

CANCERCARE® CONNECT BOOKLET SERIES

TREATMENT UPDATE

Lung Cancer



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New treatment approaches and more effective medications offer greater benefits to people with lung cancer.

Each year, nearly 210,000 Americans are diagnosed with lung cancer. Cigarette smoking is the main risk factor for lung cancer; it is the cause of 85 percent to 90 percent of lung cancers. Although it is much less common, nonsmokers can get lung cancer. There are a number of factors, including exposure to secondhand smoke, radon gas or cancer-causing chemicals, that can contribute to a lung cancer diagnosis.

In recent years, there have been some exciting developments in treating lung cancer. Researchers now understand more about the genetic makeup of lung cancer cells. By using genetic tests, doctors can identify specific types of lung tumors and prescribe treatments designed to target them. Immunotherapy has also emerged as a treatment option for certain types of cancers. These advances have made lung cancer treatment safer and more effective, with fewer side effects.



Diagnosing Lung Cancer

If a CT, MRI or PET scan shows an unusual spot on the lung, a doctor will perform a biopsy—taking a small piece of tissue from the lung. This tissue is then examined under a microscope to look for cancer cells. There are different types of biopsies. In a needle biopsy, the doctor passes a needle through the skin into the lung to remove the tissue. In some cases, a biopsy may be done during a procedure called a bronchoscopy. With the patient under sedation, the doctor inserts a small tube through the mouth or nose and into the lung. The tube, which has a light, small camera and a surgical instrument on the end, allows the doctor to see inside the lung and remove a small tissue sample.

If cancer cells are found in the tissue sample, a genetic test may be performed. The information obtained from the test can help doctors choose the best treatment.

Types of Lung Cancer

There are two major types of lung cancer: non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). NSCLC accounts for about 85 percent of lung cancers and includes:

- **Adenocarcinoma**, the most common form of lung cancer in the United States among both men and women;
- **Squamous cell carcinoma**, which accounts for 25 percent to 30 percent of all lung cancers;
- **Large cell carcinoma**, which accounts for about 10 percent of NSCLC tumors.

SCLC tumors account for the remaining 15 percent of lung cancers in the United States. They tend to grow more quickly

than NSCLC tumors. Usually, SCLC is more responsive to chemotherapy than NSCLC.

Tumors are classified in stages, which are based on whether the cancer is local (in the lung only), locally advanced (spread to nearby lymph nodes, which are small bean-shaped organs that remove waste and fluids and help fight infection) or metastatic (spread to other parts of the body).

Surgery, radiation, chemotherapy, targeted treatments, and immunotherapy—alone or in combination—can all be used to treat lung cancer. To destroy cancer cells, targeted treatments focus on specific cell mechanisms thought to be important for the growth and survival of tumor cells. These medications tend to cause less severe side effects than chemotherapy.

Pathologists (doctors who identify diseases by studying cells and tissues under a microscope) and geneticists (scientists with special training in the study of genes) can give your doctor the information he or she needs to tailor a treatment that will be most effective for you. These specialists can determine the distinct characteristics of each lung cancer: the tumor type (NSCLC or SCLC, for example); how far it has advanced (its stage); and the mutations (gene changes) that cause or “drive” the cancer.



Treatment Options

In this section we describe the treatments most often used. Your doctor will advise you about a treatment plan for your specific cancer. Some treatment approaches are only appropriate for specific types of lung cancer, or for lung cancer that has certain characteristics.

Surgery

Surgery, sometimes in combination with chemotherapy, is the most common treatment option for tumors confined to the lung. Advances in surgical techniques now allow doctors to make much smaller incisions to remove tumors or even whole sections of a lung damaged by cancer. Using video-assisted thoracoscopic surgery (VATS), the surgeon inserts a tube called a thoracoscope. This device has a light and a tiny camera connected to a video monitor so that the surgeon can see inside the chest. In a similar type of procedure, surgeons in some medical centers use robot-assisted surgery to make small incisions and remove cancerous tissue. Both techniques result in a faster recovery with less discomfort and scarring than traditional open-chest surgery.

Radiation Therapy

Increasing use of CT, MRI and PET scans has allowed radiation oncologists to accurately target tumors in the lungs. They can shape the radiation beams to the size and dimensions of the tumor to help spare healthy tissues. As a result, radiation therapy treatment has become much more focused and effective. In some cases where surgery is not possible, radiation therapy may be used, either alone or in combination with chemotherapy. These treatments also may be used before surgery to shrink the tumor or after surgery to help prevent the cancer from coming back (recurring).

Targeted Treatments

When researchers discovered that a mutation in the gene EGFR was involved in the growth and spread of lung cancer, they began to study EGFR inhibitors—targeted treatments that could block the mutation. (Ten percent of people with lung cancer have EGFR mutations.) Today, three medications are effective treatment options for lung cancer patients with this gene mutation:

- **Erlotinib (Tarceva and others).** The U.S. Food and Drug Administration (FDA) first approved the use of erlotinib for lung cancer in 2004. In 2013, it was approved as an initial treatment for patients with NSCLC that has spread to other parts of the body and has certain types of EGFR mutations or a piece missing (deletion) from this gene.
- **Afatinib (Gilotrif).** In 2013, the FDA approved afatinib for the initial treatment of metastatic NSCLC in patients with the same EGFR gene mutations or deletions as those who can be treated successfully with erlotinib.
- **Gefitinib (Iressa).** In July 2015, the FDA approved gefitinib for the first-line treatment of patients with NSCLC whose tumors harbor specific types of EGFR gene mutations, as detected by an FDA-approved test.

Another gene mutation found in some lung cancers is referred to as ALK. Two targeted treatments are effective options for people whose cancer has this gene change:

- **Crizotinib (Xalkori).** This treatment was approved by the FDA in 2013 for treating metastatic NSCLC tumors with the ALK gene mutation. Crizotinib blocks the mutated ALK gene, stopping the growth of the tumor. After being studied in clinical trials, it was found to be more effective than chemotherapy.

- **Ceritinib (Zykadia).** This medication was approved in 2014 for people with metastatic ALK-positive lung cancer who cannot tolerate crizotinib or whose cancer continued to grow while being treated with crizotinib.

Because the genes of cancer cells can evolve, some tumors may become resistant to a targeted treatment. Medications to meet those challenges are being studied now in clinical trials, which often offer important treatment options for people with lung cancer.

Chemotherapy

Chemotherapy has long been an effective treatment for SCLC. It can also be used to treat some NSCLCs, alone or in combination with surgery or radiation. A number of chemotherapy drugs have been approved by the FDA for lung cancer treatment. These medications include:

- **Pemetrexed (Alimta).** For use in combination with cisplatin (another chemotherapy drug) for the initial treatment of advanced non-squamous NSCLC. Pemetrexed also is approved for use alone to treat this type of cancer after other chemotherapy has been given.
- **Gemcitabine (Gemzar and others).** For use in combination with cisplatin for the treatment of NSCLC.
- **Etoposide (Etopophos, Vepesid).** For use in combination with other cancer medications for the treatment of SCLC.

In recent years, more chemotherapy choices have become available; many of them have less toxicity than the older treatments.

There are drugs approved by the FDA to treat conditions other than lung cancer. Patients should talk to their oncologist to see if any of those drugs are a treatment option for them.

Immunotherapy

Immunotherapy has recently emerged as a new treatment option for certain lung cancers. While any cancer treatment can cause side effects, immunotherapy is generally well-tolerated; this is in part due to its mechanism of action.

Our immune system is constantly working to keep us healthy. It recognizes and fights against danger, such as infections, viruses, and growing cancer cells. In general terms, immunotherapy uses our own immune system as a treatment against cancer.

In March 2015, the FDA approved the immunotherapy nivolumab (Opdivo) for the treatment of metastatic squamous NSCLC which was unsuccessfully treated with chemotherapy. Nivolumab works by interfering with a molecular “brake” known as PD-1 that prevents the body’s immune system from attacking tumors.

Additional approaches to immunotherapy for lung cancer have shown promise in early clinical trials and are now in late-phase development. Treatments for NSCLC have advanced the furthest; however, a number of new immune-based treatments for SCLC are also in clinical development. These treatments fall into four main categories:

- **Monoclonal antibodies** are lab-generated molecules that target specific tumor antigens (a substance that the immune system sees as being foreign or dangerous).
- **Checkpoint inhibitors** target molecules that serve as checks and balances in the regulation of immune responses.

Cutting Off the Blood Supply to Tumors

Yet another approach to destroying cancer cells is cutting off the blood supply that tumors need to grow. Blood vessels grow in several ways. One way is through the presence of a substance produced by tumors called vascular endothelial growth factor (VEGF). This substance stimulates blood vessels to penetrate tumors and supply oxygen, minerals and other nutrients to feed them. When tumors spread throughout the body, they release VEGF to create new blood vessels.

Bevacizumab (Avastin) works by stopping VEGF from stimulating the growth of new blood vessels. (Because healthy tissues have an established blood supply, the drug does not affect them.) When combined with chemotherapy, bevacizumab has been shown to help some patients with certain types of NSCLC, such as adenocarcinoma and large cell carcinoma, to live longer.

- **Therapeutic vaccines** target shared or tumor-specific antigens.
- **Adoptive T-cell transfer** is an approach in which T-cells (a type of white blood cell) are removed from the patient, genetically modified or treated with chemicals to enhance their activity, and re-introduced into the patient with the goal of improving the immune system's anti-cancer response.

The Importance of Clinical Trials

Clinical trials are the standard by which we measure the worth of new treatments and the quality of life of patients as they receive those treatments. For this reason, doctors and researchers urge people with cancer to take part in clinical trials.

Your doctor can guide you in making a decision about whether a clinical trial is right for you. Here are a few things that you should know:

- Often, people who take part in clinical trials gain access to and benefit from new treatments.
- Before you participate in a clinical trial, you will be fully informed as to the risks and benefits of the trial.
- Most clinical trials are designed to test a new treatment against a standard treatment to find out whether the new treatment has any added benefit.
- You can stop taking part in a clinical trial at any time for any reason.



Managing Treatment Side Effects

All cancer treatments can cause side effects. It's important that you report any side effects you experience to your health care team so they can help you manage them. Report them right away—don't wait for your next appointment. This will improve your quality of life and allow you to stick with your treatment plan.

Common side effects for various treatment options are shared in this section. Pain, fatigue, digestive tract problems, rash, and loss of appetite can occur with many types of treatment, and are discussed separately.

It's important to remember that not all patients experience all side effects, and patients may experience side effects not listed in this booklet.

Side Effects of Radiation Therapy Treatments

Changes to the skin are the most common side effects of radiation therapy; those changes can include dryness, swelling, peeling, redness, and blistering. If a reaction occurs, contact your health care team so the appropriate management can be prescribed. It's especially important to contact your health care team if there is any open skin or painful areas, as this could indicate an infection. Infections can be treated with an oral antibiotic or topical antibiotic cream.

Thoracic (chest) radiotherapy, which is commonly used in combination with chemotherapy, can cause acute esophagitis, an irritation or inflammation of the esophagus. Contact your health care team if you experience any discomfort.

Managing Pain

To help your doctor prescribe the best medication, it's useful to give an accurate report of your pain. Keep a journal that includes information on:

- When the pain occurs;
- How long it lasts;
- How strong it is on a scale of 1 to 10, with 1 being the least amount of pain and 10 the most intense;
- What makes the pain feel better and what makes it feel more intense.

Side Effects of Chemotherapy

The side effects of chemotherapy depend on the type and dose of drugs given and the length of time they are used, and can include:

- Hair loss;
- Increased risk of infection (from having too few white blood cells);
- Easy bruising or bleeding.

Mouth sores are also a side effect of chemotherapy. Your doctor may recommend treatments, such as:

- Coating agents. These medications coat the entire lining of your mouth, forming a film to protect the sores and minimize pain.

- Topical painkillers. These are medications that can be applied directly to your mouth sores.

Managing Fatigue

Fatigue (extreme tiredness not helped by sleep) is one of the most common side effects of many cancer treatments. If you are taking a medication that causes you to experience fatigue, talk to your doctor about whether taking a smaller dose is right for you.

There are a number of other tips for reducing fatigue:

- Take several short naps or breaks.
- Take short walks or do some light exercise, if possible.
- Try easier or shorter versions of the activities you enjoy.
- Ask your family or friends to help you with tasks you find difficult or tiring.
- Save your energy for things you find most important.

Fatigue can be a symptom of other illnesses, such as diabetes, thyroid problems, heart disease, rheumatoid arthritis, and depression. So be sure to ask your doctor if he or she thinks any of these conditions may be contributing to your fatigue.

Also, it can be very valuable to talk to an oncology social worker or oncology nurse. These professionals can also help you manage fatigue. They can work with you to manage any emotional or practical concerns that may be causing symptoms and help you find ways to cope.

Managing Digestive Tract Symptoms

Digestive tract symptoms can occur in people undergoing cancer treatments. Your doctor can prescribe medications for digestive tract side effects; the following tips also may help.

Nausea and vomiting:

- Avoid food with strong odors, as well as overly sweet, greasy, fried or highly seasoned food.
- Eat meals cold or at room temperature, which often makes food more easily tolerated.
- Nibble on dry crackers or toast. These bland foods are easy on the stomach. Having something in your stomach when you take medication may help ease nausea.

Diarrhea:

- Drink plenty of water. Ask your doctor about using drinks such as Gatorade that provide electrolytes as well as liquid. Electrolytes are body salts that must stay in balance for cells to work properly.
- Over-the-counter medicines such as loperamide (Imodium A-D and others) and prescription drugs are available for diarrhea but should be used only if necessary. If the diarrhea is bad enough that you need medicine, discuss it with your doctor or nurse.
- Avoid sweetened foods and alcohol.
- Choose fiber-dense foods such as whole grains, fruits and vegetables, all of which help form stools.

Managing Loss of Appetite

- Because it's important to maintain your weight, eat small meals throughout the day. That's an easy way to take in more calories and protein.

- To keep from feeling full early, avoid liquids with meals or take only small sips (unless you need liquids to help swallow). Drink most of your liquids between meals.
- Be physically active. Sometimes, taking a short walk an hour or so before meals can help you feel hungry.
- Keep high-calorie, high-protein snacks on hand such as hard-boiled eggs, peanut butter, cheese, ice cream, granola bars, liquid nutritional supplements, puddings, nuts, canned tuna or trail mix.
- Eat your favorite foods any time of the day. For example, if you like breakfast foods, eat them for dinner.

Rash

Many people who take immunotherapies or targeted treatments get an itchy rash, which can appear on various parts of the head and body. Ask your doctor about using over-the-counter or prescription medications.

Staying Active

There are many important reasons to stay active. Being active can help you tolerate treatments better, recover from surgery faster and reduce fatigue, pain and the need for pain medication. Other benefits of exercise include maintaining flexibility and strength, reducing anxiety or depression and boosting your self-esteem.

The American College of Sports Medicine and the American Cancer Society recommend that people with cancer do some type of activity for 30 minutes a day. It doesn't have to be 30 minutes all at once: try doing 10 minutes three times a day or 15 minutes twice a day. Even five-minute activity breaks

can benefit you. The key is to choose an activity program that works best for you, whether it involves bicycling, walking or weight training.

The Importance of Communicating With Your Health Care Team

As you manage your lung cancer, it's important to remember that you are a consumer of health care. The best way to make decisions about health care is to educate yourself about your diagnosis and the members of your health care team, including nurses, social workers and patient navigators.

Here are some tips for improving communication with your health care team:

Start a health care journal. Having a health care journal or notebook will allow you to keep all of your health information in one place. You may want to write down the names and contact information of the members of your health care team, as well as any questions for your doctor. Keep a diary of your daily experiences with cancer and treatment. You can separate your journal or notebook into different sections to help keep it organized.

Prepare a list of questions. Before your next medical appointment, write down your questions and concerns. Because your doctor may have limited time, you should ask your most important questions first, and be as specific and brief as possible.

Bring someone with you to your appointments. Even if you have a journal and a prepared list of questions or concerns,

it's always helpful to have support when you go to your appointments. The person who accompanies you can serve as a second set of ears. He or she may also think of questions to ask your doctor or remember details about your symptoms or treatment that you may have forgotten.

Write down your doctor's answers. Taking notes will help you remember your doctor's responses, advice and instructions. If you cannot write down the answers, ask the person who accompanies you to do that for you. If you have a mobile device, you can use it to take notes. Writing notes will help you review the information later.

Record your visit if your doctor allows it. Recording the conversation with your doctor gives you a chance to hear specific information again or share it with family members or friends.

Incorporate other health care professionals into your team. Your oncologist and oncology nurse are essential members of your health care team, but there are other health care professionals who can help you manage your diagnosis and treatment:

- Your primary care physician should be kept updated about your lung cancer treatment and any test results.
- Your local pharmacist is a great source of knowledge about the medications you are taking; have all of your prescriptions filled at the same pharmacy to avoid the possibility of harmful drug interactions.
- Make sure your oncologist knows of any other medical conditions you have, or any pain you are experiencing, so that they can consult with your primary care physician or your specialist if needed.

Remember, there is no such thing as over-communication.

CancerCare's Free Support Services and Programs

Oncology social workers provide emotional support for people with cancer and their loved ones. These professionals can help you cope with the challenges of a cancer diagnosis and guide you to resources. CancerCare offers free counseling from professional oncology social workers who understand the challenges faced by people with cancer and their caregivers. We can work with you one-on-one to develop strategies for coping with treatment and its side effects. Oncology social workers can also help you communicate with your doctor and other members of your medical care team about the health care issues that are important to you.

Support groups provide a caring environment in which you can share your concerns with others in similar circumstances. Support group members come together to help one another, providing insights and suggestions on ways to cope. At CancerCare, people with cancer and their families can participate in support groups in person, online or on the telephone.

Financial help is offered by CancerCare and a number of other organizations to assist with cancer-related expenses such as transportation to treatment, child care or home care.

To learn more about how CancerCare helps, please call us at 800-813-HOPE (4673) or visit www.cancercare.org or www.lungcancer.org.

Frequently Asked Questions

Q. My breathing has been affected by surgery and chemotherapy. What can I do about this?

A. When surgery reduces the size of the lungs, you cannot take in as much air. Some medications also change lung function and lead to shortness of breath. Any time you have difficulty breathing, you should report it to your doctor. He or she can prescribe pulmonary (lung) rehabilitation therapy. This therapy may include exercise training, energy-conserving techniques, breathing strategies and nutritional counseling to improve lung function.

Q. My lung cancer has an RET gene mutation. Are any drugs being studied for this type of tumor?

A. The RET gene mutation was recognized about two years ago. For people with other types of cancer with this mutation, three medications have been approved by the U.S. Food and Drug Administration (FDA): cabozantinib (Cometriq) and vandetanib (Caprelsa) for people with thyroid cancer, and sunitinib (Sutent) for those with kidney or pancreatic cancer as well as gastrointestinal stromal tumors (GISTs). Talk with your doctor about lung cancer clinical trials for people with the RET gene mutation and ask whether he or she recommends prescribing any of these medications to you “off label” (using a prescription drug legally to treat a cancer for which the drug has not been approved by the FDA).

Q. Is there a right time to contact a dietician?

A. Many hospitals and other health centers have dieticians readily available, so the right time to reach out is whenever you feel their guidance will be helpful. Dieticians will have lots of suggestions about how to maintain your appetite, eat the right kinds of foods, and deal with any “taste” related side effects of treatment.



Resources

CancerCare®

800-813-HOPE (4673)

www.cancercares.org

American Cancer Society

800-227-2345

www.cancer.org

Cancer.Net

www.cancer.net

Cancer Support Community

888-793-9355

National Cancer Institute

800-422-6237

www.cancer.gov

American Lung Association

800-586-4872

www.lung.org

Lung Cancer Alliance

800-298-2436

www.lungcanceralliance.org

LungCAN

www.lungcan.org

LungCancer.org

800-813-HOPE (4673)

www.lungcancer.org

CLINICAL TRIALS WEBSITES

Coalition of Cancer Cooperative Groups

215-789-3600

www.CancerTrialsHelp.org

EmergingMed

877-601-8601

www.emergingmed.com

National Cancer Institute

800-422-6237

www.cancer.gov/clinicaltrials

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