



What you need to know about...

stage II non-small cell lung cancer



foreword

About LUNGeivity

LUNGeivity is the largest national lung cancer-focused nonprofit, changing outcomes for people with lung cancer through research, education, and support.

About the LUNGeivity PATIENT EDUCATION SERIES

LUNGeivity has developed a comprehensive series of materials for patients/survivors and their caregivers, focused on understanding how lung cancer develops, how it can be diagnosed, and treatment options. Whether you or someone you care about has been diagnosed with lung cancer, or you are concerned about your lung cancer risk, we have resources to help you.

The medical experts and lung cancer survivors who provided their valuable expertise and experience in developing these materials all share the belief that well-informed patients make their own best advocates.

In addition to this and other booklets in the LUNGeivity patient education series, information and resources can be found on LUNGeivity's website at www.LUNGeivity.org, under "For Patients and Caregivers" and "For Supporters and Advocates."

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introduction

Lung cancer staging is a way of describing where the cancer is located, if and where it has spread, and whether it is affecting other parts of the body. Various tests are used to determine the lung cancer's stage. Knowing the stage helps your healthcare team recommend the best treatment plan for you. Lung cancer is treatable at all stages, including stage II, which is the focus of this booklet.

This booklet will help you:

- Understand what lung cancer staging is
- Find out how lung cancer stages are determined
- Learn what stage II non-small cell lung cancer is
- Find out what the treatment options are for stage II non-small cell lung cancer

YOU'LL FIND A GLOSSARY TOWARD THE END OF THIS BOOKLET.

Words included in the glossary appear **blue** the first time that they are used in the text.

01 lung cancer staging

What is lung cancer staging, and why is it important?

Staging is a way of describing where the **lung cancer** is located, if or where it has spread, and whether it is affecting other parts of the body. Treatment options are available for all **stages** of lung cancer, and knowing the stage helps your healthcare team:

- Understand how advanced your lung cancer is
- Recommend those treatment options that are likely to be most effective for you
- Evaluate your response to treatment

When is lung cancer staged?

Lung cancer may be staged once or twice. The first staging, which all patients should undergo, is carried out when a patient is initially diagnosed, and should be completed before treatment begins. This type of staging is called clinical staging. Clinical staging is based on the results of various tests, discussed in more detail later in this chapter, including imaging tests and **biopsies**. The clinical stage is not only the basis for deciding on a patient's treatment plan, but is also the basis for comparison when checking into the patient's response to treatment. The second staging, called pathologic or surgical staging, adds what is learned about the patient's cancer from surgical treatment to the determination of staging. If the pathologic stage differs from the clinical stage (which it may, for example, if it is evident that the lung cancer has spread more than initially estimated), then the healthcare team can adjust the treatment more precisely.

The TNM lung cancer staging system

The staging system described in this booklet, the TNM staging system, is the system used for **non-small cell lung cancer (NSCLC)**, including lung adenocarcinoma, squamous cell lung cancer, and large cell lung cancer. Stage classifications are based on the 8th edition American Joint Committee on Cancer lung cancer stage classifications.

The TNM staging system can also be used for **small cell lung cancer**, although another staging system for small cell lung cancer that has only two stages, **limited-stage** and **extensive-stage**, is more often used.

TNM stages are based on the values assigned to a patient's lung cancer in three categories—T (**tumor**), N (**node**), and M (**metastasis**):

- **T:** The size of the **primary tumor** and if it has grown into adjacent structures. The primary tumor is the original, or first, tumor.
- **N:** Whether and how **regional lymph nodes** are affected by the cancer. **Lymph nodes** are small bean-shaped structures that are part of the body's circulatory and **immune systems**; regional lymph nodes are those that are in the region around a tumor.
- **M:** Whether there is **distant metastasis**. Distant metastasis is the spread of cancer cells from the place where they first formed to distant organs, such as the **adrenal gland**, bones, brain, or other lung, or to distant lymph nodes.

The particular combination of TNM values assigned to a patient's lung cancer determines its stage.

Stages using TNM classifications are designated by a number, zero (0) through four. For one through four, the Roman numerals I through IV are used. The lower the stage number, the less advanced the cancer is and the better the outcome is likely to be; the higher the stage number, the more advanced the cancer is. Stages I–IV are further divided into substages. Briefly, the TNM stages of lung cancer are:

- **Stage 0:** This is called “*in situ*” disease, meaning that the lung cancer is “in place” and has not spread from where it first developed.
- **Stage I:** Stage I lung cancer tumors are small tumors that are only in one lung and have not spread to any lymph nodes or metastasized.
- **Stage II:** Stage II lung cancer tumors are also in one lung, are larger than stage I tumors, may or may not have grown into nearby areas or spread to lymph nodes, and have not metastasized.
- **Stage III:** Stage III lung cancer tumors are also in one lung, are larger than stage II tumors, may or may not have grown into other areas or spread to nearby lymph nodes, and have not metastasized.
- **Stage IV:** Stage IV lung cancer primary tumors are of any size, may or may not have spread to any lymph nodes, and have metastasized.

Recurrent lung cancer is lung cancer that has come back after treatment. If there is a recurrence, then the cancer may need to be staged again (“restaged”), using the same TNM system.

Tests to help determine the lung cancer stage

There are a number of tests that can be used to determine the lung cancer stage. Your healthcare team and you will determine which are appropriate for you. These tests include:

Imaging tests

Imaging tests create pictures of the inside of the body. Examples include:

- **Computed tomography (CT or CAT scan):** This test uses a computer linked to an **X-ray** machine to make detailed pictures of the inside of the body. Unlike a conventional X-ray, which takes one picture, a CT scanner takes multiple pictures as it rotates around the patient in order to get images from different angles. Three-dimensional (3D) views of the organs and tissues can be created. A CT scan can provide specific information about the size, shape, and position of tumors in the lungs. It also can help find enlarged lymph nodes or masses in other organs that might be caused by the spread of lung cancer. CT scans usually only take a few minutes to complete.
- **Magnetic resonance imaging (MRI):** This test is used to find out whether the lung cancer has spread to the brain, spinal cord, liver, or other parts of the body. MRI scans provide detailed pictures of areas inside the body by using radio waves and strong magnets in a pattern that a computer translates into images. It is particularly good for images of the brain and nervous tissue. The patient may need to lie in a scanner for up to an hour or more.

- **Positron emission tomography (PET):** This type of scan is used to help determine whether the lung cancer has spread to lymph nodes, bones, or other organs in the body. (It is less useful in checking for cancer that has spread to the brain.) The patient is injected with a radioactive sugar. Because cancer cells grow rapidly, they absorb more of the radioactive sugar than do most healthy cells. About an hour after the injection, the patient is placed on a table in the PET scanner for approximately 30 minutes while a special camera creates a picture of the areas in the body that absorbed the radioactive sugar. (PET scans are usually used in place of a bone scan in lung cancer.)
- **PET/CT scan:** A combined PET/CT scan can be performed using a machine that does both simultaneously, allowing the comparison of areas of radioactivity as shown on the PET scan with the detailed view of that area as shown on the CT scan.

Biopsies

Biopsies are procedures in which small amounts of tissue are removed for examination. Depending on which method is used, your healthcare team can determine whether the cancer has spread to lymph nodes or other organs. Examples of biopsy procedures used to help in lung cancer staging include:

- **Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA):** EBUS-TBNA is used to access **mediastinal** lymph nodes. A flexible **bronchoscope** fitted with an ultrasound device is guided in the **trachea** (windpipe). Once the bronchoscope is in place, a needle is inserted through the **bronchus** and into a lymph node to obtain a sample.

- **Endoscopic esophageal ultrasound:** This test uses an **endoscope** to access the esophagus. The esophagus is behind the trachea in near proximity to lymph nodes in the chest. The device can be aimed in different directions to observe the lymph nodes and other structures inside the chest to which the lung cancer may have spread. A needle can be inserted through the endoscope to obtain a sample.
- **Mediastinoscopy:** This procedure is used to acquire tissue samples from the **mediastinum**, which is the area between the lungs. A thin tube through which tissue samples from the nearby lymph nodes along the trachea can be taken is used; the tube is inserted through a small incision in the front of the neck.
- **Mediastinotomy:** This procedure allows access to lymph nodes that are not reachable by mediastinoscopy. The incision is larger and is made between the second and third ribs next to the breast bone. This is sometimes used to biopsy lymph nodes from tumors on the left side.
- **Thoracoscopy:** For staging, this procedure is used to sample tumors and lymph nodes on the outer parts of the lungs, check whether lung cancer has spread to the spaces between the lungs and chest wall, and check whether the tumor has spread to nearby lymph nodes and organs. This is a more invasive procedure than the others, and so usually is not the first to be used. (This procedure is also referred to as video-assisted thoracoscopic surgery [VATS].)

More details on lung biopsies can be found in LUNgevity's "What you need to know about biomarker testing" booklet, which can be downloaded at <https://lungevity.org/for-patients-caregivers/get-educational-materials> or <https://lungevity.org/for-patients-caregivers/lung-cancer-101/diagnosing-lung-cancer/biomarker-tests>.

Deciding on a treatment plan

There are a number of treatment options for each stage of lung cancer. Your healthcare team will recommend a treatment plan based on your stage as well as other factors about you and your cancer, including your overall health and information on how well the organs of your body are functioning.

You may have one or more kinds of laboratory tests to assess these factors, including:

- A **complete blood count (CBC)** to check for:
 - **Anemia:** a low number of red blood cells
 - **Thrombocytopenia:** a low number of platelets, which can cause bleeding
 - **Neutropenia:** a low number of white blood cells (WBCs), which can put a patient at increased risk for infection
- **Blood chemistry tests** to check whether your liver or kidneys are working well. The results from these blood tests help the healthcare team decide if you are able to undergo surgery or receive another type of lung cancer treatment.
- **Heart and lung function tests** to check if these organs are working well. Results of these tests will help your healthcare team decide whether you are eligible for surgery.

You may be as involved in the treatment plan decision as you want to be. Discuss all of the options, understand what the goal of each option is (for example, cure vs. control), consider the benefits and risks of each, check about likely side effects, understand how your everyday life might be affected, find out what the treatment will mean to you financially, and do not hesitate to get a second opinion if you have unaddressed concerns.

It is always a good idea to take someone with you to your appointment to help with questions and take notes.

02 stage II non-small cell lung cancer

What is stage II non-small cell lung cancer (NSCLC)?

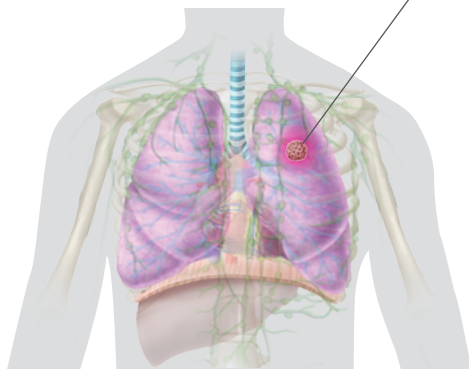
Like stage I lung cancer, stage II lung cancer is localized in the lung; that is, it has not metastasized to distant parts of the body.

Stage II lung cancer is divided into two substages: stage IIA and stage IIB.

Stage IIA

Stage IIA tumors are more than 4 cm but no more than 5 cm in the greatest dimension and have not spread to nearby lymph nodes. Tumors may or may not have grown into the main bronchus or the lung's inner lining, or have caused lung collapse or swelling.

LUNG CANCER: STAGE IIA



Tumor **more than 4 cm but no more than 5 cm** in the greatest dimension

AND

Cancer **has not spread** to any lymph nodes

AND

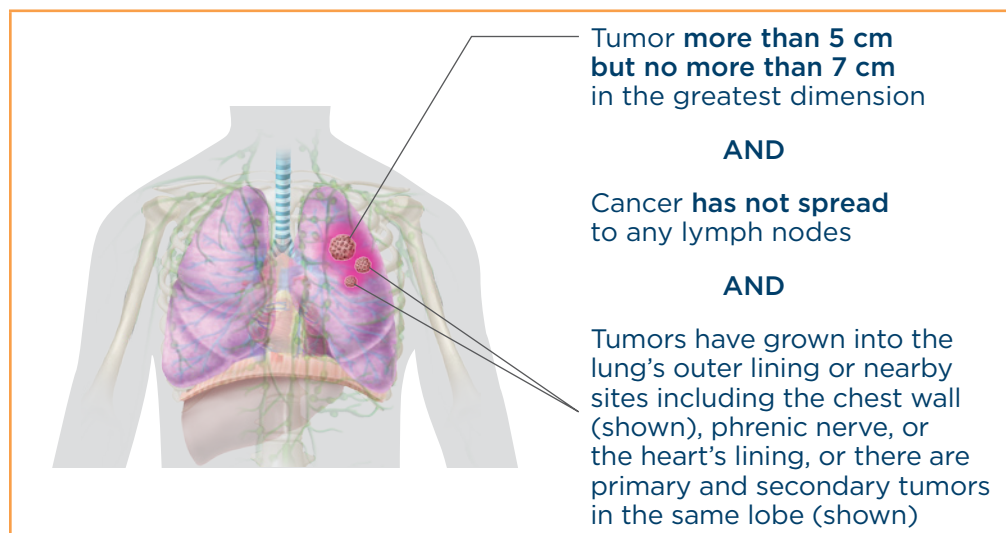
Tumors may or may not have grown into the main bronchus or the lung's inner lining, or have caused lung collapse or swelling

Stage IIB

Stage IIB tumors are either:

- More than 5 cm but no more than 7 cm in the greatest dimension and have not spread to nearby lymph nodes. They have grown into the lung's outer lining or nearby sites, including the chest wall, **phrenic nerve**, or the heart's lining, or there are primary and secondary tumors in the same **lobe**.

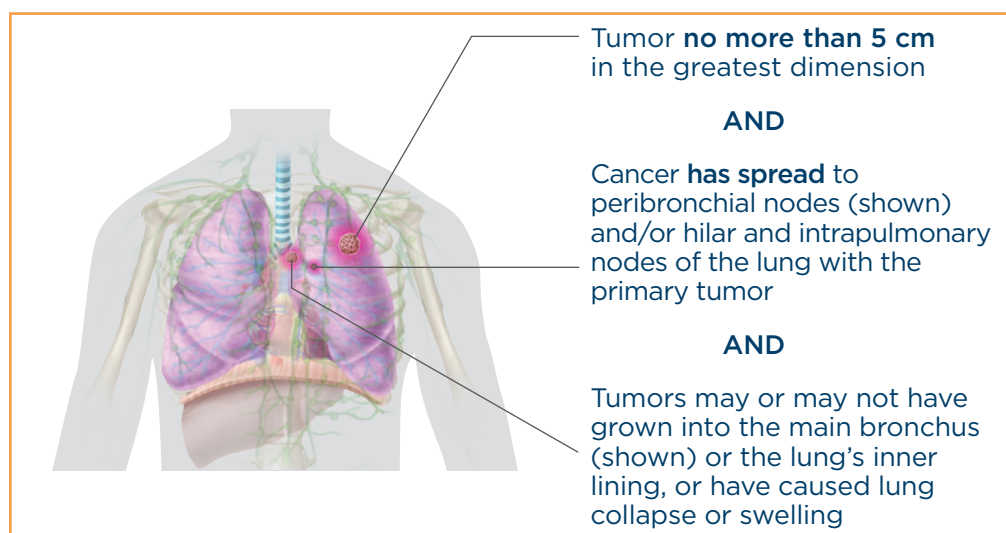
LUNG CANCER: STAGE IIB



OR

- No more than 5 cm in the greatest dimension and have spread to **peribronchial** nodes and/or **hilar** and **intrapulmonary** nodes of the lung with the primary tumor. They may or may not have grown into the main bronchus or the lung's inner lining, or have caused lung collapse or swelling.

LUNG CANCER: STAGE IIB



Signs and symptoms of stage II NSCLC

Early-stage lung cancer is most often symptomless and therefore may first be detected on X-rays, CT scans, or other kinds of tests being done to check on another health issue.

While they are more likely to appear at a more advanced stage than stage II, the following are signs and symptoms of lung cancer. These signs and symptoms may also be caused by other conditions and are not specific to lung cancer. Speak with your healthcare team if you have any of the following:

- Coughing symptoms
 - A cough that gets worse or does not go away
 - Coughing up blood
- Chest symptoms
 - Breathing trouble, such as shortness of breath
 - New wheezing when you breathe
 - Ache or pain in your chest, upper back, or shoulder that doesn't go away and may get worse with deep breathing
 - A hoarse voice
 - Frequent respiratory tract infections, such as pneumonia or bronchitis
- General physical symptoms
 - Feeling unusually tired all the time
 - Weight loss with no known cause and loss of appetite
 - Trouble swallowing
 - Swelling in the face and/or veins in the neck

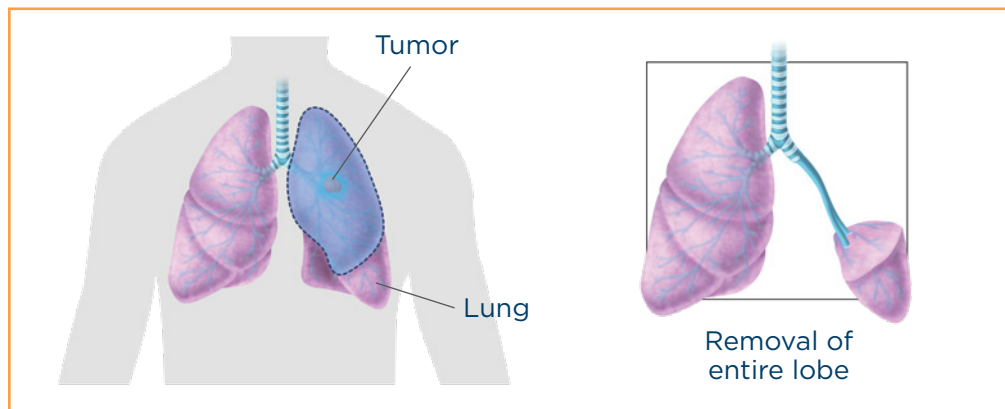
Treatment options for stage II NSCLC

Your healthcare team and you will determine the best treatment plan for you.

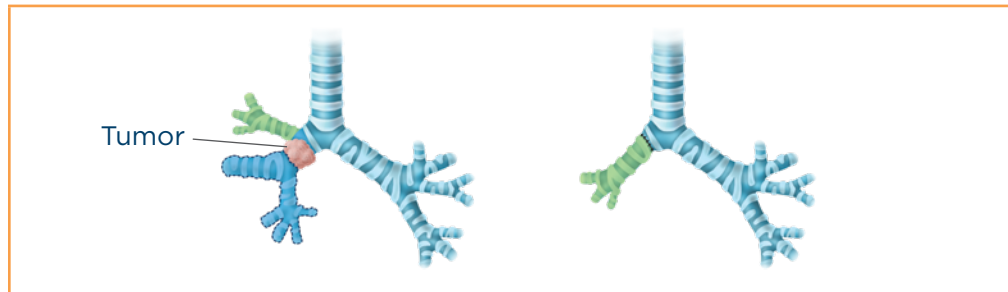
Treatment options for patients with stage II lung cancer may include surgery, **chemotherapy**, and **radiation therapy**, in various combinations and sequences.

Types of surgery that may be used include lobectomy (removal of the lobe of the lung where the tumor is), **sleeve lobectomy**, **wedge resection**, or **segmentectomy**. The latter two surgeries involve removing a smaller piece of the lung if removing the entire lobe would be problematic. During any of these surgeries, lymph nodes will also be removed.

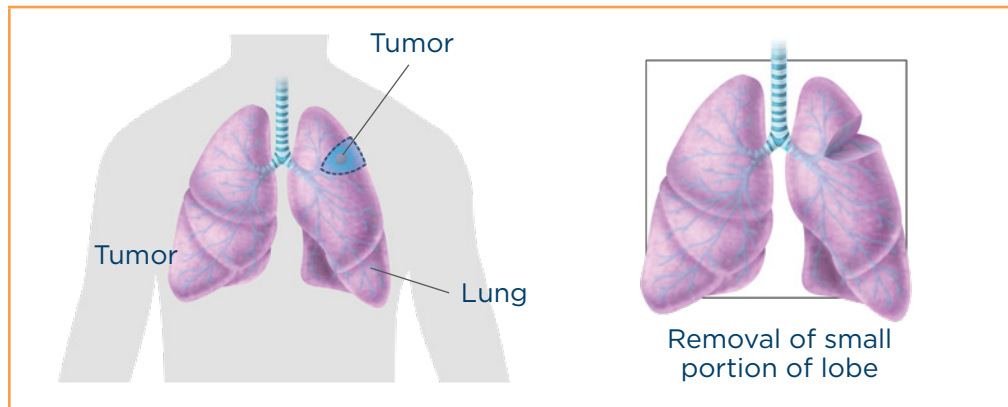
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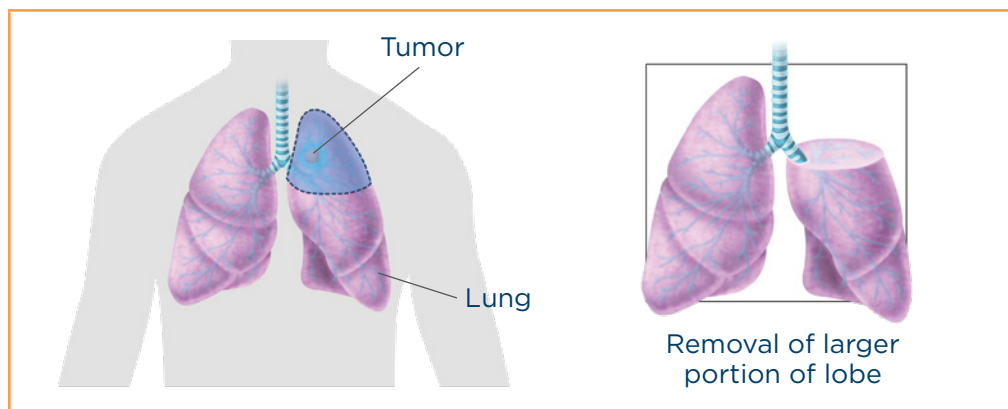
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WEDGE RESECTION



SEGMENTECTOMY



Stereotactic body radiation therapy (SBRT) is the radiation therapy typically given. SBRT delivers a highly focused dose of radiation to the tumor, while limiting the dose to the surrounding area. SBRT is also known as stereotactic ablative radiotherapy.

SBRT is an option for some patients who cannot be or choose not to be treated surgically.

Your healthcare team may recommend adding chemotherapy to your surgical treatment plan. Chemotherapy may be given before surgery (also known as neoadjuvant chemotherapy) to reduce the size of the tumor or after surgery (also known as adjuvant chemotherapy) to reduce the risk of the cancer coming back. Commonly used chemotherapy drugs used to treat stage II lung cancer include:

Generic (chemical) name	Brand name (sold as)
Carboplatin	Paraplatin®
Cisplatin	Platinol-AQ®
Docetaxel	Taxotere®
Etoposide	Etopophos®
Gemcitabine	Gemzar®
Paclitaxel	Taxol®, Onxol®
Paclitaxel (albumin-bound)	Abraxane®
Pemetrexed	Alimta®
Vinorelbine	Navelbine®

Your healthcare team will select the appropriate chemotherapy drug(s).

Treatment options for patients with stage IIA lung cancer may include:

- Surgery alone to remove the tumor and lymph nodes
- Surgery followed by another surgery or **chemoradiation** (chemotherapy and radiation therapy either at the same time [concurrently] or one following the other [sequentially]) to ensure that the cancer is gone if the **pathologist** finds cancer cells in the **margins** of the removed tumor
- Surgery followed by chemotherapy if cancer may still be in the body

Treatment options for patients with stage IIB lung cancer may include:

- Surgery alone to remove the tumor and lymph nodes
- Surgery followed by chemotherapy if there is no cancer in the margins, but cancer may still be in the body
- Surgery followed by another surgery and chemotherapy if there is cancer in the margins that can only be seen with a microscope
- Surgery followed by chemoradiation (either concurrent or sequential) if there is cancer in the margins that can only be seen with a microscope
- Surgery followed by another surgery and chemotherapy if there is cancer in the margins that can be seen without a microscope
- Surgery followed by chemoradiation (concurrent) if cancer can be seen without a microscope

A Pancoast (superior sulcus) tumor is a lung cancer that starts in the apex of the lung and grows into the surrounding ribs and tissues, including the nerves to the arm. Because of its location, it is treated differently than other stage II tumors. If you have a Pancoast tumor, your healthcare team will discuss the best treatment options for you.

In addition, there are new treatments to consider for the treatment of stage IIA and IIB lung cancer that are available now only through **clinical trials**, such as **immunotherapy** and surgery followed by both radiation therapy and immunotherapy.

Side effects of stage II NSCLC treatment and how to manage them

Side effects from lung cancer treatment are common, but just because a side effect is common does not mean that you will have it. Before you begin your treatment for stage II NSCLC, discuss with your healthcare team what side effects you might expect and how to prevent or ease them. Speak with your healthcare team if and when new side effects begin, as treating them early on is often more effective than trying to treat them once they have already become severe. Although most side effects go away when treatment is over, some can last a long time.

The management techniques below are not all-inclusive. Your healthcare team will have a more extensive set of recommendations.

Common side effects of surgery

- **Pain:** Depending on the type of surgery a patient has and how big the incision, the patient's chest and back may be painful for several weeks or longer after surgery. Pain medicines that will help can be prescribed.
- **Fatigue:** A patient should expect to feel more tired than usual after surgery. How long it will take to get back to normal is different for each patient. Rest is very important to recovery.
- **Fluid, blood, or air in chest:** One or more chest tubes are typically placed during surgery to keep the patient's chest cavity free of fluid, blood, and air that collect after lung surgery. The tubes will be connected to a machine that gently suctions the fluid from the chest. These tubes are left in place until the fluid and air have stopped draining. Air leaks typically stop 1-4 days post-surgery.

- **Shortness of breath:** A patient should expect to feel short of breath after lung surgery. The extent of this depends on how much of the lung was removed and how much pain the patient is experiencing. After a portion of a lung is removed, the remaining lung tissue can expand over time and make it easier to breathe. A respiratory therapist can help the patient with breathing treatments after surgery. These treatments may include deep breathing exercises, the use of a **spirometer** to encourage deep breathing and expand the lungs, and medications to help open the airways. In addition, **pulmonary rehabilitation** offers techniques to improve lung function after lung surgery. For example, pursed-lip breathing decreases how often a patient takes breaths and keeps airways open longer. This allows more air to flow in and out of the lungs so that a patient can be more physically active.
- **Loss of muscle:** Patients benefit from exercise post-surgery. Physical therapy may also be prescribed to help build strength and endurance.

Common side effects of chemotherapy

- **Fatigue:** Fatigue can be treated by relieving conditions related to it, such as anemia and depression. If a patient is depressed, antidepressant medications may be prescribed.
- **Nausea, vomiting:** There are multiple medications available to prevent and treat nausea and vomiting. If one anti-nausea medication doesn't work, then a different one or an additional one can be prescribed. Techniques such as distraction, relaxation, and positive imagery can help change the expectation and fear of nausea and vomiting.
- **Hair loss:** Some chemotherapy drugs may cause hair loss from all over the body. Not all chemotherapy drugs cause hair loss. Certain medications and cold cap therapy may prevent hair loss during chemotherapy.

- **Loss of appetite:** Appetite stimulants and nutritional supplements can be given to improve appetite and reduce weight loss.
- **Diarrhea:** Antidiarrheal medications may be prescribed as needed.
- **Constipation:** Stool softeners and laxatives can be used.
- **Peripheral neuropathy:** Sometimes physical therapy and complementary therapies, such as massage and acupuncture, can help. The most common medications to treat neuropathic pain are anticonvulsants and antidepressants. Over-the-counter pain medications may be recommended for mild pain, or prescription non-steroidal anti-inflammatory drugs or analgesics may be prescribed for severe symptoms.

Sometimes, the doses of the chemotherapy drugs may need to be lowered or treatment may need to be delayed to prevent the side effects from getting worse.

Common side effects of radiation therapy

- **Fatigue:** Fatigue can be treated by relieving conditions related to it, such as anemia and depression. If a patient is depressed, antidepressant medications may help.
- **Sunburn-like skin changes, such as dryness, itching, or peeling:** Moisturizing creams, showering and bathing with warm water rather than hot, and antihistamines may help.
- **Hair loss:** Hair is lost only in the area being treated. In most cases, hair will grow back.
- **Cough, difficulty breathing, and shortness of breath:** These symptoms can develop as “radiation pneumonitis” up to months after therapy and may require anti-inflammatory medication.
- **Sore throat and trouble swallowing:** Pain and anti-inflammatory medications and speech pathology to learn different ways to swallow may help.

- **Loss of appetite:** Appetite stimulants and nutritional supplements can be given to improve appetite and reduce weight loss.
- **Nausea and vomiting (when the treated area is near the stomach):** There are multiple medications available to prevent and treat nausea and vomiting. If one anti-nausea medication doesn't work, a different one or an additional one can be prescribed. Techniques such as distraction, relaxation, and positive imagery can help change the expectation and fear of nausea and vomiting.

Outlook for stage II NSCLC patients

The outlook for stage II NSCLC patients is in general better than for patients with more advanced lung cancer, but statistics do not apply to individuals. There are a number of factors that determine the outlook for any individual stage II NSCLC patient, including the type of NSCLC, the patient's health in general, and the responsiveness of the patient's lung cancer to treatment. Speak with your healthcare team about your outlook.

Finding a clinical trial that might be right for you

If you are considering participating in a clinical trial, start by asking your healthcare team whether there is one that might be a good match for you in your geographic area. Note that if your stage II NSCLC tests positive for a **driver mutation** for which a U.S. Food and Drug Administration (FDA)-approved therapy exists, you may be eligible to enroll in a trial with specific targeted therapies.

Below are several resources in addition to your healthcare team to help you find a clinical trial that may be a good match.



RESOURCES TO HELP YOU NAVIGATE YOUR CLINICAL TRIALS SEARCH:

- **LUNgevity Clinical Trial Finder:** <https://clinicaltrials.lungevity.org/>
 - Find available clinical trials by type of lung cancer and geographic location
 - Also find information and links to the medical centers at which these clinical trials are taking place
- **EmergingMed:** <https://app.emergingmed.com/lcctal/home>
 - LUNgevity partners with this free clinical trials matching service to help you with the decision of whether to participate in a clinical trial; EmergingMed helps you identify lung cancer clinical trials for which you may be eligible
 - Clinical trial navigators are available Monday through Friday from 9:00am to 5:00pm ET at 877-769-4834
- **National Cancer Institute (NCI):** www.clinicaltrials.gov
- **My Cancer Genome:** www.mycancergenome.org/
 - My Cancer Genome gives up-to-date information on what mutations make cancers grow and related treatment options, including available clinical trials

(CONTINUED)



RESOURCES TO HELP YOU NAVIGATE YOUR CLINICAL TRIALS SEARCH (CONTINUED):

- **Lung Cancer Mutation Consortium (LCMC):**
www.golcmc.com/
 - Composed of 16 leading cancer centers across the country, LCMC's goal is to examine the tumors of patients who have advanced stage non-small cell lung cancer adenocarcinoma (advanced stage NSCLC) (stage IIIB or IV), and match those patients to the best possible therapies, including clinical trials
- **Lung Cancer Master Protocol (LUNG-MAP):**
www.lung-map.org/
 - For patients with squamous cell lung cancer, LUNG-MAP is a collaboration of many research sites across the country. They use a unique approach to match patients to one of several drugs being developed

In addition, if you are interested in a specific drug or other treatment that is being developed, you can often find information about studies for that drug on the website of the company developing it.



QUESTIONS TO ASK YOUR HEALTHCARE TEAM ABOUT LUNG CANCER STAGING:

- What kind of lung cancer do I have?
- What is the stage of my lung cancer?
- Has the cancer spread to the lymph nodes?
- Has the cancer spread to other parts of my body? If so, where?
- Do I need any other tests before treatment can start? If so, why, and what are they?
- May I have a copy of the pathology reports (that show the results of diagnostic tests and/or surgery)?
- May I have a copy of the imaging and radiology reports?
- What are my near-term and long-term outlooks given the stage of my lung cancer?
- What are the survival statistics for this stage? How do these statistics relate to me?
- What are my treatment options? What is the intent of each of the treatment options?
- What can I expect after we start treatment? How long will I need to have treatment?
- If my cancer spreads, will my stage change? How will this impact my treatment options?
- Will my cancer be tested for biomarkers?
- Are there clinical trials for new treatment options for my stage of lung cancer?

03 glossary

Adrenal gland—A small gland that makes hormones that help control heart rate, blood pressure, and other important body functions. There is an adrenal gland on top of each kidney

Biopsy—The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue

Blood chemistry tests—A common panel of blood tests that measures the amount of electrolytes and other chemicals made in the body. It provides information on how the body's organs, such as kidneys, liver, and heart, are functioning

Bronchoscope—A thin, tube-like instrument with a light and a lens for viewing. It may also have a tool to remove tissue; this tissue can then be checked under a microscope for signs of disease. The bronchoscope is inserted through the nose or mouth

Bronchus—A large airway that leads from the trachea (windpipe) to a lung

Chemoradiation—Treatment that combines chemotherapy with radiation therapy. Also called chemoradiotherapy

Chemotherapy—Treatment with drugs that kill cancer cells

Clinical trial—A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease. Also called clinical research trial or study

Complete blood count (CBC)—A measure of the number of red blood cells, white blood cells (WBCs), and platelets in the blood. A CBC is used to help diagnose and monitor many conditions. Also called blood cell count

CT scan—A procedure that uses a computer linked to an X-ray machine to make a series of detailed pictures of areas inside the body. The pictures are taken from different angles and are used to create three-dimensional (3D) views of tissues and organs. A dye may be injected into a vein or swallowed to help the tissues and organs show up more clearly. Also called CAT scan and computed tomography scan

Distant metastasis—Refers to cancer that has spread from the primary (original) tumor to distant organs or distant lymph nodes

Driver mutation—A change in the DNA of a gene that leads to the development or progression of a tumor

Endoscope—A thin, tube-like instrument used to look at tissues inside the body. An endoscope has a light and a lens for viewing and may have a tool to remove tissue

Extensive-stage small cell lung cancer—Small cell lung cancer that has spread outside the lung in which it began or to other parts of the body

Hilar—Related to the hilum, on the medial side of each lung, where the main bronchus, pulmonary arteries, bronchial arteries, and nerves enter the lung and where the pulmonary veins, bronchial veins, and lymphatic vessels leave the lung

Immune system—A complex network of cells, tissues, organs, and the substances they make that help the body fight infections and other diseases. The immune system includes white blood cells (WBCs) and organs and tissues of the lymph system, such as the thymus, spleen, tonsils, lymph nodes, lymph vessels, and bone marrow

Immunotherapy—A type of cancer therapy that uses substances to stimulate or suppress the immune system to help the body fight cancer, infection, and other disease. Some types of immunotherapy target only certain cells of the immune system. Others affect the immune system in a general way

Intrapulmonary—Situating within, occurring within, or administered by entering the lungs

Limited-stage small cell lung cancer—Small cell lung cancer found in one lung, the tissues between the lungs, and nearby lymph nodes only

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

Lung cancer—Cancer that begins in tissues of the lung, usually in the cells lining air passages

Lymph node—A bean-shaped structure that is part of the body's immune system. Lymph nodes filter lymph (lymphatic fluid) and store lymphocytes (white blood cells [WBCs]). They are located along lymphatic vessels

Margin—The edge or border of the tissue removed in cancer surgery. The margin is described as negative or clear when the pathologist finds no cancer cells at the edge of the tissue, suggesting that all of the cancer has been removed. The margin is described as positive or involved when the pathologist finds cancer cells at the edge of the tissue, suggesting that all of the cancer has not been removed

Mediastinal—Of the mediastinum

Mediastinum—The area between the lungs. The organs in this area include the heart and its large blood vessels, the trachea, the esophagus, the thymus, and lymph nodes but not the lungs

Metastasis—The spread of cancer from the primary site, or place where it started, to other places in the body

Node—See lymph node

Non-small cell lung cancer (NSCLC)—A group of lung cancers that are named for the kinds of cells found in the cancer and how the cells look under a microscope. The three main types of NSCLC are lung adenocarcinoma, squamous cell lung cancer, and large cell lung cancer. NSCLC is the most common kind of lung cancer

Pathologist—A doctor who identifies disease by studying cells and tissues under a microscope or with other equipment

Peribronchial—Of, relating to, occurring in, affecting, or being the tissues surrounding a bronchus

Peripheral neuropathy—A nerve problem that causes pain, numbness, tingling, swelling, or muscle weakness in different parts of the body

Phrenic nerve—A nerve that runs from the spinal cord to the diaphragm (the thin muscle below the lungs and heart that separates the chest from the abdomen). It causes the diaphragm to contract and relax, which helps control breathing

Primary tumor—The original, or first, tumor in the body

Pulmonary rehabilitation—A medically supervised program to help people with lung diseases improve their overall physical, mental, and social functioning

Radiation therapy—The use of high-energy radiation from X-rays, gamma rays, neutrons, protons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body near cancer cells (internal radiation therapy, or brachytherapy)

Regional lymph node—A lymph node that drains lymph from the region around a tumor

Segmentectomy—Removal of a section of a lobe of the lung

Sleeve lobectomy—Surgery to remove a lung tumor in the lobe of the lung and a part of the main bronchus (airway). The ends of the bronchus are rejoined, and any remaining lobes are reattached to the bronchus. This surgery is done to save part of the lung. Also called sleeve resection

Small cell lung cancer—An aggressive (fast-growing) cancer that forms in tissues of the lung and can spread to other parts of the body. The cancer cells look small and oval-shaped when looked at under a microscope

Spirometer—An instrument used for measuring the air entering and leaving the lungs

Stage—The extent of a cancer in the body. In non-small cell lung cancer (NSCLC), lung cancer stages go from stage 0 to stage IV. The higher the stage, the more advanced the cancer is. In small cell lung cancer, the stages used most often are limited-stage disease and extensive-stage disease

Trachea—The airway that leads from the larynx (voice box) to the bronchi (large airways that lead to the lungs). Also called windpipe

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

Wedge resection—Surgery to remove a triangle-shaped slice of tissue. It may be used to remove a tumor and a small amount of tissue around it

X-ray—A type of radiation used in the diagnosis and treatment of cancer and other disease. In low doses, X-rays are used to diagnose disease by making pictures of the inside of the body. In high doses, X-rays are used to treat cancer

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