize the risk of disease transmission, such as hepatitis and AIDS.

Please discuss your concerns with your doctor. You may also contact the Blood Transfusion and Apheresis Center at the University of Michigan at (734) 936-6900.

Remember, you will most likely NOT need a blood transfusion.
The Day of Surgery

The schedule for your day of surgery will depend on the type of surgery you are having.

Will I Be Hospitalized?

Most breast cancer surgeries are done on an outpatient basis and do not require hospitalization. In general, some patients undergoing mastectomies and axillary lymph node dissections will be admitted to the hospital from the recovery room and will stay one night as an inpatient. Most patients will not require any hospitalization after breast cancer surgery.

Individuals who require monitoring or treatments while preparing for surgery are admitted to the hospital the day before surgery. This is not common but can be done if necessary.

Patients Having a Sentinel Lymph Node Mapping Procedure

Patients undergoing a sentinel lymph node biopsy have a complex schedule involving several appointments prior to arrival at the operating room.

It is important to remember that on the morning of the procedure (or occasionally the night before) you will go directly to the nuclear medicine department, which is located on level B1 of University Hospital. They will perform the lymphatic mapping here.
Patients Having an Outpatient Procedure
If you are scheduled to have surgery as an outpatient, you will have surgery and then be released to home on the same day. Trained personnel will monitor you as the effects of anesthesia wear off. You will be released when your condition is stable and your recovery is proceeding well. If your condition requires monitoring, you will be admitted. Pack an overnight bag and store it in your car just in case. Also, you must bring someone along who will be able to drive you home. A taxi is not an appropriate driver. Please discuss any transportation problems with your doctor or nurse before the day of the procedure.

When you are released, you will be given:

- Detailed instructions about how to care for yourself at home
- Prescriptions for any needed medication
- A telephone number to call if questions or concerns arise

You will not be released from the outpatient surgery area unless you have a driver present.
**Postoperative Considerations**

**Exercising / Movement**

(This section has been reproduced with permission from: *Exercises Following Axillary Surgery*: a UMHS booklet written by Mary Wakefield, PT with support from The Division of Physical Therapy of the Physical Medicine and Rehabilitation Department and the Breast Care Center)

The following activities have been approved by your physician to help you increase the motion and strength of your shoulder and improve your posture after surgery. Your physician or the nurse specialist can answer more specific questions you might have: for example, when to expect full range of motion and the amount of weight you may lift when exercising your operated arm.

**When Should I Start?**

Exercises should be started immediately following surgery. Several exercises require above-the-shoulder movement and should be started after the drains are removed. These exercises are boxed and noted as “drain out only” exercises.

**Why Should I Exercise?**

Posture exercises are important because there is a tendency after surgery to “protect” the surgical area, which often leads to poor posture. The poor posture over time can lead to upper back and neck problems. The shoulder mobility exercises are done to prevent a frozen shoulder, which can occur very quickly when the shoulder is not used. A frozen shoulder can be very painful, so it’s essential that you begin the shoulder mobility exercises as soon as possible, refer to the descriptions below.

**When Can Exercises Be Discontinued?**

Exercises can be discontinued when your posture is good, you can perform all the mobility and strengthening exercises with ease, and you are using your arm for everyday activities.
Posture
Your posture, or the way you carry your head, neck and trunk, will ultimately affect the movement of your shoulder. Maintaining correct posture will increase your overall comfort in the post-operative period. It is helpful to correct your posture by looking in a mirror frequently during the day. Check to see that your back is erect as possible, shoulders are level and that your chin is tucked.

Perform these exercises slowly, 10 repetitions each, twice daily. Continue until they become part of your regular daily activities.

Posture Exercises
Exercise A: Chin Tuck: Sitting in a relaxed position, back erect, move your head backwards as far as possible, tucking in your chin. Make a double chin as you continue looking straight ahead. Hold for 5 seconds, relax and repeat. (see illustration below)
Exercise B: Shrug your shoulders up and toward your ears, hold for 5 seconds, relax and repeat. (see illustration below)

Exercise C: Squeeze your shoulder blades together, hold for 5 seconds, relax and repeat. (see illustration below)
Exercise D: Roll your shoulders up, back and down in a circular motion, relax and repeat. (see illustration below)

Shoulder Mobility

Using your arm in daily functional activities is an excellent means of regaining the shoulder mobility that you had before surgery. Some examples of these activities are: washing and brushing your hair, drying your back with a towel, fastening your brassiere, letting your arms swing as you walk and reaching into cabinets. The following exercises will help you regain full shoulder mobility. Perform these exercises slowly 5 repetitions each, twice daily. Continue these exercises until full arm mobility is achieved.

Mobility Exercises

Perform this exercise only AFTER drains are removed
Exercise E: While standing arm length away from the wall:

1. Face the wall, slowly walk both hands up the wall as far as possible. Step toward the wall, lean into the arm, hold for 5 seconds, relax and repeat.
2. Turn your side to the wall, slowly walk your affected hand up the wall as far as possible. Step toward the wall, lean into the arm, hold for 5 seconds, relax and repeat. (see illustration below)
Exercise F: While sitting erect with hands at nape of neck, move elbows forward touch together and then push elbows apart, relax and repeat (see illustration below)

Exercise G: While sitting erect, put hands on shoulders and circle elbows forward up, out and down. Repeat. (see illustration below)
Perform this exercise only AFTER drains are remove
Exercise H: While sitting or lying down, clasp hands, lift arms up and over your head. Keep elbows as straight as possible, relax and repeat. (see illustration below)

Perform this exercise only AFTER drains are remove
Exercise I: While sitting or lying down, move your arms outward away from your sides, clasp hands overhead; return to sides. Keep elbows straight, relax and repeat. (see illustration below)
Increasing Arm Strength

Daily functional activities and hobbies will also help to increase your arm strength. Some examples of these activities are grocery shopping, doing laundry, washing the car and preparing meals. For the first eight weeks after surgery, strengthening for the operated side is limited to lifting 10 pounds or less. After that time, check with your physician about lifting heavier loads. The following exercises are designed to help you regain the strength you had before your operation.

Remember to always warm up your arm with the mobility exercises before performing strengthening work.

Perform these exercises slowly, 5 repetitions each, twice daily. Gradually increase the number of repetitions as tolerated. Continue these exercises until full preoperative strength is achieved.

**Strengthening Exercises**

Exercise J: Standing tall, and facing a wall, put both hands on the wall at shoulder height. Start with your elbows bent. Push away from the wall, straightening your elbows and rounding your back. Hold for 5 seconds, relax and repeat. (see illustration below)
Exercise K: Sitting erect, hands in front of your chest, with elbows bent, push the heels of your palms together for 5 seconds. Hook your fingers together and pull 5 seconds, relax and repeat the sequence. (see illustration below)

Exercise L: Sitting or standing erect, with arms at your side, hold a 2-pound weight in each hand and swing your arms back. Hold for 5 seconds, relax and repeat. (see illustration below)
Perform this exercise only AFTER drains are removed

Exercise M: Sitting with your back supported, hold a 2-pound weight and bend your elbow; then lift your arm as far as comfortable toward the ceiling. Alternate arms. (see illustration below)
Beginning Other Activities

As you become more comfortable with your improved mobility and strength you may want to gradually return to an enjoyable sport or get involved in a structured exercise program. Participation in water exercise classes or dance classes with emphasis on gentle sustained upper extremity movement may be useful. A recommended program would meet 2 to 3 times weekly, consisting of a warm-up with slow stretching exercises, followed by the primary activity, and ending with a cool-down session. Check with your physician for details about when you may begin these activities.

Important Tips to Remember

Activity

- Maintain good posture habits throughout the day.
- Perform your exercises slowly, twice daily
- Do not lift more than 10 pounds for 8 weeks following your surgery. This means you cannot lift children, purses, suitcases, cats, dogs, groceries or garbage **heavier than 10 pounds**. (a gallon of milk weighs 9 pounds). It also means pushing a grocery cart, pushing yourself out of bed, or pulling yourself up using the bed siderails cannot be done using your affected arm.
- Do use your arm in daily activities.

Swelling

- If you notice slight swelling or tightness in your arm, the swelling may be decreased by squeezing a ball in your hand while keeping your arm elevated higher than your heart.
- Alert your physician or nurse specialist if you are experiencing persistent swelling. Notify them that you have had lymph nodes removed.
Swelling can be caused by eating salty foods or can occur on hot days.

**Infection**

When your lymph nodes are removed, you will need to watch for the following signs of infection:

- redness
- swelling
- warmth
- tenderness in your arm

Notify your physician or nurse specialist if you experience any of these.

**Surgical Drains and Dressings**

**Dressings**

You will have a dressing placed over the surgical site in the operating room. This original dressing should remain in place for 48 hours.

The type of dressing used will vary by the type of surgery, the location of the incision and the surgeon who performed the surgery. Different surgeons use different dressings.

Most dressings have an outer dressing and an inner dressing. The inner dressing is made up of “steri-strips”. These are white strips of a strong tape that has long strings embedded in it to make it sturdy. The steri-strips usually stay in place for about 2 weeks. They may loosen during this time and occasionally may fall off early.

The outer dressing usually consists of either a layer of gauze or a clear plastic film covering (called Tegaderm®). Sometimes one or both of these are used over the steri-strips.
Removing the dressing over a surgical site and looking at the incision for the first time can be stressful. Please discuss your concerns with your nurse, surgeon or social worker, and make them aware of your feelings. If you are admitted to the hospital, the initial dressing will be removed before you leave and a nurse will assist you. If you are at home, it may be helpful to have a family member or close friend with you to help with the first dressing change.

After 48 hours remove the outer dressing, but leave the steri-strips over the incision. You may then shower (no baths or hot tubs). Avoid running water directly on the incision. Pat the incision area dry. After the first week you may wash your incision with soap and water.

We do not recommend the use of special lotions, antibiotic ointments or creams on the incision area. It’s best to let it heal on its own.

Do not use any antiperspirants or shave under your arm if there is an incision there until it is well healed (approximately 7-10 days). Use caution when shaving under your arm as you may have numbness in the underarm area and accidentally cut yourself. You may use moisturizing or softening agents after your incision is healed AND it has been three weeks since your surgery.

You may be discharged with a “breast binder” (looks like a flowery tube top). You will be told to wear this for one to two weeks after the surgery to provide support to the breast and minimize any postoperative bleeding. It’s okay to sleep with this on.

Fluid collections that feel like a hard lump are normal under any incision. This is part of the body’s way to heal, and is normal. It will usually go away on its own in one to two months. Please notify your doctor/nurse if the fluid collection continues to increase in size, becomes painful over the entire breast or has a reddened area greater than 1 inch in size around the incision area.
Surgical Drains
A surgical drain is a soft flexible plastic tube that is connected to a plastic collection bulb. Drains are used to prevent fluid from collecting at the surgery site while the body is healing. They usually remain in place for 1-3 weeks postoperatively, or until the drainage decreases to a small amount (30 milliliters or less for 2 consecutive days).

While your drain is in place:
1. Do not drive until after your drain is removed (at the discretion of your surgeon)

2. It is okay to shower

3. Keep the drain-collecting bulb anchored to your clothing to prevent accidentally pulling it out.

   a. Clean the drain insertion site daily using this procedure:
      - Remove the old drain-sponge dressing.
      - Prepare a small cup of solution: ½ tap water and ½ hydrogen peroxide
      - Dip a clean cotton-tipped swab in the solution and cleanse around the drain area (Do not dip a used swab into the clean solution).
      - Apply a clean drain sponge around the drain and tape as necessary.

4. Empty the collection bulb on your drain 3 times daily (or more often if necessary) using the following procedure:
   - Open the small lid on the top of the bulb and pour the drainage into the measuring container or cup.
● Squeeze the bulb and hold it while closing the lid. The bulb needs to be collapsed to create the suction needed to drain the incision area.
● Measure the drainage amount in the cup and record it on the drain record sheet. Record each drain amount separately.
● Call your nurse practitioner when the total daily drainage is less than 30 milliliters or 30cc’s each day, for 2 days in a row. Note that one milliliter (written as 'ml') and one cubic centimeter (written as ‘cc’) are equal.

5. Strip the tubing 3 times daily (or more often if there are many blood clots) using the following procedure: (Refer to illustration below)
   ● Grasp the tubing closest to your body (at the insertion site) with one hand and hold the tubing tightly. This hand will keep the tubing from pulling out of your body.
   ● Take an alcohol swab in the other hand. Using the swab, pinch the tubing tightly just below your first hand. Keeping the tubing pinched, slide the alcohol swab down the tubing toward the collection bulb and away from your body. You should notice any clots in the tube are forced down the tube and into the collection bulb. This is called “stripping” or “milking” the tube.
   ● The tube may become flat from the suction. This is okay.
After your drain is removed:
Your drain will be removed in the surgery clinic. Once it has been removed you may notice a small collection of fluid at the site. A small collection of fluid is normal (about the size of a walnut or quarter). This will not harm you and will reabsorb into the tissue within a month or two. If the fluid becomes larger than this (about the size of an orange), you should notify the surgical nurse practitioners at the phone numbers listed in the back of this book. This fluid collection is not an emergency.

Once the drain has been removed, you should follow these guidelines:
1. Keep the site dry with a gauze dressing over it for the first 48 hours.
2. Stop using the hydrogen peroxide; use only soap and water for cleaning
3. Some leaking at the drain site is normal. If the site continues to leak after 3 days, contact the surgical nurse practitioners. A continuously leaking site can lead to infection.
4. Notify of the nurse practitioners of any large fluid collections.
When to Call Your Doctor

Contact your surgeon or nurse practitioner for any of the following reasons:

- Oral temperature of 101 degrees Fahrenheit or greater
- Persistent, severe or increasing pain
- Bleeding from the incision that is difficult to control with light pressure
- Persistent nausea or vomiting
- Fluid or drainage from the incision area
- 1 inch of redness or more around the incision area
- Incision becomes warm or hot to the touch
- Foul odor from the incision area
- Swelling of the entire breast
- Leakage around your drainage tube and the gauze dressing is wet
- Any significant change that causes you concern

How to Call Your Doctor Contact Phone Numbers:

**Monday through Friday; 8am to 4pm**
Contact the surgical nurse practitioners at (734) 936-6000.

**Daily after 4:00 pm, all weekends and holidays:** contact the UM page operator at: (734) 936-6267 and ask to have the On-call Surgical Oncology Resident paged.
# Surgery Drain Record Sheet

Record your findings directly on this sheet, and bring it with you to your appointments.

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## Postoperative Considerations
# Surgery Drain Record Sheet

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Lymphedema
The following is a reprint of the PDQ statement on lymphedema written by cancer experts for health professionals and published by the National Cancer Institute. This and other credible information about cancer treatment, screening, prevention, supportive care, and ongoing trials, is available from the NCI.

Lymphedema is the buildup of lymph (a fluid that helps fight infection and disease) in the fatty tissues just under the skin. The buildup of lymph causes swelling in specific areas of the body, usually an arm or leg, with an abnormally high amount of tissue proteins, chronic inflammation, and thickening and scarring of tissue under the skin. Lymphedema is a common complication of cancer and cancer treatment and can result in long-term physical, psychological, and social issues for patients.

Figure 15: Lymphedema

The lymphatic system consists of a network of specialized lymphatic vessels and various tissues and organs throughout the body that contain lymphocytes (white blood cells) and other cells that help the body fight infection and disease. The lymphatic vessels are similar to veins but have thinner walls. Some of these vessels are very close to the skin surface and can be found near veins; others are just under the skin and in the deeper fatty tissues near the muscles and can be found near arteries.
Muscles and valves within the walls of the lymphatic vessels near the skin surface help pick up fluid and proteins from tissues throughout the body and move the lymph in one direction, toward the heart. Lymph is slowly moved through larger and larger lymphatic vessels and passes through small bean-shaped structures called lymph nodes. Lymph nodes filter substances that can be harmful to the body and contain lymphocytes and other cells that activate the immune system to fight disease.

Eventually, lymph flows into one of two large ducts in the neck region. The right lymphatic duct collects lymph from the right arm and the right side of the head and chest and empties into the large vein under the right collarbone. The left lymphatic duct or thoracic duct collects lymph from both legs, the left arm and the left side of the head and chest and empties into the large vein under the left collar bone.

The lymphatic system collects excess fluid and proteins from the body tissues and carries them back to the bloodstream. Proteins and substances too big to move through the walls of veins can be picked up by the lymphatic vessels because they have thinner walls. Edema may occur when there is an increase in the amount of fluid, proteins, and other substances in the body tissues because of problems in the blood capillaries and veins or a blockage in the lymphatic system.

Lymphedema may be either primary or secondary. Primary lymphedema is a rare inherited condition in which lymph nodes and lymph vessels are absent or abnormal. Secondary lymphedema can be caused by a blockage or cut in the lymphatic system, usually the lymph nodes in the groin area and the armpit. Blockages may be caused by infection, cancer, or scar tissue from radiation therapy or surgical removal of lymph nodes. This summary discusses secondary lymphedema.
Acute versus gradual-onset lymphedema

There are four types of acute lymphedema. The first type of acute lymphedema is mild and lasts only a short time, occurring within a few days after surgery to remove the lymph nodes or injury to the lymphatic vessels or veins just under the collarbone. The affected limb may be warm and slightly red, but is usually not painful and gets better within a week after keeping the affected arm or leg supported in a raised position and by contracting the muscles in the affected limb (for example, making a fist and releasing it).

The second type of acute lymphedema occurs 6 to 8 weeks after surgery or during a course of radiation therapy. This type may be caused by inflammation of either lymphatic vessels or veins. The affected limb is tender, warm or hot, and red and is treated by keeping the limb supported in a raised position and taking anti-inflammatory drugs.

The third type of acute lymphedema occurs after an insect bite, minor injury, or burn that causes an infection of the skin and the lymphatic vessels near the skin surface. It may occur on an arm or leg that is chronically swollen. The affected area is red, very tender, and hot and is treated by supporting the affected arm or leg in a raised position and taking antibiotics. Use of a compression pump or wrapping the affected area with elastic bandages should not be done during the early stages of infection. Mild redness may continue after the infection.

The fourth and most common type of acute lymphedema develops very slowly and may become noticeable 18 to 24 months after surgery or not until many years after cancer treatment. The patient may experience discomfort of the skin or aching in the neck and shoulders or spine and hips caused by stretching of the soft tissues, overuse of muscles, or posture changes caused by increased weight of the arm or leg.
Temporary versus chronic lymphedema

Temporary lymphedema is a condition that lasts less than 6 months. The skin indents when pressed and stays indented, but there is no hardening of the skin. A patient may be more likely to develop lymphedema if he or she has:

- surgical drains that leak protein into the surgical site
- inflammation
- an inability to move the limb(s)
- temporary loss of lymphatic function
- blockage of a vein by a blood clot or inflammation of a vein.

Chronic (long-term) lymphedema is the most difficult of all types of edema to treat. The damaged lymphatic system of the affected area is not able to keep up with the increased need for fluid drainage from the body tissues. This may happen:

- after a tumor recurs or spreads to the lymph nodes
- after an infection and/or injury of the lymphatic vessels
- after periods of not being able to move the limbs
- after radiation therapy or surgery
- when early signs of lymphedema have not been able to be controlled
- when a vein is blocked by a blood clot.

Risk factors

Factors that can lead to the development of lymphedema include radiation therapy to an area where the lymph nodes were surgically removed, problems
after surgery that cause inflammation of the arm or leg, the number of lymph nodes removed in surgery, and being elderly.

Patients who are at risk for lymphedema are those with:

- Breast cancer if they have received radiation therapy or had lymph nodes removed. Radiation therapy to the underarm area after surgical removal of the lymph nodes and the number of lymph nodes removed increases the risk of lymphedema.

- Surgical removal of lymph nodes in the underarm, groin, or pelvic regions.

- Radiation therapy to the underarm, groin, pelvic, or neck regions.

- Scar tissue in the lymphatic ducts or veins, under the collarbones, caused by surgery or radiation therapy.

- Cancer that has spread to the lymph nodes in the neck, chest, underarm, pelvis, or abdomen.

- Tumors growing in the pelvis or abdomen that put pressure on the lymphatic vessels and/or the large lymphatic duct in the chest and block lymph drainage.

- An inadequate diet or those who are overweight. These conditions may delay recovery and increase the risk for lymphedema.


**Prevention**

Patients at risk for lymphedema should be identified early, monitored, and taught self-care. A patient may be more likely to develop lymphedema if he or she eats an inadequate diet, is overweight, is inactive, or has other medical problems. To detect the condition early, the following should be examined:

- comparison of actual weight to ideal weight
- measurements of the arms and legs
- protein levels in the blood
- ability to perform activities of daily living
- history of edema, previous radiation therapy, or surgery
- other medical illnesses, such as diabetes, high blood pressure, kidney disease, heart disease, or phlebitis (inflammation of the veins).

It is important that the patient know about his or her disease and the risk of developing lymphedema. Poor drainage of the lymphatic system due to surgery to remove the lymph nodes or radiation therapy may make the affected arm or leg more susceptible to serious infection. Even a small infection may lead to serious lymphedema. Patients should be taught about arm, leg, and skin care after surgery and/or radiation. It is important that patients take precautions to prevent injury and infection in the affected arm or leg, since lymphedema can occur 30 or more years after surgery. Breast cancer patients who follow instructions about skin care and proper exercise after mastectomy are less likely to experience lymphedema.

Lymphatic drainage is improved during exercise, therefore exercise is important in preventing lymphedema. Breast cancer patients should do hand and arm exercises as instructed after mastectomy. Patients who have surgery that affects pelvic lymph node drainage should do leg and foot exercises as
instructed. The doctor decides how soon patients should start exercising after surgery. Physiatrists (doctors who specialize in physical medicine and rehabilitation) or physical therapists should develop an individualized exercise program for the patient.

Better recovery occurs when lymphedema is discovered early, so patients should be taught to recognize the early signs of edema and to tell the doctor about any of the following symptoms:

- feelings of tightness in the arm or leg
- rings or shoes that become tight
- weakness in the arm or leg
- pain, aching, or heaviness in the arm or leg
- redness, swelling, or signs of infection.

**Treatment**

Lymphedema is treated by physical methods and with medication. Physical methods include supporting the arm or leg in a raised position; manual lymphatic drainage (a specialized form of very light massage that helps to move fluid from the end of the limb toward the trunk of the body); wearing custom-fitted clothes that apply controlled pressure around the affected limb; and cleaning the skin carefully to prevent infection. Lymphedema may be treated by combining several therapies. This is known as complex physical therapy (or complex decongestive therapy), which consists of manual lymphedema treatment, compression wrapping, individualized exercises, and skin care, followed by a maintenance program. Complex physical therapy must be performed by a professional trained in the techniques.

Surgery for treating lymphedema usually results in complications and is seldom recommended for cancer patients.
Psychosocial considerations

Because lymphedema is disfiguring and sometimes painful and disabling, it can create mental, physical, and sexual problems. Several studies have noted that women who develop lymphedema after treatment for breast cancer have more mental, physical, and sexual difficulties than women who do not develop lymphedema. The added stresses associated with lymphedema may interfere with treatment that is often painful, difficult, and time-consuming.

Coping with lymphedema in the arm after breast cancer treatment is especially difficult for patients who have little social support. Some patients may react to the problem by withdrawing. It is also difficult for patients with painful lymphedema. Patients with lymphedema may be helped by group and individual counseling that provides information about ways to prevent lymphedema, the role of diet and exercise, advice for picking comfortable and flattering clothes, and emotional support.

Further Information

The information in this section is a summary of current findings and is not comprehensive in its content. You may obtain the complete PDQ statement by calling 1-800-4-CANCER (the NCI), or ask for a copy at the Patient Education Resource Center on level B2 of the Cancer Center. They have many resources available on lymphedema, its prevention and treatment.

The University of Michigan Cancer Center offers a lymphedema education program. This class is offered twice monthly at the cancer center. Lymphedema specialists review signs and symptoms of lymphedema, measures to prevent it and resources available to treat early onset. We encourage EVERY patient to schedule one of these classes into their postoperative recovery time.
Resources

Reach to Recovery

The American Cancer Society’s Reach to Recovery program has been helping breast cancer patients (female and male) cope with their diagnosis, treatment and recovery for more than 30 years.

When a person first finds out they have breast cancer, they may feel overwhelmed, vulnerable and alone. While under this stress, many people must also learn about complex medical treatments and choose the best one.

Talking with a specially trained Reach to Recovery volunteer at this time can provide a measure of comfort and an opportunity for emotional grounding and informed decision-making. Volunteers are breast cancer survivors who give patients and family members an opportunity to express feelings, verbalize fears and concerns, and ask questions of someone who is knowledgeable and level-headed. Most importantly, Reach to Recovery volunteers offer understanding, support and hope because they themselves have survived breast cancer and gone on to live normal, productive lives.

Through face-to-face visits or by phone, Reach to Recovery volunteers provide support for:

- people recently diagnosed with breast cancer
- people facing a possible diagnosis of breast cancer
- those interested in or who have undergone a lumpectomy or mastectomy
- those considering breast reconstruction
- those who have lymphedema
- those who are undergoing or who have completed treatment such as chemotherapy and radiation therapy
- people facing breast cancer recurrence or metastasis (the spread of cancer to another part of the body)
Volunteers are trained to provide support and up-to-date information, including literature for spouses, children, friends and other loved ones. Volunteers can also, when appropriate, provide breast cancer patients with a temporary breast form and information on types of permanent prostheses as well as lists of where those items are available within a patient’s community. No products are endorsed.

For more information, or to locate a Reach to Recovery program, contact the UM Department of Social Work at (734) 647-8587 or contact the American Cancer Society at 1-800-ACS-2345.

“M” Personal Touch

The University of Michigan’s Department of Orthotics and Prosthetics offers post-mastectomy products for women through a program called “Personal Touch”. Services are provided by appointment in a private, comfortable setting with personal attention. Products include breast prosthesis, mastectomy bras, camisoles and accessories for women who have had breast cancer surgery. Specially trained fitters will help you find the appropriate products, most of which are stocked at the Personal Touch Boutique.

Personal Touch is open Monday through Friday, 8:00 am to 5:00 pm. Appointments can be made by calling (734) 973-2400. You will need to bring your physician’s prescription for breast prosthesis with you to the appointment. Personal Touch accepts most health insurance plans including Medicare, Medicaid and M-Care.

Patient and Family Support Services

It is important to us that every patient receives the right support at the right time. We offer a wide array of support services and amenities to each cancer patient and family member at the University of Michigan Comprehensive Cancer Center. These services are described in detail in our Patient & Family...
Support Services Booklet. This spiral bound booklet is available in the clinics, at the Patient Education Resource Center or by calling the Cancer AnswerLine Nurses at 1-800-865-1125. Please take a minute to examine the support and educational opportunities available to you and your family.
Notes
Important Phone Numbers
(all numbers are 734 area code)

Doctors
Dr. Jessica Bensenhaver
Dr. Alfred Chang
Dr. Jacqueline Jeruss
Dr. Lisa Newman
Dr. Michael Sabel

All Doctors can be reached at:
(734) 936-6000

Appointments
Breast Care Center Appointments 936-6000
Breast Imaging (Mammography) 936-6274
East Ann Arbor Surgical Center 232-3053
Nuclear Medicine Department 936-5090
Plastic Surgery Appointments 998-6022
Preoperative Center at Domino Farms 936-3604
Surgery Clinic Appointments 936-6000
Surgery Cancellation Number 936-8800
After Surgery Questions

Refer to Surgery Phone Number Sheet for contact numbers during business hours

After 4:30pm weekdays, weekends and holidays
Surgical-Oncology Physician on Call: 936-6267

Resources
Cancer Center Nutrition Clinic 1-877-907-0859
Lymphedema Class Registration 1-877-907-0859
Personal Touch Boutique
(Orthotics and Prosthetics Center) 973-2400
Patient Education Resource Center 647-8626
Patient & Family Support Services 1-877-907-0859
Social Work 1-877-907-0859

Operating Rooms
Main OR Family Waiting Room 936-4388
The Cancer Center connects to University Hospital on Levels 2 and B1 only.

Level 2
- The Cancer Center connects to University Hospital on Levels 2 and B1 only.
- Public Pathway:
  - Information/Registration
  - Elevators
  - Escalator
  - Food Service
  - Restroom
  - Gift Shop
  - Parking

Level 1
- The Cancer Center connects to University Hospital on Levels 2 and B1 only.
- No access to Cancer Center patient areas
- UH West Elevators
- Exit to Courtyard
- UH East Elevators
- Taubman North Elevators
- Welcome Desk
- Patient Drop Off
- Main Entrance
- Taubman East Elevators
- Registration Info
- Pharmacy Reception
- Taubman Center
- Courtyard
- UH East Elevators
- Taubman Center Reception Areas
- Taubman North Elevators
- Taubman East Elevators
- P2
- P3
- P2
Navigating the Medical Campus

CANCER CENTER

Level B1
The Cancer Center connects to University Hospital on Levels 2 and B1 only.

Level B2
The Cancer Center connects to University Hospital on Levels 2 and B1 only.
Preoperative Clinic at Domino’s Farms
4008 Ave Maria Drive
Lobby C, Suite 1100
Ann Arbor, MI 48105
Phone: 734-936-3604

Directions From the North
Follow US-23 south to Plymouth Rd (exit 41). Turn left onto Plymouth Rd. Follow 0.5 mile east and turn left at the traffic light at Earhart Road. See back of page for detailed directions to Lobby C.

Directions From the East
From I-94 west, take US-23 north (exit 180B). Follow US-23 north to Plymouth Rd (exit 41). Turn right onto Plymouth Rd. Follow 0.5 mile east and turn left at the traffic light at Earhart Road. See back of page for detailed directions to Lobby C.

From M-14 west, take US-23 south to Plymouth Rd (exit 41). Turn left onto Plymouth Rd. Follow 0.5 mile east and turn left at the traffic light at Earhart Road. See back of page for detailed directions to Lobby C.

Directions From the South
Follow US-23 north to Plymouth Rd (exit 41). Turn right onto Plymouth Rd. Follow 0.5 mile east and turn left at the traffic light at Earhart Road. See back of page for detailed directions to Lobby C.

Directions From the West
From I-94 east, take US-23 north (exit 180B). Follow US-23 north to Plymouth Rd (exit 41). Turn right onto Plymouth Rd. Follow 0.5 mile east and turn left at the traffic light at Earhart Road. See back of page for detailed directions to Lobby C.

From M-14 east, take US-23 south to Plymouth Rd (exit 41). Turn left onto Plymouth Rd. Follow 0.5 mile east and turn left at the traffic light at Earhart Road. See back of page for detailed directions to Lobby C.
Detailed directions to Preoperative Clinic:
After turning left at the traffic light at Earhart Road, turn left at Ave Maria Drive. This is the first intersection at Dominos Farms, with red, white & blue rocks on the corner. Follow the signs on Ave Maria Drive to Lobby C parking area. After passing through the Lobby C vestibule doors, take the corridor to your right to the Preoperative Clinic.
From I-275 Southbound
Take I-275 South to 7 Mile Road (exit 169). Turn right onto 7 Mile Road and make a left at the traffic light at Haggerty Rd. Make a right onto Traditions Drive.

From I-275 Northbound
Take I-275 North to 7 Mile Road (exit 169A). Turn right onto 7 Mile Road and make a left at the traffic light at Haggerty Rd. Make a right onto Traditions Drive.

For detailed driving directions visit http://www.uofmhealth.org/maps-directions.