You’ve been diagnosed with lung cancer. Now what?

LUNGevity has the information and support that patients and caregivers need to make informed healthcare decisions. Visit www.LUNGevity to learn more.

**Lung Cancer 101** is a comprehensive, medically vetted online guide to understanding how lung cancer develops, how it can be detected, treatment options and what to expect. Includes downloadable tip sheets, booklets, and informational videos.

**Experts Blog** includes clear discussions about the latest developments in research and what they mean for patients.

**Online Survivor and Caregiver Resource Centers** help patients live well with lung cancer, and provide tip sheets with questions for visits with one’s medical team.

**LifeLine** matches patients and caregivers to mentors who have had similar experiences, for personalized one-on-one support.

**Clinical Trial Ambassadors** are volunteers available to offer information about their personal experiences with clinical trials to fellow lung cancer patients.

**Lung Cancer Support Community** message boards provide patients and caregivers with peer-to-peer support and information.

**HOPE Summits** are conferences designed specifically for patients, survivors, and caregivers to hear from medical experts, inspirational speakers, and each other. These unique meetings build communities of hope and support for people at all stages of a lung cancer diagnosis.

---

**About LUNGevity Foundation**

LUNGevity Foundation is firmly committed to making an immediate impact on increasing quality of life and survivorship of people with lung cancer by accelerating research into early detection and more effective treatments, as well as by providing community, support, and education for all those affected by the disease. For more information, please visit www.LUNGevity.org.
Each of us is exceptional. This is not going to be easy, but it is doable. You can do this.
~ Linnea Olson, Lung cancer survivor
OVERVIEW

Lung cancer is the second most common cancer in both men and women, behind prostate cancer for men and breast cancer for women. To better understand how the disease affects your lungs, it helps to have a basic understanding of cancer.

Cancer begins in cells, the building blocks of tissue in the body. Abnormal cells begin to grow out of control, and these cells grow more quickly, live longer than normal cells and don’t die when they get old or damaged. Over time, the cells form a mass known as a primary tumor.

Lung cancer starts in the lungs, often in the epithelial cells, which are the cells that line the airways (see Figure 1). If left untreated, the primary tumor in the lung can grow and invade the tissue surrounding the lung (the pleura). The cancer cells can replace so many normal cells that it makes it difficult for the person to breathe. Sometimes cancer cells break off from the primary tumor and form secondary tumors in nearby sites, such as another lobe of the lung, or distant sites, such as the brain. Over time, new tumors form. This spread of cancer is called metastasis. When metastasis occurs, the cancer found in the new region is still considered lung cancer and is treated as such.

FIGURE 1
ANATOMY OF THE LUNGS

The lungs are spongy, air-filled organs located on either side of the chest (thorax). The right lung has three lobes, and the left lung has two lobes. Air enters the lungs through the nose and mouth, moving through the windpipe (trachea) and into the airways (bronchi) in the lung. Those airwaves divide into smaller branches, called bronchioles, and end in microscopic air sacs (alveoli), where oxygen and carbon dioxide are exchanged.

The lungs are covered by a thin layer of tissue called the visceral pleura. Another layer of this same kind of tissue lines the inside of the chest cavity. This layer is called the parietal pleura. Fluid between these two tissue layers acts as a lubricant as the lungs expand and contract during breathing. The diaphragm is a muscle at the base of the lungs that helps in breathing.

Cancer cells spread through blood or lymph vessels in the lungs. Lymph vessels collect and carry clear fluid (lymph) to lymph nodes, small disease-fighting organs that destroy the germs picked up by lymph. Lymph vessels and nodes are found all over the body. Lung cancer often spreads first to lymph nodes in the lungs and then to lymph nodes between the lungs in the area called the mediastinum.

TYPES OF LUNGCANCER

Lung cancer is often defined by pathologists as adenocarcinoma, squamous cell lung cancer, large cell lung cancer or small cell lung cancer based on the features of the cancer cells in a biopsy fluid sample. Adenocarcinoma, squamous cell and large cell are sometimes collectively referred to as non-small cell lung cancer and account for the majority of lung cancer diagnoses. Each has different characteristics and different responses to treatment. It is important for doctors to distinguish between lung cancer that begins in the squamous cells from lung cancer that begins in other cells as treatment decisions can be based on this information.

Adenocarcinoma starts in early versions of the cells that would normally secrete substances such as mucus and are usually found in the outer parts of the lung. This type is the most common lung cancer diagnosed in nonsmokers. It is more common in women than in men and is the most common type of lung cancer in younger people. In general, adenocarcinoma tends to grow more slowly than other types of lung cancer and is slightly more likely to be found before it has spread.

Squamous cell lung cancer starts in early versions of squamous cells, which are flat cells that line the inside of the airways in the lungs. It is often linked to a history of smoking and tends to be found in the central part of the lungs, near the main airway (bronchus).

Large cell lung cancer can develop in any part of the lung and tends to grow and spread quickly.

Small cell lung cancer is named for the size of the cancer cells when seen under a microscope. This type of cancer often starts in the bronchi near the center of the chest and almost always spreads to distant parts of the body before it is found.

Less common types of lung cancer include typical and atypical carcinoid tumors, such as large cell undifferentiated carcinoma. These tumors usually start in the neuroendocrine cells that line organs such as the lung and small intestine. Neuroendocrine cells are spe-
cial cells that are like both nerve cells and endocrine (hormone-producing) cells. Mesothelioma is another type of cancer that can originate in the lungs as well as the abdomen, heart and chest. It is associated with exposure to asbestos and can take 20 to 50 years to develop after exposure.

Being diagnosed with lung cancer is overwhelming, and you will hear a great deal of new information. To fully understand your diagnosis and to be aware of the treatments available to you, including clinical trials, you should know the specific type of lung cancer you have. If you’re not sure, ask your medical team.

ABOUT THIS GUIDE
This publication is designed to help you learn about lung cancer, from diagnosis and treatment options to managing side effects, pain relief and more. You’ll hear from three lung cancer survivors and discover resources for many types of support. Use the information you learn in this guide to help start conversations with your medical team and become an active participant in your treatment. The more you know, the more prepared you will be to face the challenges of a lung cancer diagnosis.

TIP | FROM OUR ADVISORY BOARD

“Hearing the words ‘you have lung cancer’ has generated a dread and pessimism in patients for many years. But it is no longer appropriate for these words to generate such feelings, as the outcomes for lung cancer patients of all stages has improved considerably in recent years. The diagnosis is often made in earlier stages, the side effects of all therapies are markedly less than in the past and all forms of therapy are associated with improved outcomes.”

Dr. Paul A. Bunn

KNOW YOUR MEDICAL TEAM

Depending on your diagnosis and type of treatment, your medical team will be made up of several individuals with different specialties:

- **Diagnostic radiologist** – diagnoses diseases by using imaging tests such as computed tomography, magnetic resonance imaging, ultrasound, and X-rays. Some diagnostic radiologists specialize in radiation oncology. An interventional radiologist may use imaging tests as guides while performing biopsies.

- **Medical oncologist** – treats cancer using medicines such as chemotherapy, targeted therapy and immunotherapy.

- **Oncologist** – specializes in treating cancer. As the primary doctor for your cancer, your oncologist may refer you to other specialists for additional treatment.

- **Palliative care specialist** – or pain management specialist focuses on managing the side effects and pain from cancer.

- **Pathologist** – examines the tissue sample taken during a biopsy to diagnose the type of cancer and stage it. The pathologist also prepares and sends tissues for molecular testing and immune testing when appropriate.

- **Patient navigator** – helps people with the logistics regarding a cancer diagnosis and treatment, including appointment locations, insurance and payment systems, support and advocacy groups and more.

- **Pulmonologist** – diagnoses and treats lung diseases and breathing problems, some of which may be caused by cancer or its treatment.

- **Radiation oncologist** – specializes in treating cancer with radiation therapy.

- **Respiratory therapist** – evaluates and treats people who have breathing problems or other lung disorders.

- **Thoracic surgeon** – treats diseases of the lungs and chest with surgery. Your thoracic surgeon also may be trained in surgical oncology.

---

**THINGS TO REMEMBER**

1. **Diagnosis and treatment approaches are always advancing.** Molecular biomarkers identify gene mutations that drive the growth of some lung cancers. If your tumor tests positive for a biomarker, your medical team may recommend an approved molecular therapy or participation in a clinical trial. Ask your medical team if biomarker testing is right for you.

2. **Your medical team is comprehensive.** You will work with a variety of professionals, such as an oncologist, pulmonologist, thoracic surgeon, respiratory therapist, pain management specialist and more, to guide you through the physical and emotional stages of your treatment. (See below left.)

3. **Much cancer-related pain can be managed.** The biggest myth about cancer-related pain is that it is something people with cancer must endure. There are now many ways to relieve cancer-related pain, and it’s important to understand these options and find out which option will work best for you. Ask your medical team to connect you with a pain management specialist.

4. **Quit smoking now — it CAN help.** If you think it’s too late to quit smoking after getting a lung cancer diagnosis, think again. Continuing to smoke not only increases your chance of a second cancer developing but it also can heighten the side effects from radiation therapy, lessen the effectiveness of chemotherapy and make it harder to recuperate after surgery. Quitting is challenging, especially during treatment, so don’t go it alone.

5. **You are your own best advocate.** You can play a significant role in your own care by being educated and motivated. Ask your medical team about treatment options and clinical trials. Seek a second opinion. Speak up about side effects and pain. Take good care of yourself by getting proper nutrition, exercise and sleep. Do whatever it takes to help you heal and feel physically and emotionally healthy, whether it’s meditation, yoga, relaxation techniques, spirituality or counseling.

---

**ADDITIONAL RESOURCES**

- American Cancer Society: www.cancer.org
- International Association for the Study of Lung Cancer: www.iasc.org
- LUNGevity: www.lungevity.org
METHODS FOR DIAGNOSING AND STAGING

Several tests are available to help your doctors learn more about your lung cancer. These tests have two important purposes. First, they provide information that helps your doctors diagnose the specific type of lung cancer you have. Second, the results let your doctor assign a stage to your lung cancer. An accurate diagnosis and stage are essential for determining your best treatment options. Here you will learn how and why these tests are done and what you can expect.

Your doctor will use a few different methods to diagnose and stage your lung cancer. Imaging studies can provide important information, but they can’t be used alone to diagnose lung cancer. Examining your tissue samples enables your doctor to definitively diagnose lung cancer. Staging procedures show how far your cancer has spread.

IMAGING STUDIES
Imaging studies are used primarily to help define the size, shape and location of the tumor. These studies are also useful to assess other parts of the body to see whether the cancer has metastasized (spread beyond the lung), which aids in staging the disease.

Computed tomography
Computed tomography (CT) produces three-dimensional, cross-sectional X-ray images. CT images are more precise than standard X-rays and are more likely to show a lung tumor than a standard chest X-ray. Also, CT images show the size of lymph nodes, which is important because lymph nodes often grow when cancer spreads to them. However, a lymph node can be involved without being enlarged. Because of this, other studies may be done to evaluate the lymph nodes.

A CT scanner is a large machine with a hole in the middle. For the scan, you lie on a table that moves through the hole. As the table moves slowly through the scanner, it takes pictures of your organs. A contrast material (also called a contrast dye) may be injected into a vein in your arm before the test to make your organs easier to see. The contrast material may cause a brief sensation of warmth or flushing. Aside from discomfort associated with the injection, CT is painless.

Positron emission tomography
Positron emission tomography (PET) images are not as detailed as CT images. Still, they can provide valuable information. They are especially useful if you have early-stage lung cancer because they can show whether it has spread to other sites. Knowing this can help you and your doctor decide on your best treatment option. PET scans are particularly useful if your doctor suspects that cancer has spread beyond the lung but is not sure where it has spread. PET is also helpful to distinguish cancerous lesions from benign (noncancerous) lesions. PET is not helpful, however, for finding metastasis to the brain.

Before PET is done, a small amount of radioactive glucose (sugar) is injected into a vein in your arm. Lung cancer cells use a high amount of energy and will absorb greater amounts of the radioactive sugar than normal tissue cells will. After the sugar has been absorbed by your body, you will lie on a table that slides through the opening of a large scanning machine. As the table moves through, a special camera detects any increased amounts of radioactive sugar and provides an image of the tumor or area of metastasis. PET is painless.

CT/PET
To diagnose lung cancer, a PET scan is often used with a CT scan, with the two tests done in the same testing session. The combination provides a more complete picture for the radiologist, who can compare areas of higher radioactivity on the PET scan with the detailed appearance of the same area on the CT scan.

Magnetic resonance imaging
Magnetic resonance imaging (MRI) is most valuable for detecting metastasis to the brain or spinal cord. Magnetic resonance images are produced through radio waves and a powerful magnet linked to a computer. You will need to lie still on a table within the tube of the MRI machine, which makes loud, repetitive clicking noises. As with CT, contrast material may be used to enhance the images. If you are claustrophobic, be sure to tell your doctor, as he or she may be able to provide medication to help you relax. MRI is painless.

Bone scan
A bone scan helps determine whether cancer has spread to bone. This test is often unnecessary because PET, which is used more often for people with lung cancer than with other types of cancer, can also show bone metastasis. A bone scan is usually done only when a patient has signs and symptoms of metastasis.

For the scan, a small amount of a low-level radioactive substance is injected into a vein in your arm. This radioactive substance collects in areas of metastatic disease in bone. You will then lie on a table for about 30 minutes, and a special camera will record images of areas with an increased amount of the radioactive substance. Most of the substance will be eliminated from your body within one day and will be completely gone within two days. A bone scan is painless.

FIGURE 1
BRONCHOSCOPY

©Patient Resource LLC
DEFINITIVE DIAGNOSTIC TESTS
Definitive diagnostic tests are tests that can specifically show whether abnormalities in the lung are cancer. For these tests, your doctor will examine samples from your body to see if lung cancer cells are present.

Sputum cytology
Sputum is the mucus coughed up from the windpipe (trachea) and bronchi (large airways). With sputum cytology, a sample of your sputum is examined under a microscope to see if cancer cells are present.

Needle biopsy
A needle biopsy is a way to remove lung tissue so that a pathologist can examine it with a microscope. Two types of needle biopsy are fine-needle and core-needle biopsies. A core-needle biopsy typically provides more tissue and so is usually preferred. An imaging study, such as CT or endobronchial ultrasound, is often used to help the doctor guide the needle to the exact area. You will receive an injection of a local anesthetic before the biopsy needle is inserted into the suspicious area.

Thoracentesis
Thoracentesis is a process to remove fluid that has collected in the space around the lungs (pleural space). For this procedure, you will receive a local anesthetic, and then a needle will be inserted into the pleural space. The needle draws out the fluid, which is then analyzed.

Bronchoscopy
A bronchoscopy allows your doctor to look inside the lungs and bronchi for abnormal areas or tumors. The doctor will insert a bronchoscope — a thin, tube-like instrument — through your nose or mouth into the trachea and lungs (see Figure 1). The bronchoscope has a light and lens that let the doctor examine the inside of the trachea, bronchi and lungs. Tiny tools can be inserted into the bronchoscope to obtain samples of tissue or fluid to be analyzed. You may be lightly sedated to ensure that you are comfortable during the procedure.

STAGING PROCEDURES
Staging procedures let the doctor view the lungs and surrounding area and obtain samples from nearby lymph nodes or other tissue. These procedures can help the doctor stage your lung cancer or determine how far it has spread.

Endobronchial ultrasound
With endobronchial ultrasound, also known as EBUS, a bronchoscope is inserted into the trachea, and high-frequency sound waves are used to create images. With this technique, the doctor can examine areas in the space between the lungs (mediastinum), including lymph nodes. If an area looks like it may be cancerous, the doctor can insert a biopsy needle through the bronchoscope to obtain a tissue sample for a pathologist to evaluate. You will be given a local anesthetic and be lightly sedated during the procedure.

Endoscopic esophageal ultrasound
This exam is similar to endobronchial ultrasound, but the doctor passes an endoscope (a flexible tube with a light) down the throat and into the esophagus. The doctor can see lymph nodes and look for tumors or other abnormal tissue and can also insert a needle through the endoscope to take a tissue sample. You will be given a local anesthetic and be lightly sedated for this procedure.

Mediastinoscopy
Mediastinoscopy involves the use of a mediastinoscope (a thin, hollow, lighted tube) to examine lymph nodes in the mediastinum. The doctor will make a small cut in the neck. Then, he or she will insert the mediastinoscope behind the sternum (breast bone). The doctor can examine the area and remove tissue samples from lymph nodes. Mediastinoscopy involves the use of a mediastinoscope (a thin, hollow, lighted tube) to examine lymph nodes in the mediastinum. The doctor will make a small incision into the mediastinum. The doctor will make a small incision between the second and third ribs on the left. This procedure gives the doctor access to lymph nodes that cannot be reached by mediastinoscopy. You will be given a general anesthetic for this procedure.

Thoracotomy
Thoracotomy is a similar procedure that involves a slightly larger incision between the second and third ribs on the left. This procedure gives the doctor access to lymph nodes that cannot be reached by mediastinoscopy. You will be given a general anesthetic for this procedure.

Biomarker testing
Biomarker testing of lung cancer tissue has become a vital part of diagnosis and is recommended for all people with lung cancer, especially people with an advanced diagnosis of one of the three types of non-small cell lung cancer. This testing is important because researchers have discovered molecular changes that may affect how lung cancers grow and respond to different treatments. Biomarker testing is done on tissue samples taken during biopsy. Talk to your doctor about the type of biomarker testing that is best for your particular lung cancer.
The stage of your cancer describes how far it has spread. Your doctors will determine the extent of your cancer, its location and whether it has spread to nearby organs or to other parts of the body.

Lung cancer may be staged twice. First, your doctor will evaluate the results of your physical exams, biopsies and imaging tests to assign a stage. This stage is called the clinical stage. If you have surgery, your cancer may also be assigned a pathologic stage based on the results from surgery. Staging helps your doctor select the most effective treatment plan for you.

Your doctor and the pathologist will classify the stage of the lung cancer according to the tumor, node, metastasis (TNM) system developed by the American Joint Committee on Cancer (AJCC) and the Union for International Cancer Control (UICC). This system is based on data from around the world collected by the International Association for the Study of Lung Cancer (IASLC) (see Table 2). The system considers the size and location of the tumor (T), whether cancer cells are found in nearby lymph nodes (N) and whether the cancer has metastasized (M), or spread, to other parts of the body. The TNM classifications are then used to determine the overall stage (see Table 1). Lung cancer is staged from Stage 0 (in situ disease, or cancer that has not grown into nearby tissues or spread outside the lung) to Stage IV (cancer that has spread to more than one area in the other lung, the fluid surrounding the lung or heart or distant body parts) (see Figure 1). If lung cancer metastasizes, it is most likely to spread to the adrenal glands, bone, brain, liver or the other lung. The TNM system is the preferred source for staging the types of non-small cell lung cancer. Limited-stage small cell lung cancer is on only one side of the chest, whereas extensive-stage small cell lung cancer has spread throughout the lung, to the other lung, to lymph nodes on the other side of the chest, or to other parts of the body.

### Table 1: Stages of Lung Cancer

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Tis</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IA</td>
<td>T1a</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IB</td>
<td>T2a</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IIA</td>
<td>T1a</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T1b</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2a</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2b</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IIB</td>
<td>T2b</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>IIIA</td>
<td>T1a</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T1b</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2a</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2b</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>N1</td>
<td>M0</td>
</tr>
<tr>
<td>IIIB</td>
<td>T1a</td>
<td>N3</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T1b</td>
<td>N3</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2a</td>
<td>N3</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2b</td>
<td>N3</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>N2</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>N3</td>
<td>M0</td>
</tr>
<tr>
<td>IV</td>
<td>Any T</td>
<td>Any N</td>
<td>M1a</td>
</tr>
<tr>
<td></td>
<td>Any T</td>
<td>Any N</td>
<td>M1b</td>
</tr>
</tbody>
</table>

### Table 2: TNM Lung Cancer Classifications

<table>
<thead>
<tr>
<th>Classification</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tumor (T)</td>
<td></td>
</tr>
<tr>
<td>Tx</td>
<td>Primary tumor cannot be assessed OR there is evidence of cancer according to laboratory studies but no tumor is seen on imaging studies or with bronchoscopy</td>
</tr>
<tr>
<td>T0</td>
<td>No evidence of primary tumor</td>
</tr>
<tr>
<td>Tis</td>
<td>Carcinoma in situ (in place)</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor is 3 cm (approximately 1 inch) or less in greatest dimension, surrounded by lung or visceral pleura (lining covering the outside of the lung), with no evidence of tumor in the main bronchus (airway)</td>
</tr>
<tr>
<td>T1a</td>
<td>Tumor is 2 cm (approximately 3/4 inch) or less in greatest dimension</td>
</tr>
<tr>
<td>T1b</td>
<td>Tumor is more than 2 cm in greatest dimension but not more than 3 cm in greatest dimension</td>
</tr>
</tbody>
</table>
| T2             | Tumor is more than 3 cm but not more than 7 cm (approximately 2 3/4 inches); or tumor has any of the following features:  
  • Cancer has invaded the main bronchus, 2 cm or more away from the carina (the ridge at the lower end of the trachea)  
  • Cancer has invaded the visceral pleura  
  • The tumor involves atelectasis (collapse of part of the lung) or obstructive pneumonitis (inflammation of lung tissue) that extends to the hilar region but does not involve the entire lung |
| T2a            | Tumor is more than 3 cm but not more than 5 cm (approximately 2 inches) in greatest dimension |
| T2b            | Tumor is more than 5 cm but not more than 7 cm in greatest dimension |
| T3             | Tumor is more than 7 cm, or directly invades any of the following: parietal pleural (PL3), chest wall, diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium; or the tumor is in the main bronchus less than 2 cm away from the carina but has not invaded the carina; or associated atelectasis or obstructive pneumonitis of the entire lung or separate tumor node(s) in the same lobe as the primary |
| T4             | Tumor of any size has invaded any of the following: mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, carina; OR presence of separate tumor node(s) in a different lobe of the lung with the primary tumor |

<table>
<thead>
<tr>
<th>Nodes (N)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nx</td>
<td>Regional lymph nodes cannot be assessed</td>
</tr>
<tr>
<td>N0</td>
<td>Cancer has not spread to any regional lymph nodes</td>
</tr>
<tr>
<td>N1</td>
<td>Cancer cells are found in the penobronchial and/or hilar lymph nodes and intrapulmonary nodes on the same side as the lung with the primary tumor</td>
</tr>
<tr>
<td>N2</td>
<td>Cancer cells are found in the mediastinal and/or subcarinal lymph node(s) on the same side as the lung with the primary tumor</td>
</tr>
<tr>
<td>N3</td>
<td>Cancer cells are found in the mediastinal or hilar lymph nodes on the opposite side as the lung with the primary tumor; or cancer cells are found in the scalene or supraclavicular lymph node(s) on the same or opposite side as the lung with the primary tumor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metastasis (M)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M0</td>
<td>Cancer has not yet spread from the primary tumor</td>
</tr>
<tr>
<td>M1</td>
<td>Cancer has spread from the primary tumor</td>
</tr>
<tr>
<td>M1a</td>
<td>Separate tumor node(s) is found in a lobe of the other lung, tumor has pleural nodules or malignant pleural or pericardial effusion</td>
</tr>
<tr>
<td>M1b</td>
<td>Cancer has spread to distant sites in the body</td>
</tr>
</tbody>
</table>

Note: The revisions to the 8th edition of the classification have been proposed and are likely to be adopted in early 2017.
Tumor is larger than 3 centimeters but smaller than 5 cm in greatest dimension; or the tumor has spread to the main bronchus, invaded the visceral pleura (membrane surrounding the lungs), or is associated with atelectasis (collapse of part of the lung) or with obstructive pneumonitis (inflammation of lung tissue).

Stage IIA
Tumor is up to 7 cm in greatest dimension; or the tumor has spread to the main bronchus, invaded the visceral pleura (membrane surrounding the lungs), or is associated with atelectasis (collapse of part of the lung) or with obstructive pneumonitis (inflammation of lung tissue); spread to regional lymph nodes is likely.

Stage IIB
Tumor has spread to any of the following: the main bronchus, visceral pleura (membrane surrounding the lungs), chest wall, diaphragm, phrenic nerve, mediastinal pleura or parietal pericardium; or tumor is associated with atelectasis (collapse of part of the lung) or with obstructive pneumonitis (inflammation of lung tissue); spread to regional lymph nodes is possible.

Stage IIIA
Tumor is any size and may have invaded surrounding structures, including the main bronchus, visceral pleura (membrane surrounding the lungs), chest wall, diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium, heart, trachea, esophagus, vertebrae, carina or recurrent laryngeal nerve; spread to regional lymph nodes is likely.

Stage IIIB
Tumor is any size and may have invaded surrounding structures, including the main bronchus, visceral pleura (membrane surrounding the lungs), chest wall, diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium, heart, trachea, esophagus, vertebrae, carina or recurrent laryngeal nerve; cancer has spread to regional lymph nodes.

Stage IV
Tumor is any size and has spread to the opposite lung and/or to distant organs in the body.
Your pathology report is a document that provides the results of tests to diagnose your lung cancer. It includes specific information about your cancer, which helps your oncologist and other members of your medical team plan the treatment most likely to be effective for your lung cancer.

Pathology reports look different at different cancer centers and hospitals, but most include the same information. The details and unfamiliar terms may seem overwhelming at first, but once you learn what the words mean, you’ll be more informed about your diagnosis and better able to discuss your treatment options with your doctor.

A pathologist is a doctor who diagnoses disease based on the evaluation of biopsy samples and the results of other tests. It’s best for the pathologist to be experienced in lung cancer. To diagnose lung cancer, the pathologist carefully examines tissue taken during a biopsy. In some cases, the pathologist may examine an entire tumor removed in surgery. The pathologist will note how the cells of the tissue look through a microscope, which defines the histologic type of the cancer. After examining the sample, the pathologist writes the pathology report. Your doctor will receive your test results as they become available, but it may take a few days to a few weeks to receive the full report.

The pathology report describes the tissue sample and may include the results of other testing (see Table 1). For example, testing for biomarkers is now recommended for most cases of non-small cell lung cancer. The results of biomarker testing are important because they can help guide treatment decisions.

If the pathologist cannot determine the histologic type, an expert pathologist and special studies may be required or another biopsy may be needed. Seeking a second opinion from another pathologist can be beneficial. Seek another opinion if the pathology report does not include a definitive diagnosis, if you have a rare lung cancer or if the cancer has already spread. A second opinion could confirm your diagnosis or suggest an alternative diagnosis.

The pathology report also includes the stage of your lung cancer. Learn more about how lung cancer is staged on page 6. For more information about a typical pathology report, including definitions of the terms commonly used by the pathologist, see the additional resources below.

| Table 1: Important Components of a Lung Cancer Pathology Report |
|---------------------------------|------------------|------------------|
| **Descriptor**                  | **What is described or measured** | **Significance** |
| Size                            | Length and width of the tumor. |                  |
| Location                        | The lung (right or left) and lobe in which the tumor is found. |                  |
| Histology                       | The histologic type: small cell or non-small cell type (adenocarcinoma, squamous cell lung cancer or large cell cancer), or a rare subtype. | Treatment varies according to histologic type. |
| Surgical margins                | Presence or absence of cancer cells in the normal tissue at the edges of the tumor. | Additional surgery or radiation therapy may be needed if the margins are close or positive. |
| Extent of invasion              | The structures affected by the tumor. | Extent of invasion is a factor in staging and a consideration when selecting treatment, including determining whether a tumor is operable (can be removed safely with an operation). |
| Lymph node status               | Presence (positive) or absence (negative) of cancer cells in the nearby lymph nodes. | Negative lymph node status generally means a less extensive cancer; lymph node status is another primary factor in staging. |
| Biomarker testing               | Presence or absence of molecular changes in the tumor tissue. (See page 11 for more information about these abnormalities.) | If your tumor has a molecular abnormality, it may respond to targeted therapy. |

**Questions to Ask Your Medical Team**

- May I have a copy of my pathology report?
- What is the exact type of lung cancer I have?
- What is the stage of my lung cancer and what does it mean for me?
- What are my treatment options?
- Do I need to share my pathology report with my primary care doctor?

**Additional Resources**

- American Cancer Society: [www.cancer.org](http://www.cancer.org)
  - Understanding Your Pathology Report: Lung Cancer
- American Society of Clinical Oncology: [www.cancer.net](http://www.cancer.net)
  - Reading a Pathology Report
- National Cancer Institute: [www.cancer.gov](http://www.cancer.gov)
  - Pathology Reports
Several treatment options are available to treat lung cancer. The most common therapies include surgery, chemotherapy, radiation therapy and, most recently, targeted therapy and immunotherapy. Your doctor will create a specific treatment plan for your diagnosis depending on several factors, including the type and stage of your lung cancer, the location of the tumor, results of biomarker testing, your overall lung function and your general health. Your treatment plan may include a combination of several treatments, an approach called multimodality therapy. When discussing treatment options with your doctor, make sure you know the type of lung cancer you have, including any information about biomarkers specific to your tumor. Understanding as much as you can about your cancer will help you determine the types of treatment to consider, including clinical trials.

SURGERY
Surgery is typically the treatment of choice when lung cancer is diagnosed at an early stage. However, some tumors may be considered inoperable because they are located near vital structures, and some people are not surgical candidates because of poor general health or decreased lung and/or heart function. Ideally, the decision about whether a lung cancer tumor can be surgically removed should be made by a board-certified thoracic surgeon experienced in lung cancer surgery.

Four types of operations are typically performed, and the type depends on how much of the lung is affected by cancer (see Table 1). For each procedure, surgeons may make a large cut in the chest to remove the tumor, called a standard thoracotomy, or by making several small incisions, which helps preserve muscles and/or nerves in the area. The size of the incision will depend on the size and location of the tumor. During surgery, the surgeon will likely remove lymph nodes or take tissue samples from the lymph nodes to check for cancer cells.

A newer technique called video-assisted thoracoscopic surgery (VATS) involves the use of several small incisions through which the surgeon inserts small instruments to remove the lobe (or segment) of the lung. During VATS, the surgeon does not need to spread the ribs as in the other surgical approaches. VATS offers the advantages of less recovery time, shorter hospital stays and fewer complications, but VATS cannot be done when the tumor is large or in a central location.

Another type of operation is robotic surgery. With this surgery, the surgeon makes several small incisions and uses special instruments that bend and rotate much more than the human wrist. The surgeon also uses special equipment that allows a three-dimensional view inside the body. Finding a surgeon with extensive experience in this procedure is highly recommended.

Radiofrequency ablation may be an option for individuals who have small tumors or are unable to tolerate a surgical procedure. Treatment involves placing a needle directly into the lung tumor and passing a high-frequency electrical current into the tissue. This causes heat that destroys the cancer cells.

CHEMOTHERAPY
Traditional chemotherapy is known as systemic treatment because the drugs travel through the bloodstream to all parts of the body. Chemotherapy is typically the primary treatment for all stages of small cell lung cancer and may be combined with surgery or radiation therapy for early-stage disease. It is also included in treatment regimens for most stages of adenocarcinoma, squamous cell lung cancer and large cell lung cancer and can be used as maintenance therapy, which is treatment given after the end of standard chemotherapy to help delay the progression of the cancer.

Chemotherapy may be given before surgery to shrink a tumor. This treatment is known as neoadjuvant therapy. Chemotherapy may also be used as adjuvant therapy, or treatment given after surgery, to kill any cancer cells that may remain. Chemotherapy can also be combined with radiation therapy, which is known as chemoradiation therapy. Chemoradiation therapy is sometimes used to shrink tumors to an operable size or to manage symptoms. Several chemotherapy drugs are available to treat lung cancer, and the choice depends primarily on the type of cancer. For example, some drugs may be less effective for squamous cell lung cancer than for the other subtypes of non-small cell lung cancer. Other factors in choosing a chemotherapy drug are how it will be used (for adjuvant treatment, for advanced disease or with radiation therapy) and how the benefits compare with the risks. Talk with your treatment team about which regimen is best for you.

Chemotherapy is usually given intravenously (IV) through a vein in your arm, but some drugs may be taken by mouth. You may be able to receive IV chemotherapy in your doctor’s office or in an outpatient clinic, and it typically takes 30 minutes to three hours for the chemotherapy to be completely infused. Chemotherapy is given in cycles, which refers to treatment on specific days over a period of time (usually 21 or 28 days). Sometimes different chemotherapy schedules can be used, and you can discuss the choice of schedule with your treatment team. Treatment plans may vary but usually consist of four to six cycles, and each cycle is followed by a rest period to allow your body to recover from the effects of the drug. Drugs to prevent side effects as well as additional fluids are often given intravenously. Your treatment team will discuss each of these with you.

To monitor whether treatment is working, physical exams and imaging studies may be
done after two and four cycles of chemotherapy. The results may also contribute to the decision to stop or change treatment if your current regimen is no longer effective. When the tumor is no longer shrinking, chemotherapy is usually stopped. Maintenance therapy may then be considered.

**RADIATION THERAPY**

Radiation therapy is the use of high-energy X-rays to kill cancer cells or keep them from growing. External-beam radiation therapy (EBRT) is the type of radiation used most often for treating lung cancer and may be considered as primary treatment for individuals with small tumors who are unable to have surgery. It is delivered from a machine outside of the body, and there are several newer techniques for more accurately targeting and delivering radiation to the tumor site:

- **Three-dimensional conformal radiation therapy (3D-CRT)** involves the use of precise mapping to shape and aim the radiation beams at the tumor(s) from multiple directions, typically causing less damage to normal tissue.
- **Stereotactic body radiotherapy (SBRT)** involves delivering high doses of radiation through radiation beams aimed at the tumor from multiple directions for more precise delivery. This technique is often used for smaller tumors or early-stage cancers when surgery is not an option.
- **Intensity-modulated radiation therapy (IMRT)** is an advanced form of 3D-CRT that delivers radiation from a machine that moves around the patient. Beams are shaped and aimed at the tumor in varying strengths for increased precision. This technique may be used to treat tumors located near sensitive areas such as the spinal cord.

**TARGETED THERAPY**

Targeted therapy is also systemic treatment, but it differs from chemotherapy in that targeted therapy focuses on certain parts of cells and the signals that cause cancer cells to grow uncontrollably or prevent the cells from dying. The signals are often sent by proteins known as tyrosine kinases. The advantage of targeted therapy is that it attacks the source of a tumor’s growth. Researchers have found that the growth of some forms of the three types of non-small cell lung cancer is driven by certain molecular abnormalities or changes in some tyrosine kinases. These changes are known as molecular drivers of lung cancer.

Researchers have learned that these molecular abnormalities cause the three types of non-small cell lung cancers to respond differently to different types of treatment. Because of these differences, it is not effective to treat adenocarcinoma, squamous cell lung cancer and large cell lung cancer the same way, as they once were. Instead, targeted therapy drugs are selected according to any molecular changes that are identified in a lung cancer. Researchers have not yet found targetable changes in small cell lung cancer, so targeted therapy is used only to treat adenocarcinoma, squamous cell lung cancer and large cell lung cancer at this time. When a molecular abnormality is identified in advanced adenocarcinoma, squamous cell lung cancer or large cell lung cancer, targeted therapy is preferred over chemotherapy as first-line treatment because targeted therapy has been associated with higher response rates, longer duration of benefit and far fewer side effects.

To determine if targeted therapy is right for you, your tumor must be tested. A sample of your tumor tissue will be sent to a special lab, where the sample will be tested for molecular biomarkers. This testing should be done before your treatment begins. (Ask your doctor if tissue from a previous biopsy can be used.) Not all tumors will test positively for a molecular change. If your tumor does test positively for one or more molecular changes, you may be treated with an approved targeted therapy or one that is being studied in a clinical trial.

Most targeted therapy drugs are pills that can be taken by mouth, and they are taken once or twice daily. Some targeted therapy drugs are given intravenously. In some cases, targeted therapy is used alone. In other cases, it is given along with chemotherapy.

There are many molecular changes in adenocarcinoma, squamous cell lung cancer and large cell lung cancer. The targeted therapy drugs used to attack these abnormalities are known as tyrosine kinase inhibitors (TKIs). Several drugs have been approved by the FDA to treat these abnormalities, and research continues to discover others. Following are the most common molecular changes:

- **Epidermal growth factor receptor (EGFR) abnormality.** Lung cancers with this abnormality can be treated with drugs known as EGFR inhibitors. EGFR inhibitors block the signal from the EGFR that tells the cancer cells to grow. Another
type of inhibitor, a monoclonal antibody, is a man-made inhibitor that blocks the receptors and prevents the growth signal from getting through. EGFR inhibitors are oral medications that are given alone, and monoclonal antibodies are IV medications that are given with chemotherapy. Several approved EGFR inhibitors are available, so if a lung cancer does not respond to the first EGFR inhibitor given, a different one can be tried.

- **Anaplastic lymphoma kinase (ALK)** rearrangement. Lung cancers with this abnormality can be treated with an ALK inhibitor. As with EGFR inhibitors, several ALK inhibitors are available if a lung cancer does not respond to the first ALK inhibitor given.
- **ROS-1 fusions.** Lung cancers with this abnormality can be treated with a ROS-1 inhibitor.
- **BRAF, MET, KRAS, MET and TRK** abnormalities. Researchers are still studying targeted therapy options for these abnormalities in lung cancer. If your lung cancer has one of these abnormalities, ask your doctor about clinical trials for which you may be eligible.

**Angiogenesis inhibitors**

Angiogenesis inhibitors (or antiangiogenesis drugs) are another type of targeted therapy, but their use does not depend on the results of biomarker testing. Angiogenesis inhibitors stop a protein called vascular endothelial growth factor, which has an important role in the process of angiogenesis, or the formation of blood vessels. Without blood vessels to carry blood to the tumor, it stops growing. Angiogenesis inhibitors are used for many types of cancer, including lung cancer. Angiogenesis inhibitors are usually given intravenously and are often used in combination with chemotherapy.

**IMMUNOTHERAPY**

Immunotherapy is a type of treatment that helps the body’s immune system attack cancer. Researchers used to think that lung cancer was not a cancer that was likely to cause an immune response. However, the results of recent studies have changed these beliefs. One type of immunotherapy that has been shown to be effective in lung cancer is immune checkpoint inhibitors. These inhibitors work by stopping the action of a protein, PD-L1, which can prevent your immune system from attacking lung cancer cells (see Figure 1). In addition to two checkpoint inhibitors, other immunotherapy drugs for the treatment of lung cancer are currently being studied in clinical trials.

Talk with your doctor about the many different kinds of treatment for lung cancer.

**ADDITIONAL RESOURCES**

- American Society of Clinical Oncology: www.cancer.net
- International Association for the Study of Lung Cancer: www.iaslc.org
- LUNGevity: www.lungevity.org
- National Comprehensive Cancer Network: www.nccn.com

**SURVIVOR STORY | JOHN GAVIN | STAGE IV LUNG CANCER**

**DON’T EVER GIVE UP**

*I called my college roommate and during his visit I realized what I’d be saying goodbye to. It hit me that I wasn’t ready to be done yet and, all of a sudden, I got very emotional. I told him there was no hope for me, and I just needed to make peace with what was coming. He told me, “I don’t think you need peace. I think you need a new hospital.” So we found one. A tumor had popped up on my collarbone, and my lymph nodes were getting very swollen. These were the first visible signs of the cancer, and that was scary. My oncologist was concerned that I hadn’t received any treatment for the actual cancer, so she started me on chemotherapy. The tumors seemed to be growing daily despite the treatment so, after just two rounds, we stopped it. Next, we discussed an immunotherapy drug. I began treatment and within two weeks, the tumors on my collarbone started to shrink. After three more weeks, they were almost gone. It stunned all of us. I think my doctors were just as happy about my reaction to the drug as I was. The plan is to stay on the drug for two years with infusions every three weeks. Currently, the primary tumors and the mets are not quite eliminated, but they have been stable or shrinking for several months. I don’t know if I should call it providence or luck or good timing, but I realize how lucky I am. My advice to others is to hang in there. Seek out access to these leading-edge treatments. There is some really hopeful stuff in the pipeline, and it’s worth a try.**
Lung cancer that has spread beyond the lung is called metastatic, advanced or Stage IV lung cancer. Some patients have advanced disease at the time cancer is diagnosed. For others, metastasis may be discovered during follow-up appointments or as a result of symptoms, such as a persistent headache or bone pain. When lung cancer metastasizes, it typically spreads to the adrenal glands, bone, brain, liver or the other lung. It is important to note that when lung cancer spreads to another part of the body, it is still considered lung cancer and is treated as such.

TREATMENT OPTIONS
Treatment for metastatic lung cancer is lifelong. As a result, the goals of treatment are to control the growth of the cancer or to relieve symptoms caused by it and to find the treatment that works best for you.

Metastatic lung cancer may be treated with systemic therapies, which involve the use of substances that travel through the bloodstream, reaching and affecting cells all over the body. These therapies include chemotherapy, biologic therapy, targeted therapy, hormone therapy, or a combination of these treatments.

Recent advancements have provided new, personalized lung cancer treatment options. These targeted therapy treatments focus on the tumor’s molecular abnormalities, also called molecular drivers. The abnormalities fuel the growth of some types of lung cancer, and the targeted therapy drugs use tyrosine kinase inhibitors to attack them. To determine if you are a candidate for this type of treatment, your tumor must be tested. Talk with your doctor to see if this is an option for you.

Radiation therapy is often used to relieve symptoms of metastatic lung cancer such as pain, bleeding, trouble swallowing, cough, or problems caused by spread to other organs such as the brain.

Researchers are testing new treatments for metastatic lung cancer in clinical trials. Clinical trials offer a unique opportunity to gain access to state-of-the-art cancer treatment. Ask your doctor if your type of lung cancer is eligible for a clinical trial.

MONITORING YOUR CANCER
With metastatic lung cancer, tracking how your disease responds to treatment is an important part of your overall care plan. To monitor your cancer, your doctor will order routine testing. Several types of tests can help monitor the cancer’s response to treatment, including imaging studies, tumor marker testing and blood tests. Often, more than one test is needed. To have a baseline for comparison with later studies, your doctor will perform one or more of these studies before treatment.

You will have routine visits with your doctor during treatment. Use the visits to tell your doctor about any new or changing symptoms. Depending on the sites of metastasis, your doctor may be able to tell if treatment is working by performing a physical exam. For example, if a lymph node is a site of metastasis, your doctor may be able to feel that the node has gotten smaller, which means that the metastasis has shrunk.

Together, your input and the results of ongoing, specific testing can tell you and your doctor how well your treatment is working. If your treatment is not slowing or stopping the growth of your cancer, you and your treatment team should discuss other treatment options. Ask about second and third-line therapies that may be appropriate for you, as well as any clinical trials that may be available for your tumor type.

CHOOSING THE RIGHT PATH FOR YOURSELF
Undergoing continuous treatment can take a toll on you. You may reach a point where you feel you need a break from your chemotherapy or other treatments. Talk with your doctor to ensure you understand what taking a break from treatment means for your treatment plan and discuss your reasons for wanting a break. Keep in mind that the treatment you choose initially may need to be adjusted depending on how your body responds and the progression of the disease. Changing your treatment dosage or intensifying the management of your side effects may be appropriate alternatives to stopping treatment.

If you have tried multiple treatment options that are no longer working, you may reach a time when you choose to stop treatment altogether. Talk with your doctor about your feelings. If you make that difficult decision, you are strongly encouraged to investigate hospice care, where efforts are focused on managing symptoms and supporting the patient and family without using cancer therapies. Hospice care can take place at home or in a hospice center and offers physical, emotional and spiritual support for you and your loved ones.

PALLIATIVE CARE
Palliative care is a treatment strategy focused on improving the quality of life for patients by treating or preventing the side effects and symptoms of the disease. Palliative care, also called supportive care, may be given with primary treatment for the lung cancer or by itself, which may be the case for more advanced disease.

Individuals with lung cancer often suffer from shortness of breath. This symptom can be caused by a number of factors, such as fluid buildup in the area surrounding the lungs or a tumor that restricts an airway. Fluid that builds up in the chest surrounding the lungs is called pleural effusion. Your doctor may recommend thoracentesis (a procedure to drain the fluid) or pleurodesis, which involves draining the fluid and then injecting a substance that causes the lining of the chest wall and lung to stick together, preventing any further fluid buildup. Another option may be to place a catheter into the chest to allow the doctor to regularly drain fluid buildup. If the shortness of breath is caused by an airway restriction, laser therapy may be used to destroy the tumor, or a stent (silicone or metal tube) may be placed inside the airway to keep it open.

Lung tumors that have spread to the area around the heart can cause fluid buildup that affects its function. This may be treated using pericardiocentesis (a procedure to drain the fluid) or by creating a pericardial window, which prevents future fluid buildup by removing a piece of the sac around the heart to allow for drainage into the chest or abdomen.

Always tell your doctor about any new or worsening symptoms so they can be addressed immediately. Working to alleviate discomfort is an important part of managing your disease.

ADDITIONAL RESOURCES
- American Cancer Society: www.cancer.org
  What is Metastatic Cancer?
- National Cancer Institute: www.cancer.gov
  Metastatic Cancer
In September 2011, a Stage IV adenocarcinoma of the lung diagnosis took Lysa Buonanno, 40, completely by surprise. Four years later, she is managing her disease successfully, thanks to a comprehensive medical team and a wide support network. Lysa’s words to live by: “You never know how strong you are until being strong is the only choice you have.”

I was suffering from what I thought was a pulled muscle in my back but, after four months, the sporadic back pain was much worse. My mother convinced me to see a doctor, so together we visited a walk-in clinic. An EKG and X-ray prompted the doctor to send us directly to the emergency room for more testing. I was concerned I might have something serious that would keep me off my feet for months, like a slipped disk. Cancer wasn’t even on my radar.

The ER doctor told me my CT and MRI showed lung cancer with a tumor that was wrapped around my spinal cord. Because they felt paralysis was an immediate danger, they admitted me to the hospital immediately.

The news devastated our entire family. I was happily married with a son (19) and a daughter (11). I had just graduated from college the month before, and I was excited to start a new chapter in my life as a radiology technologist.

We had only been married six years, and it made us question everything, all our hopes and dreams. We cried a lot, and we picked each other up a lot.

Everything happened very quickly and, fortunately, I felt comfortable with the oncology team on staff. Seven days later, I had my first spinal surgery. My husband worked nights, so it was a balancing act with our daughter for that first 12-day hospital stay. My mom was by my side to help, and stayed by my side through it all.

Soon after, I began an aggressive two-week schedule of 10 radiation treatments to my pelvis and spine. We followed that with chemotherapy.

I took the chemotherapy drugs in succession, and that made for long days. We were usually there for seven hours at a time.

As a result of the chemotherapy, my primary tumor shrank by 70 percent, but I wanted to have surgery to remove the tumor. My doctor, however, informed me it was not standard protocol for Stage IV disease. I was disappointed but, at my doctor’s urging, I continued to take a maintenance drug for nine months — until 16 more tumors appeared.

Frustrated, I switched oncologists. On my second visit to my new oncologist, I joked that I wanted the tumor out so badly that I was willing to go out in the backyard and do it right then. Genetic sequencing had not yet been done on my tumors, and my doctor thought it was very likely I would have a genetic mutation. So, after two failed biopsies, my oncologist asked, “Why don’t we just cut it out?” He picked up the phone, called a colleague who was a thoracic surgeon and asked his opinion. The surgeon agreed to assist, and the surgery was scheduled. I was floored.

It was a game changer. He literally saved my life.

To remove the tumor, the thoracic surgeon had to remove my entire lower right lobe, but that also enabled my medical team to perform mutation testing on the tumor. Three weeks later, my oncologist called at 10 p.m. to share the results: the tumor was ROS-1 positive.

This was very good news due to a targeted therapy treatment that is available specifically for the lung cancer population that tests positive for a ROS-1 tumor. It’s a rare finding in that only 1 percent of those with lung cancer have this distinction. I soon started treatment.

Throughout this experience, I relied heavily on research, learning from sites such as the American Lung Association and LUNGevity. I read scholarly articles and talked to patients in similar situations. I have found great strength in the friendships I have made through advocacy groups, such as LUNGevity and Inspire. I am active in LUNGevity’s mentor program and in Inspire, a lung cancer support group. And, because there was no support group in my area, I started one. I have more than 150 survivors on my friend list, and I’m proud to say I’ve met about 90 percent of those friends in person.

I’ve lost a lot of friends along the way, but the best part of this whole mess is becoming friends with other survivors.

Three years later I continue to take the medication and have positive results. My lung functionality has diminished, but I feel great. Although I can’t run anymore, I stay active by hiking, paddle-boarding and playing with our dogs.

I’m still considered Stage IV, but the drug has kept me cancer-free since May 2013. I’m very grateful.
Fear of treatment-related side effects can increase the stress of a person with lung cancer, but you can prevent and manage side effects. All treatments have side effects, but they vary from person to person. Not everyone who gets the same treatment will have the same side effects. Some may be minor inconveniences, while others may cause more discomfort, pain or emotional distress. Described here are some of the most common side effects of lung cancer treatment along with suggestions for managing them.

**BONE LOSS**
Cancer and its treatments, including radiation therapy and chemotherapy, can cause loss of bone mass. Bone density is lost when the cells that rebuild bone are not replaced as fast as they get destroyed. As a result, bones become thin, porous and brittle. Bone loss also occurs when cancer metastasizes (spreads) to bone.

Once bone is lost, it cannot be replaced. Your doctor can monitor your bone mass with bone density scans taken before, during and after treatment. Several bone-modifying agents that prevent or delay bone fractures can be prescribed. External-beam radiation therapy can be used to relieve symptoms of bone loss, and low-level radiation can be injected into your veins if you have multiple sites of painful metastases.

**Tips to try:**
- Get enough calcium by eating dairy products, leafy greens and beans. Get enough vitamin D by eating salmon or fortified breakfast cereal.
- Or, with your doctor’s approval, take supplements to ensure you get plenty of both.
- If possible, exercise daily to help stimulate bone-forming cells.
- Reduce your risk of falling by wearing shoes that fit well and by eliminating clutter in your home. Maintaining a healthy weight can help prevent bone fractures.

**COUGH AND UPPER RESPIRATORY INFECTION**
Common side effects of targeted therapy and immunotherapy include a cough or an upper respiratory infection. These may subside as your body adjusts to the treatment. If they persist or you become concerned, talk to your doctor.

**DIARRHEA**
Diarrhea is the passing of loose or watery stools three or more times a day, which may cause abdominal cramps, rectal pain and/or discomfort. When mild, diarrhea is an inconvenience but, left untreated, it can lead to serious problems, such as dehydration, loss of important nutrients, weight loss and fatigue. If you have diarrhea, don’t be embarrassed to talk to your doctor. It is a common problem.

**Tips to try:**
- Along with drinking six to eight glasses of water per day, try Gatorade, Pedialyte or even broth.
- Eat foods that are easier to digest (such as applesauce, bananas, boiled white rice, mashed potatoes, plain toast and crackers).
- Avoid high-fiber foods, caffeine, alcohol, fried or greasy foods, creamy sauces, spicy foods, dairy and chocolate.

**DYSPNEA**
Dyspnea is the medical term for difficult or labored breathing, and it’s common for people with lung cancer. Dyspnea can also refer to shortness of breath. People experiencing dyspnea may feel like they can’t get enough air. Some people may feel anxious or stressed when they feel dyspnea coming on, which can make it worse. It can be scary for both you and your loved ones, but you should know that people do not suffocate or die from it. If you have difficulty breathing, tell your medical team. They can determine the cause of dyspnea and help you manage it.

Dyspnea can be caused by certain cancer treatments. How it is treated depends mostly on its cause. Depending on the cause of your dyspnea, certain procedures or medications may help you treat it.

**Tips to try:**
- Receive oxygen from a tank or other device.
- Perform breathing techniques to help you take in more air.
- Quit smoking and avoid smoky places.
- Open windows or use fans to increase air circulation.
- Use a humidifier or vaporizer to moisten the air.
- Drink a lot of water to help thin mucus and make coughing easier.
- Perform light exercises to increase the flow of oxygen in your blood.
- Sleep with your head propped up on pillows.
- Practice relaxation training to reduce anxiety.

**FEAR OF FUTURE MORTALITY**
Fear of treatment-related discomfort or death can increase the stress of a person with lung cancer, but you can prevent and manage fear. All treatments have side effects, and the fear of future mortality can increase the stress of a person with lung cancer. Everyone who gets the same treatment will not have the same side effects. Some may be minor inconveniences, while others may cause more discomfort, pain or emotional distress.

**Tips to try:**
- Accept help from others who volunteer to prepare meals, complete chores and perform other tasks.
- Be active, if you can do so safely and comfortably. Regular moderate exercise, especially walking, decreases fatigue.
- Set a routine for sleeping and waking. Try to get eight hours of sleep per night.
- Nap when you can, but try to keep naps to about 30 minutes. Longer naps can reduce your energy level.
- Conserve energy. Do the most important things when you have the most energy.

**HAIR LOSS (ALOPECIA)**
Hair loss can be one of the most emotionally difficult side effects of cancer treatment. Chemotherapy targets quickly dividing cells, and hair follicle cells as well as cancer cells divide quickly. As a result, chemotherapy can harm your hair follicles and you may lose hair on your head along with your eyebrows, eyelashes, pubic hair and other body hair. Radiation therapy can also cause hair loss in the treated area. Not everyone receiving these treatments will experience hair loss.

**Tips to try:**
- Buy a wig before treatment. Asking a stylist to cut and color the wig to more closely match your current look may make you more comfortable.
- Your health insurance may cover wigs. Ask your doctor for a prescription for a “cranial prosthesis.”
- Shop for turbans, scarves and hats.
- Use a soft brush or wide-toothed comb, and be gentle when brushing or combing your hair.
- Don’t use hair dye or hot styling tools such as rollers or curling irons.
- Sleep on a satin pillowcase.
- Avoid elastic hair bands.
- Use a mild shampoo and conditioner.

**FATIGUE**
The fatigue that can come with cancer and its treatment is stronger and lasts longer than typical fatigue. For some people with lung cancer, fatigue persists even when they get enough sleep. Fatigue often occurs with chemotherapy and radiation therapy.

**Tips to try:**
- Accept help from others who volunteer to prepare meals, complete chores and perform other tasks.
- Be active, if you can do so safely and comfortably. Regular moderate exercise, especially walking, decreases fatigue.
- Set a routine for sleeping and waking. Try to get eight hours of sleep per night.
- Nap when you can, but try to keep naps to about 30 minutes. Longer naps can reduce your energy level.
- Conserve energy. Do the most important things when you have the most energy.
LOSS OF APPETITE (ANOREXIA)
The loss of appetite or desire to eat is a common symptom of cancer and its treatments. To prevent weight loss, try to maintain a nutritious diet during and after treatment.

If you cannot eat enough food to maintain your weight, talk to your doctor.

Tips to try:
- Discuss nutrition counseling with your medical team.
- If eating is too difficult, ask your doctor about adding supplements to your diet.
- Eat smaller meals frequently throughout the day rather than two or three big meals.
- Have healthy snacks between meals.
- Stick to a schedule of eating meals and snacks at the same time each day, even when you are not hungry.
- Keep snacks handy. People tend to eat more when food is readily available.
- At times when your appetite is not good, rely on foods you really like.

NAUSEA AND VOMITING
Nausea is feeling sick to your stomach and may come with an urge to vomit. Nausea and vomiting are often caused by chemotherapy but can be caused by other treatments for lung cancer, too. Your doctor may prescribe medicines to prevent or reduce nausea before or during your treatment.

Tips to try:
- Eat smaller, more frequent meals throughout the day instead of three big meals a day.
- Eat when you feel best. You don’t have to stick to a standard meal schedule.
- Avoid spicy, citric and fatty foods. Bland foods, such as rice, bananas and crackers, are easier to digest.
- Try soothing foods and drinks that include ginger, such as ginger ale or ginger tea. Peppermint can also relieve nausea.
- Drink plenty of fluids.

NEUROPATHY
Neuropathy is pain or discomfort caused by damage to the peripheral nervous system, which includes the nerves that control movement and feeling in the arms and legs. Symptoms include numbness, pain, burning, tingling or loss of feeling in the hands or feet. If you have these symptoms, write down when they happen, how long they last and how intense they are. Be as specific as possible so you can share the information with your medical team.

Chemotherapy can cause neuropathy, but not everyone who receives chemotherapy will experience it. If you do, your doctor may switch to a different chemotherapy drug or change how your chemotherapy is given. Your doctor may prescribe pain medicines, steroids or numbing creams or lotions.

Tips to try:
- Avoid tight-fitting clothes.
- Wear comfortable shoes.
- Keep your hands and feet warm.
- Avoid standing or walking for long amounts of time.

NEUROPATHY (LOW WHITE BLOOD CELL COUNT)
White blood cells are quickly dividing cells that are affected by chemotherapy. White blood cells are the cells that fight infection, and if too many are destroyed, the condition is known as neutropenia. The risk of infection is higher for people with neutropenia. Although chemotherapy is the most common cause of neutropenia, it can be caused by something else.

People with neutropenia usually do not know they have it because there are no obvious symptoms. You usually learn you have neutropenia by having a blood test. However, you can watch for symptoms of infection. The most important one is fever.

Tips to try:
- Ask your doctor about possible side effects, and discuss them with your dermatologist before beginning treatment.
- Use a mild soap in the shower, and avoid soaps and laundry detergents with strong scents and perfumes. Shower with lukewarm water and avoid long, hot showers.
- Apply a cream-based moisturizer to all of the skin within five minutes of showering or bathing. Use hypoallergenic moisturizers that do not have perfumes or preservatives.
- Avoid the sun, and use a sunscreen with a sun protection factor (SPF) of at least 15. If the sunscreen causes a burning sensation, try sunscreens that contain titanium dioxide.
- Don’t use medicines that treat acne because these may dry or irritate your skin even more.

SKIN REACTIONS
Dry, itchy skin, red, itchy rashes and acne-like rashes are common side effects linked with immunotherapy and targeted therapy. Skin reactions can range from mild to severe. Small rashes that are not uncomfortable or infected usually don’t require treatment. If the rash spreads over a larger area and causes itchiness or pain, your doctor may prescribe a mild corticosteroid cream or an antibiotic gel. Severe rashes are usually treated with an oral antibiotic and perhaps an oral corticosteroid.

Other types of treatment can cause skin reactions. People taking certain chemothera-

ADDITIONAL RESOURCES
- American Cancer Society: www.cancer.org
- American Society of Clinical Oncology: www.cancer.net
- LUNGevity: www.lungevity.org
- National Cancer Institute: www.cancer.gov

Tips to try:
- Wash your hands often, and encourage people who come into contact with you to do the same.
- Avoid contact with sick people.
- Clean and bandage all wounds.
- Avoid raw foods, large crowds, and swimming in hot tubs, ponds, lakes and rivers.

Tips to try:
- Avoid spicy, citric and fatty foods. Bland foods, such as rice, bananas and crackers, are easier to digest.
- Try soothing foods and drinks that include ginger, such as ginger ale or ginger tea. Peppermint can also relieve nausea.
- Drink plenty of fluids.

Tips to try:
- Keep snacks handy. People tend to eat more when food is readily available.
- At times when your appetite is not good, rely on foods you really like.

Tips to try:
- Eat when you feel best. You don’t have to stick to a standard meal schedule.
- Avoid spicy, citric and fatty foods. Bland foods, such as rice, bananas and crackers, are easier to digest.
- Try soothing foods and drinks that include ginger, such as ginger ale or ginger tea. Peppermint can also relieve nausea.
- Drink plenty of fluids.

Tips to try:
- Eat smaller, more frequent meals throughout the day instead of three big meals a day.
- Eat when you feel best. You don’t have to stick to a standard meal schedule.
- Avoid spicy, citric and fatty foods. Bland foods, such as rice, bananas and crackers, are easier to digest.
- Try soothing foods and drinks that include ginger, such as ginger ale or ginger tea. Peppermint can also relieve nausea.
- Drink plenty of fluids.

Tips to try:
- Eat smaller, more frequent meals throughout the day instead of three big meals a day.
- Eat when you feel best. You don’t have to stick to a standard meal schedule.
- Avoid spicy, citric and fatty foods. Bland foods, such as rice, bananas and crackers, are easier to digest.
- Try soothing foods and drinks that include ginger, such as ginger ale or ginger tea. Peppermint can also relieve nausea.
- Drink plenty of fluids.

Tips to try:
- Eat smaller, more frequent meals throughout the day instead of three big meals a day.
- Eat when you feel best. You don’t have to stick to a standard meal schedule.
- Avoid spicy, citric and fatty foods. Bland foods, such as rice, bananas and crackers, are easier to digest.
- Try soothing foods and drinks that include ginger, such as ginger ale or ginger tea. Peppermint can also relieve nausea.
- Drink plenty of fluids.
It is especially important for caregivers to protect themselves and their loved one by keeping up with their own regular medical appointments and staying up-to-date on recommended vaccines, such as the pneumococcal and influenza vaccines.

Taking good care of yourself physically and emotionally helps you be at your best for your loved one. Be sure to eat a healthy diet, exercise and take mental breaks. Seeing a movie, reading a book or getting coffee with a friend can be invigorating. Caregivers often feel that by focusing on themselves, they are being selfish. Actually, it has the opposite effect, allowing you to be more alert and focused on your caregiving responsibilities.

You play an essential role, but it is important to realize you cannot carry the full weight of caregiving. Sharing some of your daily responsibilities will free up your time for the most important duties. Additionally, when you ask for and accept help from loved ones and family members, you give them the opportunity to feel as if they are making a valuable contribution.

### CAREGIVING TIPS

#### 10 WAYS TO DELEGATE

**COMMUNICATING**

Asking a friend to share patient updates by phone, e-mail or another social media tool relieves you and your loved one of having to repeat the same story multiple times, and it ensures everyone hears a consistent message.

**DRIVING**

Schedules can be hard to coordinate. Ask for driving assistance from someone who can offer a block of time so the patient isn’t rushed.

**CLEANING**

Clean clothes and a clean living space are important. When things are clean, everyone at home is more likely to feel refreshed. Coordinating housework to happen while you are at medical appointments may make it easier for your loved one to accept this type of help.

**PREPARING MEALS**

Asking others to prepare meals is especially helpful. Be specific about the day and time you’d like a meal to be delivered. Be sure to share any special diet needs ahead of time. If more than one friend is interested in cooking, ask someone to create a meal schedule.

**CARING FOR CHILDREN**

A change of pace is a good diversion for kids of all ages. Arrange an outing to the park or the library. If your loved one prefers not to be left alone, ask a friend to come over and entertain the kids at home.

**CAREGIVING TIPS**

**ORGANIZING**

Bills, research, insurance correspondence and medical forms can be overwhelming. Asking for help, even if it is just to set up a system to get organized, will provide much-needed peace of mind.

**CAREGIVING TIPS**

**CARING FOR PETS**

Pets offer unconditional love, but they feel the pain of neglect and stress, even when it's unintentional. A trip to the dog park, a walk around the block or the occasional treat can do wonders.

**OUTDOOR CHORES**

Mowing the lawn and shoveling snow take a lot of energy. Having help lets you and your loved one conserve valuable energy and reduce anxiety about chores that may be too massive to attempt.

**SHOPPING**

Everyone goes to the store, so asking a friend to pick up a few items is an easy request.

**SOCIALIZING**

Invite a friend over to do or talk about something with your loved one that is completely unrelated to cancer. It’s important to continue doing some of the same activities he or she did before the cancer, if possible.
In April 2005, I had pneumonia that wouldn’t respond to antibiotics. My doctor ordered a CT scan, and I was floored when it revealed I had non-small cell lung cancer (NSCLC). I didn’t know that non-smokers were at risk for lung cancer.

I immediately sought care at a renowned cancer center. The cancer was staged as IB, BAC, mucinous—now called invasive mucinous adenocarcinoma. Knowing I would find bad news, my oncologist told me to stay off the Internet, but I went online anyway. It was discouraging, but I prefer to know my enemy.

I had a lower left lobectomy followed by four rounds of adjuvant chemotherapy. My tumor was also tested for EGFR, but the test came back negative. At my first scan after chemotherapy, I already had a new nodule. With no viable treatment options, both lungs filled with more than two dozen nodules. In summer 2008, another biopsy confirmed metastatic spread. My oncologist restaged my cancer to Stage IV and advised that I had three to five months to live.

As a last-ditch effort, I went on a targeted therapy for two months. Then my biopsy came back positive for an ALK mutation, and I enrolled in a phase I clinical trial targeting ALK mutations that fall. Through the trial, I became the fourth person in the world with NSCLC to participate. Three years later, I entered another phase I clinical trial, this time for a different drug. After 18 months, I returned to chemotherapy. Six months later, I asked for a break from treatment. In spring 2014, I returned to my first trial drug for several months before entering a phase 1 clinical trial, for a new therapy. Eleven years after diagnosis, I am now in my longest period of stability yet.

I am fortunate to have had two cutting-edge oncologists. When I was diagnosed, testing for EGFR was hardly the norm. I was tested for ALK in 2008, shortly after that mutation was first identified as a driver in NSCLC. My strategy has always been about buying time. When I was diagnosed, my youngest child was seven. In a few weeks, I will watch him graduate from high school—an experience I never thought I’d have.

I have undergone a lot of treatments. I have enormous respect for my body because of how it has bounced back. Then again, I work hard to be both physically and mentally resilient. Currently, I have no side effects from my cancer but am seeing a physical therapist for neuropathy and a neuro-oncologist for cognitive challenges, both caused by treatment. I am focusing not just on surviving, but on thriving.

At one low point, I would lie on the couch and repeat to myself, “You are the strongest person alive.” I kept telling myself that I could get through this, and I used a lot of positive visualization.

People in our community were fabulous. One friend arranged for three months of meals while I was going through chemotherapy. Because we moved two years after my diagnosis, I was really on my own when I started my first clinical trial. Although my husband (we are now divorced) was not as supportive as I would have liked, my incredible medical team and my social worker got me through it. I still see the social worker every three weeks, and I can’t say enough about how she has helped me cope.

I am so much stronger than I ever imagined. Before cancer, I would often say “I can’t.” Now, I know I can do anything. I really feel that confident.

The best advice I received came from my original oncologist and was more a gentle nudge in a different direction than advice. I was focused on a cure, and when it became apparent that I would have to live with my cancer, he told me about outliers—those people who were way on the end of a statistical curve. I shifted my focus to being an outlier. Now, at 11 years of survival, I am one.

Each of us is exceptional. Your stage is just a number. This is not going to be easy, but it is doable. Focus on that far end of the curve, and tell yourself you like a challenge. You can do this. ■
**Managing Pain**

A pain affects most people with cancer, but you don’t have to accept cancer-related pain as a way of life. When you’re in pain, your body’s disease-fighting abilities are lowered, interfering with your health and recovery in general. Pain affects your ability to sleep, work and maintain your relationships. These harmful effects make pain too important to ignore.

Read on to learn about the typical types of cancer-related pain and the options available for managing them. Although you can’t expect to live entirely pain-free, you can expect your medical team to work diligently toward alleviating your pain.

**Common Pain Sources**
Cancer-related pain is caused by several different factors. In most cases, it is directly related to the cancer itself and the location of the tumor(s). As a tumor grows, it can press on internal organs, tissues and joints, creating pressure that ultimately leads to pain in that area. Pain also can be caused by cancer that has spread (metastasized) to bone. This pain is typically felt in the back, pelvis and hips, the most common sites of bone metastasis. Cancer-related pain also may be felt in other parts of the body, especially in advanced disease.

Diagnostic procedures and treatments may cause different types of pain. After surgery, pain is usually felt in the area of the surgery but usually lessens as the body heals. The pain or discomfort caused by chemotherapy and radiation therapy can be mild to severe but often (although not always) ends when treatment does. Sometimes, a hormone imbalance or treatment-related nerve damage may contribute to chronic pain.

The side effects of cancer treatments can also cause pain, including loss of motion, lymphedema, peripheral neuropathy and osteoporosis.

**Types of Pain**
Cancer-related pain is grouped into three categories:

- **Acute pain** is pain that occurs suddenly. It is sometimes related to a diagnostic procedure or treatment and usually resolves once the body recovers and heals.
- **Chronic pain**, also called persistent pain, lasts for at least one month after treatment.

This type of pain is usually related to the direct effects of a tumor or cancer treatment. In a small number of people, chronic pain may be unrelated to either the cancer or the treatment.

- **Breakthrough pain** includes severe flares of pain that “break through” during treatment with pain medication. Breakthrough pain can range from mild to severe and can last minutes to hours.

Once your medical team understands your pain, they can recommend the best treatment options for you. You can help further by describing your pain in as much detail as possible:

- Use descriptive words, such as “shock-like” or “burning.”
- Rate your pain on a scale of zero to 10 (with 10 being the worst).
- Note if anything makes it better.
- Note if anything makes it worse.
- Describe how it affects your daily life.

**Pain Relief Ladder**
Several pain management techniques are available. Your doctor most likely will start with less intensive pain medications and switch to stronger medications if your pain is unrelieved. This stepped process is known as the analgesic ladder (see Figure 1). You and your doctor will decide how to best manage your pain, using the analgesic ladder as a guide. Because every person responds to treatments differently, you and your medical team will discuss the options that best meet your needs.

Pain medication, known as pharmacotherapy, is a typical way to alleviate pain. Mild pain can often be controlled with over-the-counter pain relievers, whereas more severe pain will likely require stronger medications that must be prescribed by your doctor. Ask your medical team about the different ways strong pain medications can now be taken.

Commonly used medications for pain include the following:

- **Non-steroidal anti-inflammatory drugs (NSAIDs)** or non-opioid analgesics are intended to relieve mild-to-moderate pain. These drugs are typically available without a prescription.

**Figure 1**
**Pain Relief Ladder**

<table>
<thead>
<tr>
<th>Targeted drug delivery</th>
<th>Percutaneous techniques</th>
<th>Neurosurgical procedures</th>
<th>Neurostimulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>04</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Strong opioids         |                          |                          |                 |
| **03**                 |                         |                          |                 |

| Weak opioids           |                          |                          |                 |
| **02**                 |                         |                          |                 |

<table>
<thead>
<tr>
<th>Nonopioid analgesics NSAIDS</th>
<th>Compounded medications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>01</strong></td>
<td></td>
</tr>
</tbody>
</table>

NSAIDS = Nonsteroidal anti-inflammatory drugs

©Patient Resource LLC
Percutaneous pain techniques include nerve blocks, ablative procedures (those that consist of removing body tissue) and vertebroplasty/kyphoplasty or cementoplasty (filling the bones of the spine with cement to stabilize them and/or reduce pain). These techniques can often be done in an outpatient setting and, for many people, pain relief is often immediate.

Targeted drug delivery may be an option if you cannot find pain relief with other routes of pain medication (oral, intravenous, etc.) or if you have side effects that you cannot tolerate. A targeted drug delivery system consists of a small pump and a catheter that deliver pain medication directly to the intrathecal space or the fluid surrounding the spinal cord. The system has been shown to be safe and effective and can be used for patients at all stages of the care continuum, especially during end-of-life care.

Neurosurgical options are procedures designed to stop pain at its source by modifying specific brain and spinal cord fibers that carry pain signals. These procedures are performed by a neurosurgeon—a specialist in surgery on the brain and other parts of the nervous system, including the spinal cord—who has expertise in treating pain. Neurosurgical options include neurostimulation, neuroablation, cordotomy, myelotomy and radiosurgical hypophysectomy.

Integrative oncology addresses symptom control with therapies other than pain medications or procedures. Complementary therapies are treatments to control symptoms, and they are used in combination with traditional cancer treatments. Integrative oncology includes only complementary therapies that studies have shown to be beneficial and safe. The most commonly used integrative therapies for cancer-related pain include mind-body therapies, acupuncture, and manipulative and body-based therapies. Choosing complementary therapies can help you take a more active role in your care. Many of them are also effective at reducing stress and anxiety, which can help you cope with pain. Integrative oncology does not include alternative therapies, which are treatments given instead of traditional cancer treatments.

Palliative treatment uses conventional anti-cancer treatments, such as radiation therapy, chemotherapy and surgery, to shrink a tumor or to improve a person’s quality of life. These treatment options have risks as well as benefits. It is essential to ask questions and discuss your expectations with your medical team.

Rehabilitation care is an important part of overall cancer care because it can help reduce the level of pain you experience during or after treatment. Health care professionals work as a team to provide rehabilitation care to help patients improve their physical strength, increase their ability to care for themselves and manage pain and other symptoms.

Effectively managing pain relies on open communication between you and your medical team. Some people hesitate to talk about pain because they don’t want to seem as if they’re complaining. But reporting pain is the first step to feeling comfortable and having a good quality of life.

**COMBATTING PAIN**

**AROUND-THE-CLOCK DOSING**

Pain medication is much more effective when it is taken at regular intervals around-the-clock rather than when you have pain. Around-the-clock dosing can help you “stay ahead” of pain. Take your pain medication exactly as your doctor prescribes. Make sure to discuss with your doctor how to handle breakthrough pain.
ASSISTANCE & SUPPORT RESOURCES

CANCER EDUCATION

American Cancer Society ........................................ www.cancer.org
American Society of Clinical Oncology ..................... www.cancer.net
Association of Community Cancer Centers ............... www.accs-cancer.org
CANCER101 ...................................................... www.cancer101.org
CancerCare ......................................................... www.cancercare.org
CancerGuide ....................................................... www.cancerguide.org
CancerQuest ....................................................... www.cancerquest.org
Centers for Disease Control and Prevention (CDC) ........ www.cdc.gov
The Gathering Place ............................................ www.touchedbycancer.org
Get Palliative Care ............................................... www.getpalliativecare.org
Global Resource for Advancing Cancer Education (GRACE) www.cancergrace.org
The Hope Light Foundation ..................................... www.hopelightproject.com
LIVESTRONG Foundation ..................................... www.livestrong.org
LUNGevity Foundation ......................................... www.lungevity.org
National Cancer Institute ...................................... www.cancer.gov
National Comprehensive Cancer Network (NCCN) ...... www.nccn.org
National LGBT Cancer Network ............................. http://cancer-network.org
OncoLink ............................................................ www.oncolink.org
OncoLink Oncology Nursing Society ........................... www.onconurse.org
PatientPoint Cancer Support .................................... www.patientpoint.org
PearlPoint Cancer Support ...................................... www.pearlpoint.org
Fine Street Foundation ......................................... www.finestreetfoundation.org
R.A. Bloch Cancer Foundation ................................... www.blochcancer.org
Scott Hamilton Cares Foundation .............................. www.scottscares.org
Triage Cancer ....................................................... www.triagecancer.org

CAREGIVERS & SUPPORT

4th Angel Mentoring Program .................................. www.4thangel.org
Bloch Cancer Hotline .......................................... 800-433-0464
CanCare ............................................................ www.canercare.org
CANCER101 ...................................................... www.cancer101.org
Cancer Action ..................................................... www.canceractiontc.org
Cancer and Careers ............................................. www.cancerandcareers.org
CancerCare ......................................................... www.cancercare.org
Cancer Connection ............................................. www.cancerconnection.org
Cancer Hope Network .......................................... www.cancerhope.org
Cancer Information and Counseling Line ................. 800-525-3777
Cancer Support Community .................................... www.cancersupportcommunity.org
Cancer Support Community Open to Options counseling program 888-793-9355
Cancer Survivors Network ..................................... http://csn.cancer.org
Cancer Wellness Center ....................................... www.cancerwellness.org
Caregiver Action Network ...................................... www.caregiveraction.org
CaringBridge ...................................................... www.caringbridge.org
Center to Advance Palliative Care ............................ www.capc.org
Cleaning For A Reason ......................................... www.cleaningforareason.org
Cuddle My Kids .................................................. www.cuddlemykids.org
Family Caregiver Alliance ..................................... www.caregiver.org
Fighting Chance ............................................... www.fightingchance.org
Friend for Life Cancer Support Network .................... www.friend4life.org
The Gathering Place .......................................... www.touchedbycancer.org

At LUNGevity Foundation, we envision a world where no one dies of lung cancer.

One in 15 Americans will be diagnosed with lung cancer in their lifetime. LUNGevity Foundation is firmly committed to making an immediate impact on increasing quality of life and survivorship of people with lung cancer by accelerating research into early detection and more effective treatments, as well as providing community, support and education for all those affected by the disease.

As thought leaders in the lung cancer advocacy community, we seek to empower patients to be active decision makers in their treatment process through our extensive educational resources, online peer-to-peer support and in-person survivorship programs.

Guide Posts of Strength, Inc ........................................ www.guideposts.org
The Hope Light Foundation ..................................... www.hopelightproject.org
I Can Cope ........................................................ www.canecope.org
Immanuel Angels ................................................. www.immanuelangels.org
The LGBT Cancer Project – Out With Cancer .............. www.lgbtqcancer.org
LIVESTRONG Foundation ..................................... www.livestrong.org
LivingWell Cancer Resource Center .......................... www.livingwellcancer.org
Lotus Helping Hands ........................................... www.lotushelpinghands.com
LUNGevity Caregiver Resource Center ..................... www.lungevity.org/caregiver
LUNGevity LifeLine Support Program ....................... www.lungevity.org/lifeline
MyLifeLine Cancer Foundation ................................ www.mylifeline.org
National Center for Complementary and Integrative Health www.nccih.nih.gov
MolecularMatch ................................................ www.molecularmatch.com
My Clinical Trial Locator ....................................... www.mylctriallocator.com
National Cancer Institute ...................................... www.cancer.gov
National Institutes of Health .................................. www.nih.gov
National LGBT Cancer Network ............................. www.nccn.org
National Comprehensive Cancer Network (NCCN) ...... www.nccn.org
National Lung Cancer Network ................................ http://lungcancer.org
National Organization for Rare Disorders .................. www.nord.org
National Society for Lung Health ............................. www.lsth.org
Neurological Foundation of America ........................ www.nfaam.org
Office of Cancer Complementary and Alternative Medicine (OCAM) www.cancer.gov/cam
Patient Power ..................................................... www.patientpower.info
PearlPoint Cancer Support .................................... www.pearlpoint.org
Palliative Care ..................................................... www.patientpower.info
SHARE Caregiver Circle for Family and Friends .......... www.sharesupportercircle.org
SHARE Center .................................................... www.sharesupporter.org
Silent No More .................................................. www.silentnomore.com
South Street Cancer Support ................................... www.southstreetcancer.com
Stand Up To Cancer ........................................... www.standup2cancer.com
Triage Cancer ....................................................... www.triagecancer.org

CLINICAL TRIALS

ACT (About Clinical Trials) ........................................ www.actsaboutclinicaltrials.org
Center for Information and Study on Clinical Research Participation www.ciscrp.org
CenterWatch ..................................................... www.centerwatch.com
Coalition of Cancer Cooperative Groups ..................... www.cancertrialshelp.org
LIVESTRONG Foundation ..................................... www.livestrong.org
LUNGevity Clinical Trial Finder ................................ http://clinicaltrials.lungevity.org
MolecularMatch ................................................ www.molecularmatch.com
My Clinical Trial Locator ....................................... www.myclinicaltriallocator.com
National Cancer Institute ...................................... www.cancer.gov
National Institutes of Health .................................. www.nih.gov
National Lung Cancer Network ................................ www.nccn.org
National Organization for Rare Disorders .................. www.nord.org
National Society for Lung Health ............................. www.lsth.org
Neurological Foundation of America ........................ www.nfaam.org
Office of Cancer Complementary and Alternative Medicine (OCAM) www.cancer.gov/cam
Patient Power ..................................................... www.patientpower.info
PearlPoint Cancer Support .................................... www.pearlpoint.org
Palliative Care ..................................................... www.patientpower.info
SHARE Caregiver Circle for Family and Friends .......... www.sharesupportercircle.org
SHARE Center .................................................... www.sharesupporter.org
Silent No More .................................................. www.silentnomore.com
South Street Cancer Support ................................... www.southstreetcancer.com
Stand Up To Cancer ........................................... www.standup2cancer.com
Triage Cancer ....................................................... www.triagecancer.org

TRIALCHECK .................................................. www.trialcheck.org

COMPETITIVE PROGRAMS & ALTERNATIVE MEDICINE

Believe Big ........................................................ www.believebig.org
The Center for Mind-Body Medicine ........................ www.cmbm.org
Kansas City Healing Project .................................... www.kansascityhealingproject.org
National Center for Complementary and Integrative Health www.nccih.nih.gov
Office of Cancer Complementary and Alternative Medicine (OCAM) www.cancer.gov/cam
Society for Oncology Massage ................................ www.sfom.org
Stewart’s Caring Place Cancer Wellness Center ............ www.stewartscao.com
Touching, Caring and Cancer .................................. www.partnersinhealing.net

LUNG CANCER

American Lung Association .................................... www.lung.org
Bonnie J. Addario Lung Cancer Foundation ................. www.lungcancerfoundation.org
Cancer Action Network ......................................... www.canceractnow.org
Cancer Support Community .................................... www.cancersupportcommunity.org
Caregiver Resource Center ..................................... www.lungcancer.org/caregiver
Caring Ambassadors Lung Cancer Program ................ www.lungcancercap.org
Free To Breathe ................................................... www.freetobreathe.org
International Association for the Study of Lung Cancer .... www.iaslci.org
Lung Cancer Action Network ................................ www.lungcancer.org
Lung Cancer Alliance ............................................ www.lungcanceralliance.org
Lung Cancer Foundation of America ........................ www.lfcmfoundation.org
LungCancer.org ................................................ www.lungcancer.org
Lung Cancer Research Foundation .......................... www.lungresearch.org
Lung Cancer Support Community (a service of LUNGevity) www.foundations.lungevity.org

MENTAL HEALTH SERVICES

American Psychosocial Oncology Society Helpline ........... 866-276-7443

PAIN MANAGEMENT

American Chronic Pain Association .......................... www.theaopa.com
Cancer Pain Research Consortium ......................... http://cancerpainresearchconsortium.org
LIVESTRONG Foundation ..................................... www.livestrong.org
The Resource Center of the Alliance of State Pain Initiatives www.tri.wisc.edu
U.S. Pain Foundation ............................................ http://uspainfoundation.org
This patient education guide was produced with support from Pfizer Oncology.