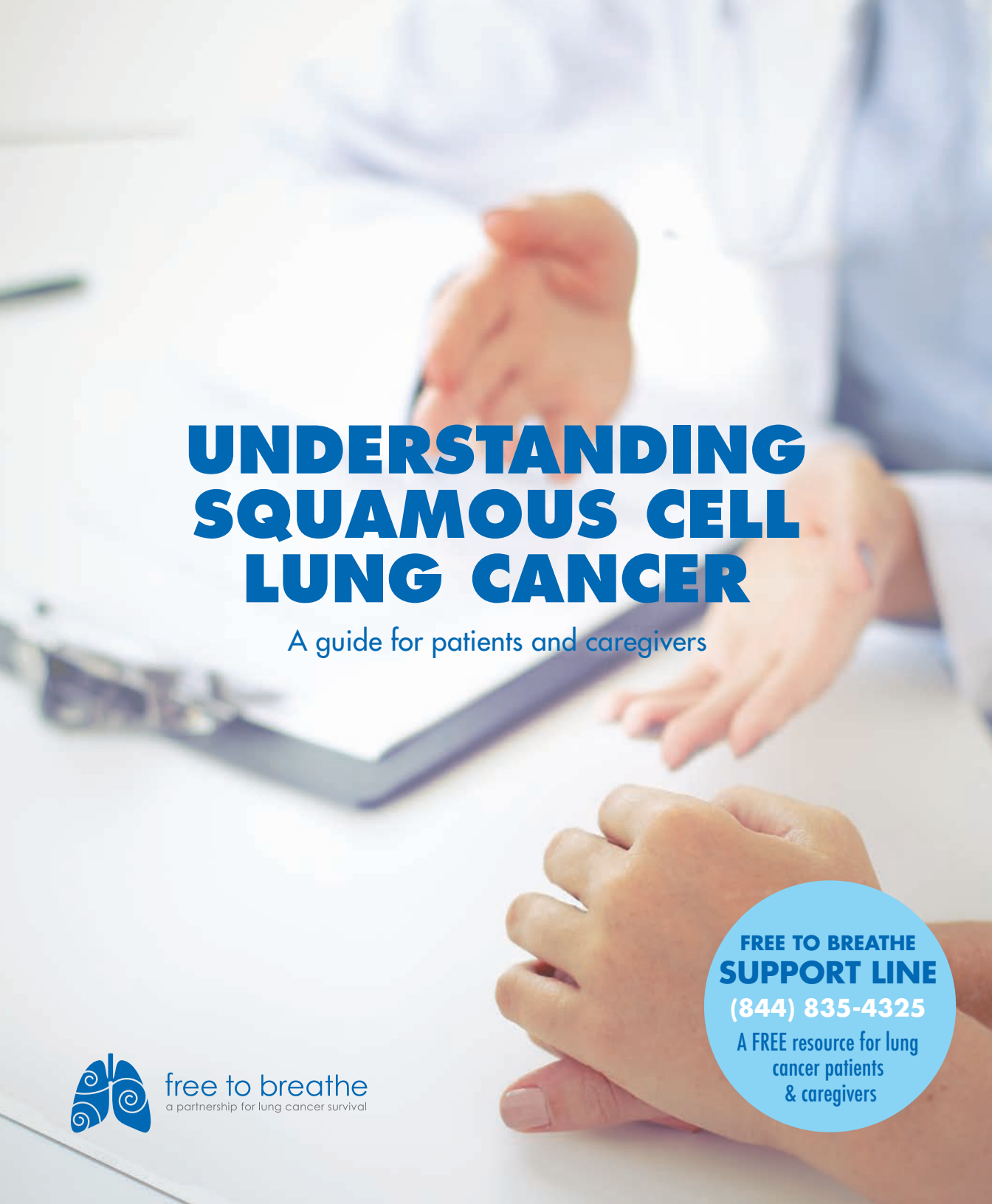


UNDERSTANDING SQUAMOUS CELL LUNG CANCER

A guide for patients and caregivers

FREE TO BREATHE
SUPPORT LINE
(844) 835-4325
A FREE resource for lung cancer patients & caregivers

free to breathe
a partnership for lung cancer survival

About this brochure

This brochure is for patients who have been diagnosed with a type of lung cancer known as squamous cell carcinoma. Not all lung cancers are the same. Different types of lung cancers are treated differently. Knowing about squamous cell lung cancer can help you and your caregiver(s) better understand your diagnosis and which treatments are available to you.

The information provided in this brochure is not intended to be a substitute for medical advice provided by your healthcare team.

We encourage you to speak with your doctor or nurse about your specific lung cancer, tests and treatments.

About Free to Breathe

We are Free to Breathe. We are a partnership of lung cancer survivors, advocates, researchers, healthcare providers and industry leaders. We are united in the belief that every person with lung cancer deserves a cure. We hope that this brochure is useful to you.

For additional patient resources, please visit freetobreathe.org.

Don’t let anyone steal your hope

Even the experts don’t understand everything about lung cancer, especially how each person will respond to treatment. Be cautious when reading the statistics as they do not tell you about your specific lung cancer. Find doctors who share your hope for survival and are willing to fight alongside you.

Please talk with your doctor about what treatments or clinical trials might be right for you. Know that researchers continue to work on new treatments with the ultimate goal of helping patients with lung cancer.

Squamous Cell Carcinoma is a Type of Lung Cancer

Diagnosis of squamous cell lung cancer

Not all lung cancers are the same. When your doctor thought you might have lung cancer, you may have had imaging tests, such as a chest x-ray or a CT scan. If your doctor saw something abnormal or suspicious on these scans, a sample of tissue from your lung (or another place) may have been removed (biopsied) and examined to make a diagnosis of lung cancer.

A tumor sample used to make the diagnosis of lung cancer might also be used to find out more about your specific type of lung cancer. The two main types of lung cancer are:

- Non-small cell lung cancer (NSCLC)
- Small-cell lung cancer

NSCLC is the most common type of lung cancer. About eight out of ten (80%) patients with lung cancer have NSCLC.

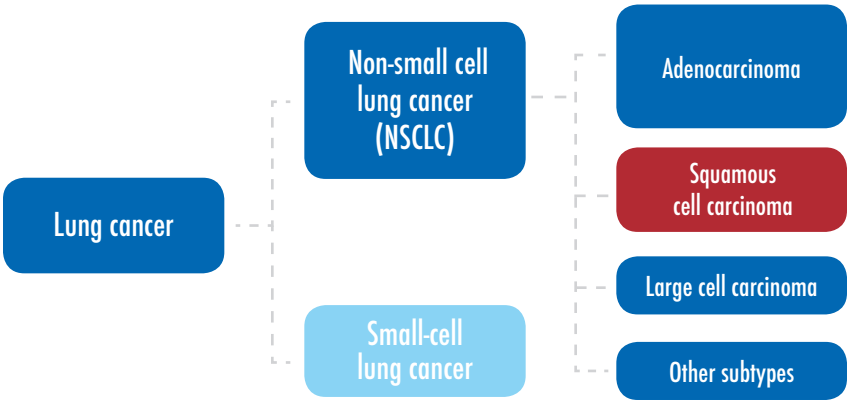
NSCLC is further divided into subtypes based on histology, which is the use of a microscope to look at cells or tissues.

Specific stains and/or tumor markers can be used to see if a tumor is squamous cell lung cancer.

The most common subtypes of NSCLC based on histology are:

- Adenocarcinoma
- Squamous cell carcinoma
- Large cell carcinoma

Types of lung cancer



How many people have squamous cell carcinoma of the lung?

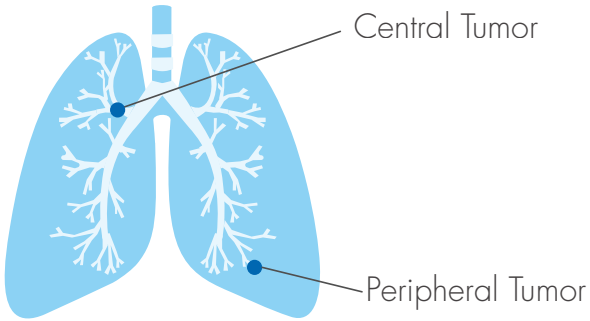
Squamous cell carcinoma is the second most common subtype of NSCLC. About one in four (25%) of patients with lung cancer have squamous cell carcinoma. Based on available estimates, about 55,000 Americans are diagnosed with squamous cell lung cancer each year.

Squamous cell lung cancer tends to be more common in men than women. Roughly 60% of patients with squamous cell lung cancer in the US are men and 40% are women.

How is squamous cell carcinoma different from other types of lung cancers?

- These cancers start in squamous cells, which line the airway of the lungs.
- In the past, squamous cell tumors were mainly found in the center of the lungs, near a main airway (bronchus). More recently, the percentage of peripheral squamous cell tumors (tumors found near the outer edges of the lungs) seems to be increasing.

Central and peripheral tumors

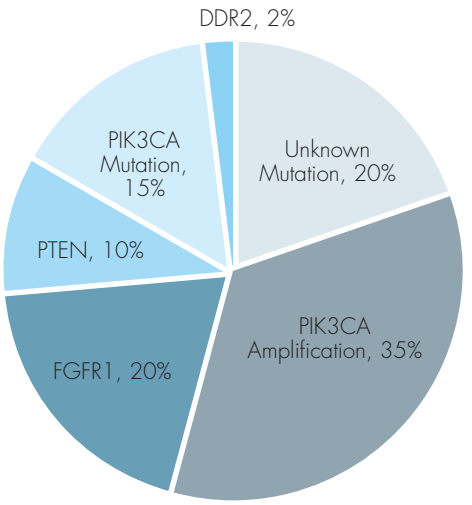


- Central tumors can cause symptoms, such as coughing, wheezing, difficulty breathing, shortness of breath, or coughing up blood. But, many lung cancers do not cause any symptoms and may only be diagnosed after the disease is in an advanced stage.
- Smoking is the main cause of all types of lung cancers. The association between smoking and squamous cell lung cancer is thought to be stronger than for adenocarcinoma.
- Like other types of lung cancers, additional risk factors for squamous cell lung cancer include exposure to secondhand smoke, mineral and metal dust, asbestos, or radon.

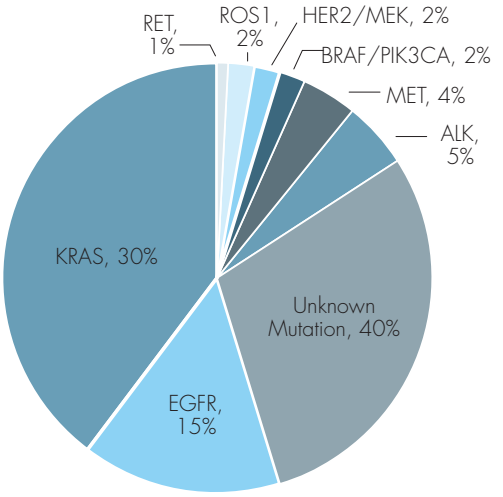
Why is it so important to know the type of lung cancer?

Knowing the type of your lung cancer can help your healthcare team develop a treatment plan that is personalized for you.

Percentage of lung cancers with mutations



Squamous cell carcinoma



Adenocarcinoma

Adapted from Chan BA, et al. *Transl Lung Cancer Res.* 2015;4(1):36-54.

More detailed testing can be done on your tumor if your doctor requests it. These tests are sometimes called molecular testing or biomarker testing, and may involve:

- Looking for changes (mutations) in the DNA of the tumor
- Looking at levels of specific proteins in the tumor

Testing your tumor can help you and your doctor decide on the best treatment plan for you. See page 12 for additional information on tumor testing.

Squamous cell lung cancers tend to have different mutations than other types of lung cancer, such as adenocarcinoma (See chart).

Patients with squamous cell lung cancer are less likely to have EGFR, ALK, or ROS1 mutations than patients with adenocarcinoma NSCLC. Treatments that target these mutations are available.

Even if you don't have a mutation for which there is an approved therapy, other treatment options are available to you.

Researchers continue to look for new ways to target mutations found in squamous cell lung cancer.

Treatment of Squamous Cell Lung Cancer

TO LEARN MORE ABOUT STAGING AND TREATMENT OF LUNG CANCER

Please see the Free to Breathe booklet *Living with a Diagnosis of Cancer.* This booklet is available free of charge at freetobreathe.org or by calling the Free to Breathe Support Line (844) 835-4325.

What are the options for treating squamous cell lung cancer?

Like other types of lung cancers, ways to treat squamous cell carcinoma may include:

- Surgery
- Radiation therapy
- Chemotherapy
- Immunotherapy
- Palliative care
- Clinical trials

Surgery

Surgery means having an operation to remove the tumor. The lobe of the lung with the tumor and lymph nodes in the middle of the chest might be removed in addition to the tumor itself.

Surgery to remove a tumor is usually only an option if the lung cancer has not spread (metastasized) outside of one lung to other parts of the body (ie, stage IV cancer means your cancer has spread from the lungs to other areas of the body).

Ideally, a thoracic surgeon, an expert in lung cancer surgery, should perform this operation. If you need surgery, find a surgical center that performs a lot of lung cancer surgeries and offers minimally invasive techniques.

Minimally invasive techniques use smaller openings and a video camera to guide the surgeon. This procedure results in less injury to your bones and muscles, which can mean a faster recovery time.

Radiation

Radiation therapy is the use of x-rays or other high-energy beams to damage cancer cells to stop them from growing or multiplying. Radiation might be used to treat any stage of lung cancer.

If the cancer has not spread beyond the lungs, radiation might be aimed at the tumor to try to kill all of the tumor cells.

If the cancer has spread to other parts of the body, radiation might be used to help relieve symptoms in affected areas, such as the brain, lungs, or bones.

Chemotherapy

Chemotherapy (or chemo) usually refers to medicines that travel throughout your body to either kill or stop the growth of cancer cells.

Chemotherapy can be an important treatment option for patients with squamous cell lung cancer that has spread beyond one lung to other parts of the body. As with other treatments, your doctor will help determine whether chemotherapy is a good treatment option for you.

Chemotherapy is often considered for use as the first treatment after diagnosis of metastatic squamous cell carcinoma. Combinations of two chemotherapy drugs or a single chemotherapy drug might be used.

If your cancer doesn't grow during initial chemotherapy, you might be treated with maintenance therapy. Maintenance therapy involves continuing a drug or using a different drug after the initial course of chemotherapy. Maintenance therapy can help treat the cancer and prevent it from spreading.

If your cancer grows during or after initial chemotherapy, a second course of chemotherapy using a different drug might be given.

Tumor testing

Tumor testing can involve looking at levels of specific proteins (such as PD-L1) in the tumor. PD-L1 testing might be done before starting treatment with an immunotherapy, such as pembrolizumab. Be sure to talk with your doctor if you have questions about tumor testing.

At the time of printing of this brochure, chemotherapy drugs used to treat squamous cell lung cancer include:

- Cisplatin
- Carboplatin
- Docetaxel (Taxotere®)
- Gemcitabine (Gemzar®)
- Nab-paclitaxel (Abraxane®)
- Paclitaxel (Taxol®)

These drugs are administered through the veins (intravenously or IV).

Immunotherapy

Immunotherapy is one of the most exciting new approaches to the treatment of squamous cell lung cancer. Immunotherapies work by helping the body's own natural defenses fight cancer.

At the time of printing of this brochure, three immunotherapies are approved by the FDA to treat patients with NSCLC:

- Nivolumab (Opdivo®)
- Pembrolizumab (Keytruda®)
- Atezolizumab (Tecentriq®)

Pembrolizumab is approved as initial (first-line) therapy in patients whose tumors have high levels of PD-L1 (ie, >50% PD-L1), and no EGFR or ALK mutations.

Nivolumab, pembrolizumab and atezolizumab are approved to treat patients with NSCLC whose tumor progresses (gets worse) after chemotherapy or targeted therapy if they have EGFR- or ALK-mutated NSCLC.

All three of these immunotherapies can be used to treat patients with squamous cell lung cancer.

- The first approval of nivolumab for lung cancer was specific for patients with squamous cell carcinoma. Nivolumab was studied in patients with squamous cell lung cancer whose disease got worse after chemotherapy.

Pembrolizumab is approved for use in patients whose tumors express a protein called PD-L1. Nivolumab and atezolizumab are approved as second-line therapy regardless of levels of PD-L1.

These drugs are administered through the veins (intravenously or IV).

LUNG-MAP

Lung-MAP is a large clinical trial (study) that is testing new treatments for patients with advanced squamous cell lung cancer. "Lung-MAP" stands for "lung cancer master protocol." The master protocol approach means that many different treatments are being studied to see if they work in patients with squamous cell lung cancer. The trial has hundreds of sites across the country, which gives many patients access to the latest treatments.

Each patient's tumor is tested to look for mutations that might be causing the cancer to grow. If a mutation is found, the patient may be eligible to be treated with a drug that targets their specific type of squamous cell lung cancer. Even if a patient's tumor does not have any of the mutations, they may be able to be treated with an immunotherapy or a combination of immunotherapies. No patient will be given a placebo.

You can get more information at: lung-map.org/patients.

Supportive care (or palliative care)

Some of the care you receive may be designed to manage symptoms related to lung cancer. Supportive care cannot only help you with your physical symptoms, but it can address any psychological, social or spiritual concerns you may be facing.

Supportive and palliative care strategies have also been shown to lengthen patients' lives. Supportive care is not just for "end of life."

Clinical trials

New drugs continue to be developed and studied all the time. You might be able to get an active treatment as part of a clinical trial (study). Talk with your doctor to see if a clinical trial might be a good option for you.

Other treatments approved to treat patients with squamous cell lung cancer

Some other treatments are approved for use in patients with squamous cell lung cancer. Be sure to talk with your doctor about which treatments might be recommended for your specific cancer.

- Ramucirumab (Cyramza®) works by blocking VEGF (which stands for vascular endothelial growth factor). Blocking VEGF interferes with the ability of a tumor to make new blood vessels. Ramucirumab is used with docetaxel (a chemotherapy) after certain types of chemotherapy have stopped working. Some guidelines (eg, National Comprehensive Cancer Network or NCCN) discuss concerns for side effects of racmucirumab. Be sure to discuss possible side effects with your doctor. This drug is given through the veins (intravenously or IV).
- Afatinib (Gilotrif®) is approved for treatment of patients with squamous cell carcinoma of the lung whose disease got worse after chemotherapy. Afatinib works by targeting the growth factor EGFR and is a pill taken orally (by mouth).
- Necitumumab (Portrazza®) is approved for use with chemotherapy (gemcitabine and cisplatin) for treatment of patients with squamous NSCLC. This drug blocks EGFR differently than other approved drugs that act on EGFR mutations. This drug is administered through the veins (intravenously or IV).

Additional information

Not every drug approved for lung cancer is used to treat squamous cell lung cancer. Two drugs that are not approved for use in patients with squamous cell lung cancer are bevacizumab (Avastin®) and pemetrexed (Alimta®).

Some factors that help determine treatment options

Has your cancer spread to other parts of your body?

- If your cancer is only found in one lung and has not spread to other parts of your body, having an operation (surgery) to remove the tumor might be an option for you.
- If your cancer has spread from the lungs to another part of your body (ie, Stage IV), surgery is generally not recommended. But, treatments that work throughout your body, such as chemotherapy or immunotherapy, might be options for you.
- You might be treated with radiation to try to kill the tumor or to relieve symptoms caused by your tumor. Radiation might be used before or after surgery, or in combination with other treatments, such as chemotherapy.

What is the size and location of your tumor?

- Whether your tumor can be removed safely by surgery depends on the size and location of the tumor.
- If a tumor cannot be safely removed because of its size and/or location, the disease is called inoperable or unresectable. Depending on your particular lung cancer, treatments that work throughout the body might be used if your tumor is inoperable.

Are you able to withstand treatments such as surgery, radiation or chemotherapy?

- Your doctor will determine if you are otherwise healthy enough to have surgery, radiation, chemotherapy, or other treatments. If you have other conditions as well as lung cancer (such as heart disease), you may not be able to withstand surgery or certain types of treatments. You and your doctor should discuss personalized treatment options based on your health and medical history.

Key Questions

If I have squamous cell lung cancer, is my tumor still tested for mutations or other biomarkers?

This is a great question and one you should discuss with your doctor!

Testing your tumor can help you and your doctor decide on the right treatment for you. Even if your tumor does not have a mutation that can be matched to an approved targeted therapy, you will have other treatment options.

Some guidelines (eg, NCCN) note that EGFR and ALK testing could be considered in certain patients who have squamous cell lung cancer, such as never smokers or those whose tumors have mixed histology. Mixed histology means that your tumor might have characteristics of more than one histologic subtype of lung cancer.

Your doctor may recommend testing your tumor for the amount of PD-L1 before prescribing an immunotherapy, such as pembrolizumab.

Are histology and molecular tumor testing the same thing?

No. Histology is the use of a microscope to determine the type of lung cancer. Specific stains and/or tumor markers can be used to see if a tumor is a squamous cell carcinoma or another type of lung cancer, such as adenocarcinoma. Squamous cell carcinoma and adenocarcinoma are histologic subtypes of NSCLC.

Molecular tumor testing can involve looking for changes (mutations) in the DNA of the tumor or looking for levels of specific biomarkers. Molecular tumor tests can be used to see if your tumor has mutations or gene abnormalities in EGFR, ALK, ROS1, KRAS, or other molecules. Biomarker testing to look at levels of specific proteins (such as PD-L1) may be used before starting on immunotherapy. Molecular tumor testing is usually done on a sample of the tumor. In 2016, blood tests (or "liquid biopsies") were approved to test for certain types of EGFR mutations.

What about targeted therapy?

Targeted therapies work to stop or limit the growth and spread of cancer by targeting specific mutations of cancer cells. At the time of printing of this brochure, targeted therapies are available for patients whose lung cancer has mutations (changes) or gene abnormalities in EGFR, ALK, or ROS1. Patients with squamous cell lung cancer are less likely to have these mutations than patients with adenocarcinoma NSCLC.

Keep in mind that even if you don't have one of these mutations, other treatment options are available to you.

If you smoke

If you smoke, or used to, it's not too late to make changes to help you achieve and maintain a healthy lifestyle.

If you smoke, it is important to work with your treatment team to quit smoking. Studies have shown that quitting smoking helps you live longer, even if you have lung cancer. Quitting smoking will help you breathe more easily, put less stress on your heart and lungs and help your treatments work better.

Talk with your oncology social worker, case manager or psychologist to find out about programs to help you develop a plan and quit smoking. This plan may include counseling and medications designed to make quitting easier. It is not too late to quit. To create a quit plan today, call (800) QUIT-NOW or visit smokefree.gov or becomeanex.org.

Questions to Ask Your Doctor

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The following is a list of questions that you may want to discuss with your doctor.

What type of lung cancer do I have?

- What is the histology of my tumor?

Has the cancer spread to other parts of my body?

- What stage of lung cancer do I have?
- Has my cancer spread beyond one lung to other parts of the body?

What are the options for treating my lung cancer?

- Surgery?
- Radiation?
- Chemotherapy?
- Immunotherapy?
- Is a clinical study a good option for me?
- Targeted therapy?

Has my tumor been tested for mutations or biomarkers?

- If not, why not?
- If not, would a blood test to check for mutations be right for me?
- If yes, what were the results?
    - If I do not have a mutation, would chemotherapy be an option for me?
    - If I have a mutation, would targeted therapy be an option for me?
    - If I was tested for PD-L1, is immunotherapy an option for me?

What supportive care treatments are available to me?

What are the main side effects of my treatments?

What is the outlook for my cancer?

- Is the cancer likely to come back even after treatment?

The Free to Breathe Support Line provides education, connection to resources and opportunities for meaningful engagement. We strive to help patients and caregivers better face the challenges of lung cancer. Free to Breathe is committed to building and empowering the lung cancer community.

We are available Monday through Friday between 8 am and 4 pm Central Time, toll free:
(844) 835-4325

Patients and caregivers may call as often as they wish,
and the service is offered completely free of charge!

You may also contact us at: support@freetobreathe.org

Join our online community at: healthunlocked.com/freetobreathe

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