

2026 Science fair log book

Lung cancer treatments

By Navkirat and Saffron

Websites used

[https://www.cancer.org/cancer/types/lung-cancer/about/what-is.html#:~:text=The%20main%20types%20of%20lung,a%20main%20airway%20\(bronchus\).](https://www.cancer.org/cancer/types/lung-cancer/about/what-is.html#:~:text=The%20main%20types%20of%20lung,a%20main%20airway%20(bronchus).)

[Lung cancer - Symptoms and causes - Mayo Clinic](#)

[Lung Cancer: Types, Stages, Symptoms, Diagnosis & Treatment](#)

<https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627#:~:text=Radiation%20therapy%20treats%20cancer%20with,relieve%20pain%20and%20other%20symptom>

<https://www.cdc.gov/lung-cancer/treatment/index.html#:~:text=Treatment%20options,before%20this%20treatment%20is%20us>

<https://www.cancercenter.com/community/blog/2021/03/benefits-and-risks-of-chemotherapy#:~:text=consider%20other%20options.-,The%20risks%20of%20chemotherapy,whether%20you%20can%20tolerate%20treatment.>

<https://www.moffitt.org/cancers/lung-cancer/faqs/what-are-the-risks-of-lung-cancer-surgery/#:~:text=Lung%20cancer%20surgery%20may%20involve,benefits%20of%20the%20proposed%20procedure.>

<https://www.cancerresearchuk.org/about-cancer/treatment/chemotherapy/how-chemotherapy-works>

<https://my.clevelandclinic.org/health/treatments/22733-targeted-therapy>

<https://my.clevelandclinic.org/health/diseases/12194-cancer>

<https://www.icts.com.sg/all-you-need-to-know-about-lung-cancer/>

Dec-30-2025

Difference between lung cancer and other types of cancer

What specifically differentiates lung cancer from other types of cancer (for ex breast cancer). Differences are mostly because of the specific cancer cell type and where it appears. It is also very hard to spot lung cancer cells especially in their earlier stages. Lung cancer grows aggressively (especially Small Cell Lung Cancer), and has different types (NSCLC and SCLC) affecting treatment. It is also called lung cancer since its found in lung cancer cells instead of eventually spreading to the lungs.

Lung cancer leads to most deaths in all cancer worldwide

Jan 3rd - 2026

What is the lung?

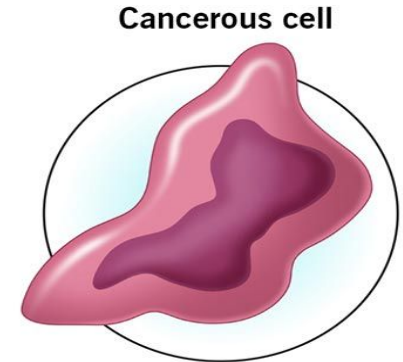
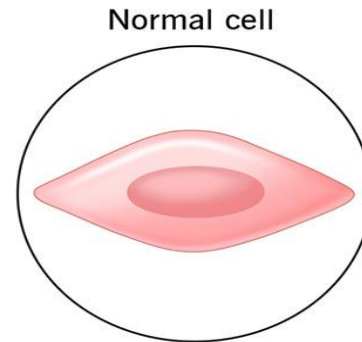
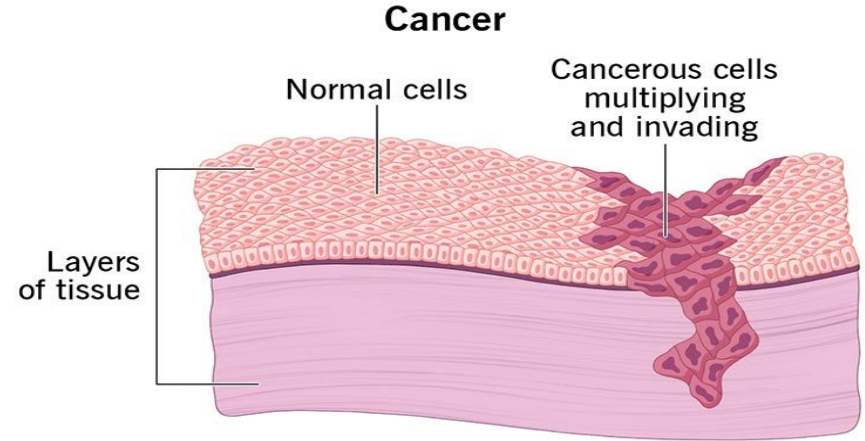
Lungs are a part of our body or organs that help us breathe and out when we breathe in the air it goes down through our “windpipe” it “divides into tubes called bronchi” that go into our lungs “and divide into smaller bronchi. These divide to form smaller branches called bronchioles. At the end of the bronchioles are tiny air sacs known as alveoli.”

“Alveoli” is a part of our lungs that “absorbs oxygen in our blood” and we exhale the rest of the carbon oxide out

What is cancer? jan-15-26

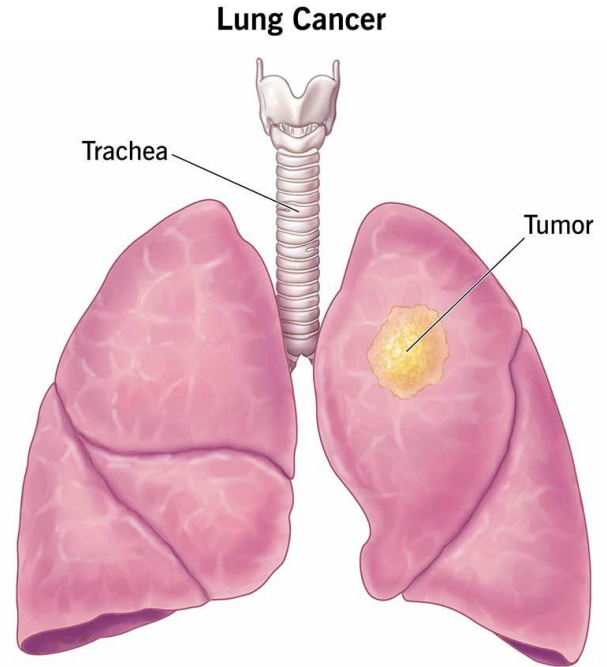
There is lots of types of cancer but there are some things in common. Cancer happens when there is uncontrolled cell neoplasia (abnormal growth of tissue). Your genes give orders for the cells, normal cells follow these instructions, but cancer cells ignore them and sadly the genes wont notice it.

Cancer is the most common cause of death in Canada, but less population die in cancer than 20 years ago. Discovering cancer earlier and more morden treatments is curing cancer and giving people with cancer have a longer live.



What is lung cancer dec-4-2025

Lung cancer happens when there is uncontrolled cell neoplasia in your lungs. Neoplasia is a uncontrolled growth of cancerous cells that creates a tumor or neoplasm. Unfortunately, sometimes the cells keeps making more copies of themselves when they shouldn't. When damaged cells divide uncontrollably, it create masses, or tumors, which are tissue that stops your organs from working properly.



Risk of having lung cancer dec-4-2025

People with the greatest risk of lung cancer are people who smoke or have smoke. The risk depends with the amount of cigarettes or the amount of time you have smoked. If you have smoked in your earlier years what have quit smoking it will decrease the chance of Lung cancer. But it isn't for people who have smoked it can also happen to people who have never smoked in their life.

Types of lung cancer dec-4-2025 [Lung Cancer: Types, Stages, Symptoms, Diagnosis & Treatment](#)

The types of lung cancer

The types of lung cancer are non-small cell lung cancer(80 to 85 percent of lung cancer is NSCNC) and small cell lung cancer(SCLC usually happens to people who smoke a lot over a long period of time).

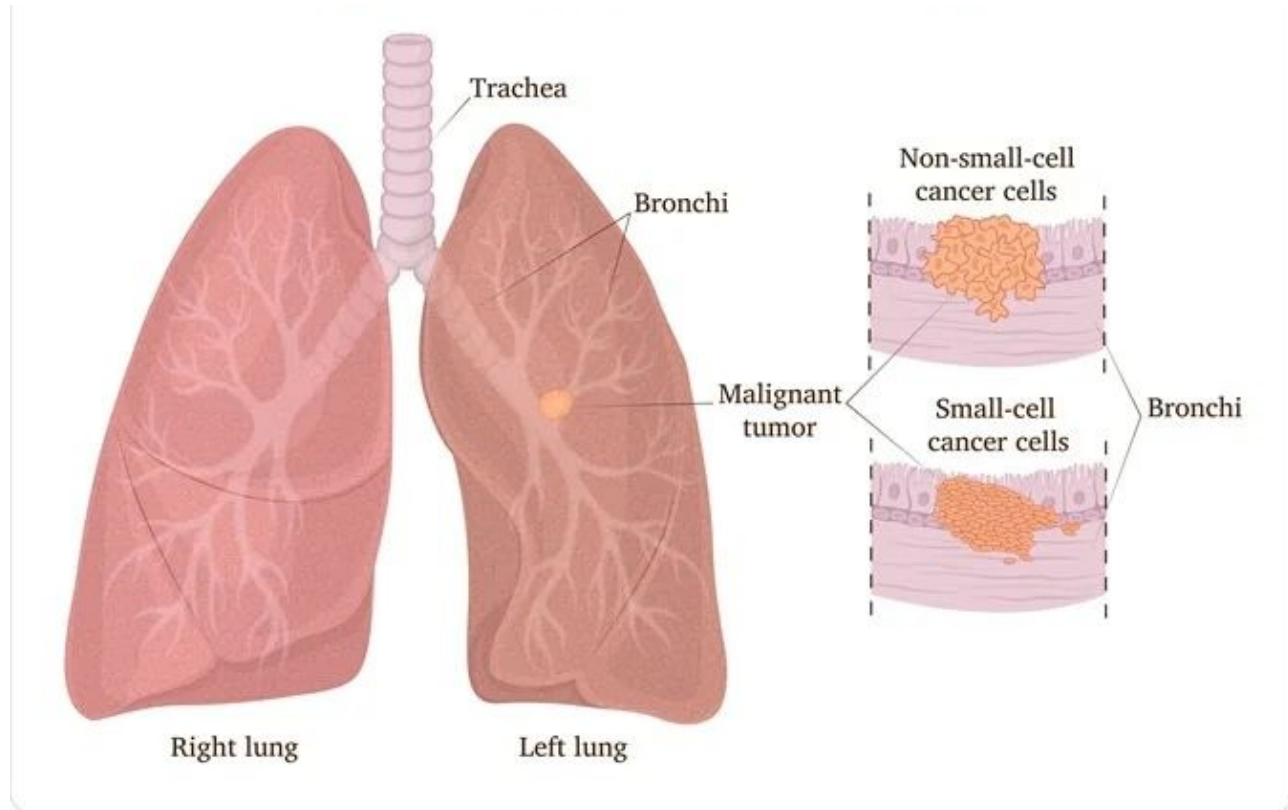
The subtypes of **non-small cell lung cancer** include adenocarcinoma, squamous cell carcinoma, and large cell carcinoma.

Adenosquamous carcinoma and sarcomatoid carcinoma (less common).

Small cell lung cancer (SCLC) grows quicker and is harder to treat.

The subtypes are small cell carcinoma (also called oat cell carcinoma) and combined small cell carcinoma.

This is a image of small and non small cancer cells
jan-26-26



The stages of lung cancer dec-4-2024

[Lung Cancer: Types, Stages, Symptoms,](#)

[Diagnosis & Treatment](#)

Lung cancer stages (4)

Stage 0 (in-situ): Cancer is in the surface of the lung and have not yet spread to the rest or\and outside the lungs.

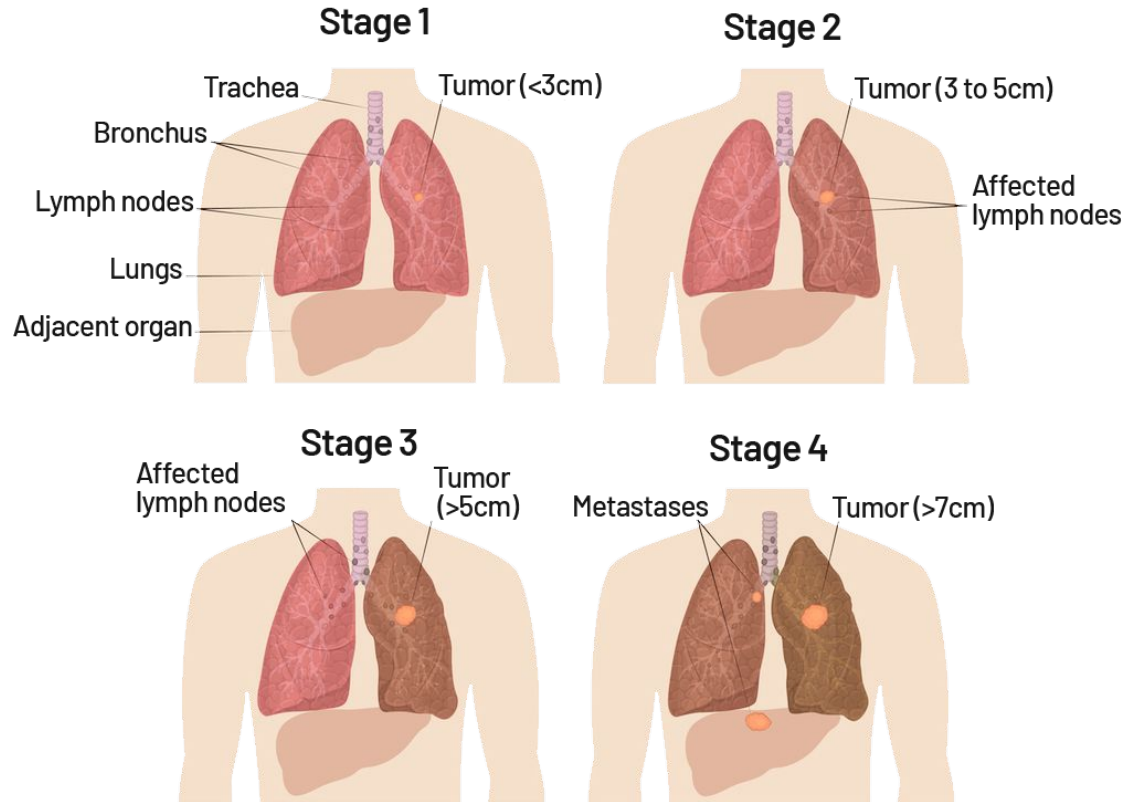
Stage #1: Had not spread to the outside of the lungs.

Stage #2: Spread to lymph nodes in the lung or multiple tumors may exist in the same lobe of the lung.

Stage #3: Spread to nearby lymph nodes, structures or have more than one tumor in a different lobe of the same lung.

Stage #4: The lung cancer spreads to the other lung and\or the fluid around lung, heart and\or distant organs.

Picture- stages of lung cancer



The stages of lung cancer part-2 jan-8-2026

Other stages of lung cancer you might have heard of are the limited and the extensive stage.

Limited stage SCLC is in one lung and sometimes cancer cells can spread to the lymph nodes in the center of the chest or above the collarbone on the same side. Extensive stage SCLC spread all through one or both lungs, on the opposite side of the lung Lymph nodes lung, or lymph nodes in other parts of the body.

Symptoms and signs of lung cancer (In or close to the lungs)

[Lung Cancer: Types, Stages, Symptoms, Diagnosis & Treatment](#)

[Lung cancer - Symptoms and causes - Mayo Clinic](#)

Mostly people don't experience symptoms until the higher stages of lung cancer but some people do. They might experience...

- A cough that doesn't heal or worsened.
- Hard to breathe or short breath (dyspnea).
- Chest pain or discomfort.
- Wheezing.
- Coughing up blood (hemoptysis).
- Hoarseness.
- Loss of appetite.
- Unexplained weight loss.
- Unexplained fatigue (tiredness).
- Shoulder pain.
- Face, neck, arms or upper chest swells (superior vena cava syndrome).
- One eye has a very small pupil the eyelid droops , and there are almost no sweating on that side of the face. (Horner's syndrome)

Diagnosis of lung cancer dec-30-2025

A doctor has to diagnose you of lung cancer because you are experiencing symptoms that you worry about. They might start with x-ray unless you smoke or used to smoke, then they might do an Imaging test to look for signs even before you start experiencing or developing any symptoms. People also might take lung cancer using screening low-dose CT scans if they are 50 or 50+ and have smoked a lot in your earlier years or if you have generally just smoked a lot.

One may also go through the tests if your family doctor or a professional of this field might think that you have lung cancer.

Diagnosis of lung cancer part -2 jan-8-2026

The tests include:

Imaging test : which is practically like x-ray or other body scans this is usually done to determine the size or spot of tumor

Sputum cytology: It is a mucus is coughed up from lungs. And It can be looked at under a microscope because It might have microcells of lung cancer.

Diagnosis of lung cancer part -3 dec-30-2025

Biopsy: This process is used to collect something called a tissue for this they would send a tube with a camera in your mouth to your lung. Important medical tools can be passed through the catheter and sample collection of tissue. There are also other ways to perform a “biopsy”.

Which is a process called Mediastinoscopy . In which, an incision is made at the base of your neck. Needed med tools are used at the back of your sampling of the sternum and extraction of lymph node tissue samples .

They might also use a needle biopsy. Your doctor might also use a CT image in order to figure out where the needle is in your skin on your chest. Then it goes into your lung tissue and collects the sample. It can also be taken from places that had been spread to or contained cancer cells which would then later be taken to a lab to figure out the treatment of this disease.

If it turns out that you have lung cancer, they would then do a series of X-rays and Imaging tests might look for signs of cancer in your lymph nodes or in other parts of your body. Your healthcare team uses the cancer staging test results to help create your treatment plan.

Treatments of lung cancer dec-30-2025

<https://www.cdc.gov/lung-cancer/treatment/index.html#:~:text=Treatment%20options,before%20this%20treatment%20is%20used.>

There are many ways to cure lung cancer, not only one but first they would see what type of lung cancer you have, then conduct some scans or tests to discover the stage or how far the cancer has spread. They would probably check if you have any change in your genes (gene mutation) then decide which treatment would suit you best.

A person with non-small cell lung cancer can be treated with the help of surgery, chemotherapy, radiation or targeted therapy, or they might combine these treatments. A person with small cell lung cancer can be mostly treated with radiation therapy and chemotherapy.

- **Surgery** happens when surgeons operate on your body in order to carefully cut out the spread cancer parts of your body
- **Chemotherapy:** Is a special set of medicines that you might take in a form of pills or just getting it injected into your vanes or both this is done to destroy or weaken or shrink the cancer.
- **Radiation therapy:** Use of high-energy rays (similar to x-rays) to destroy the cancer.
- **Targeted therapy:** Drugs would be taken in the form of pills or infected in your vanes in order to stop the cancer from growing farther. But before this treatment is used they would test your body to make sure that this is the right treatment for you

How does chemotherapy works jan-12-2026

Chemotherapy kills cancer cells that are uncontrollably growing or that are in process dividing into 2 new cells, but it also damages the genes that are inside the nucleus.

But it can also work in a different way depending on the type of drug used in the process.

- destroy the part of the cell control center responsible for cell division.
- interfering with the chemical processes during cell division.
- damage to cells occurs during the replication of all genes before cell division.
- damage to cells at the site of cell division.

(Cancer cells) they divide much more often and faster than most of the normal cells. Which means chemotherapy is very likely to kill them. Chemotherapy is usually has less chances to likely damage most of the normal cells You might be different combinations of chemotherapy drugs. Because some specific drugs would damage or kill cells at different stages of cell division. Which means there's more chance of killing more cells.

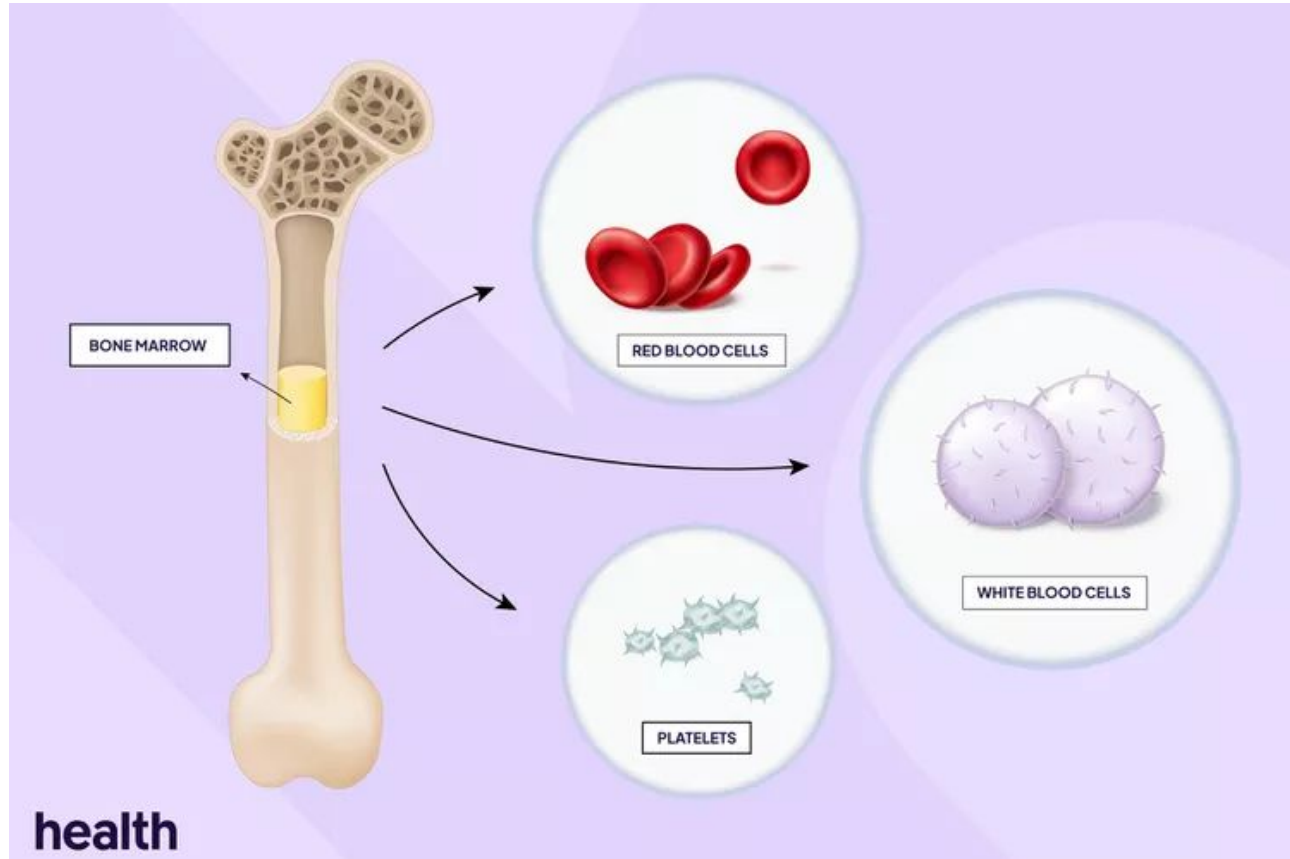
<https://www.cancerresearchuk.org/about-cancer/treatment/chemotherapy/how-chemotherapy-works>

Negative effects of chemotherapy short term dec-31-2025

Chemotherapy is used to kill cancer cells, but it also has its negatives cause it might also kill or damage healthy cells during the process. This is often the cause of some common side effects of chemotherapy. For instance, chemotherapy might slow or decrease the production of red blood cells and white blood cells in the bone marrow, which can cause short or long term anemia, fatigue and a weaker immune system. Some specific drugs may also damage or kill some of cells that help hair grow which might cause short-term hair loss. Damage to the cells located inside the digestive system might cause vomiting, diarrhea or constipation. The side effects may also depend on you health, type of drug or if it is used with another treatment cause everyone does not experience the same side effects.

<https://www.cancercenter.com/community/blog/2021/03/benefits-and-risks-of-chemotherapy#:~:text=consider%20other%20options.-,The%20risks%20of%20chemotherapy,whether%20you%20can%20tolerate%20treatment.>

red and white blood cells in the bone marrow



Negative of chemotherapy long term

jan-8-2026

You don't usually get long term side effect, but that can depend on who you are:

Peripheral neuropathy: Patient may feel tingling or numbness in your fingers or toes. This often stops or gets better ,but could maybe happen to not fully resolve.

Heart problems: Cardiac problems can be a high risk depending on the type of drug used. If patient is receiving those kind of drugs, patient should be monitored regularly with electrocardiograms (EKG or ECG) and echocardiograms (echo).

Lung problems: Patients who also received radiation, are or is smoking and have had lung disease have a higher chance of lung damage. Patient could be monitored by pulmonary function studies, but only if patient's physician think so.

Patients must sign an informed consent form before receiving treatment, which lists all potential side effects. Many of these side effects, while very rare, are still concerning. Your doctor can tell you which side effects you are more likely to experience.

Positives of chemotherapy

jan-8-2026

The usual benefit of chemotherapy are its potential to destroy the lung cancer cells. It is used to fight against cancer and is still one of the most potential tools we have to fight cancer. The benefit of chemotherapy for each patient is different because it depends on the type of cancer and what stage you are on and how far its spread and what do patients hope to gain from treatment also depends on what type of drug is used in the treatment.

For instestence, the power of the drug depends on how far the tumor has spread. Some people are on a stage that can be cured and have a type of cancer that we can call “curative potential” which typically means that it can be cured with chemotherapy without no or barely any side effects. Chemotherapy has a high possibility of getting rid of your cancer, but there are some possible side effects.

Negatives of surgery for lung cancer

jan-13-2026

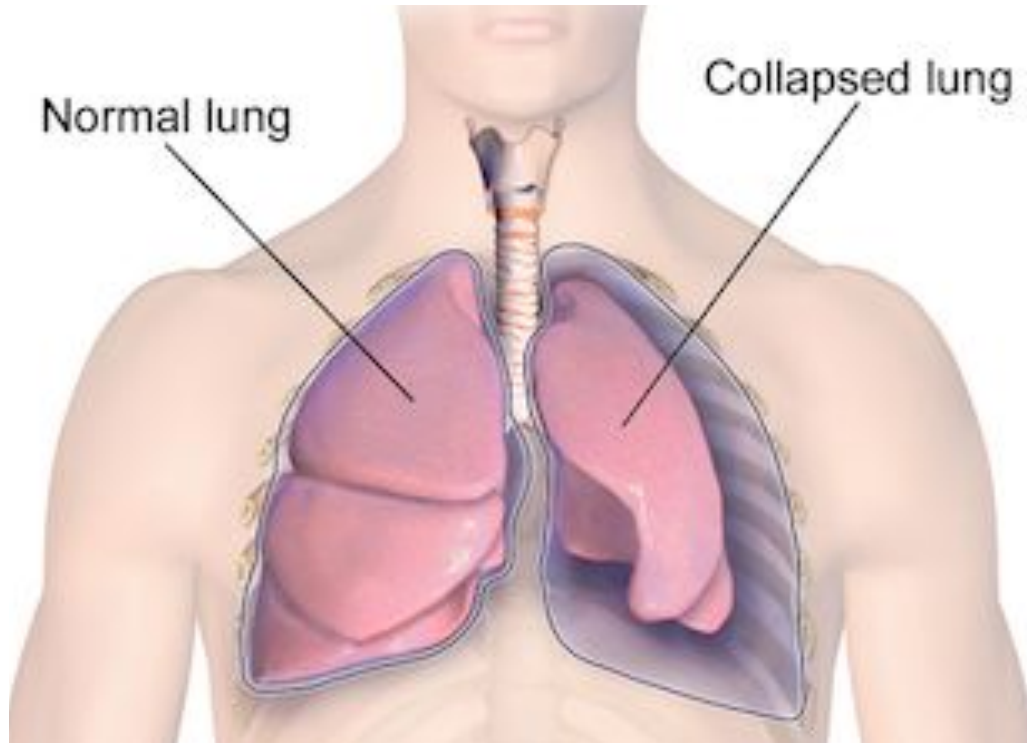
Surgery for lung cancer may include the removal a small or a large part of your lung it might even be an entire lung depending on how far the cancer has spread. To sum it all up , the risks of lung cancer surgery most likely can be influenced by many things.

These are the most common ones of lung cancer surgery :

- Infection
- Pain
- Bleeding
- An air leak in a lung
- Damage to a lung, blood vessel, nerve or the heart

<https://www.moffitt.org/cancers/lung-cancer/faqs/what-are-the-risks-of-lung-cancer-surgery/#:~:text=Lung%20cancer%20surgery%20may%20involve,benefits%20of%20the%20proposed%20procedure.>

Air leak in lungs



An air leak happens when air comes together in any other space than the alveoli. Air gets out of the lung and gather around the lung, this usually makes the lung collapse.

Positives of lung cancer surgery

Jan-13-2026

The main benefits of having lung cancer surgery is that it is the best chances at curing lung cancer surgery because it doesn't just tries to damage cancer cells but rather take out the part of the lung th is infected by a surgical process giving a long term chance to survive if yu have lung cancer. But it is still best if you are on a earlier stage because it is still just a small part that is infected .

Key benefits

It is the best and most efficient way to almost completely cure cancer in its early stages

Removing the entire tumor: To physically remove the cancerous tumor, the mardin (surrounding lung tissue) margin, and nearby lymph nodes for examination.

Process of lung cancer surgery

Jan-13-2026

When your surgeon is doing your surgery they will cut the part of lung that is infected and a little bit around it to make sure the cancer is completely taken out ...

- **Wedge resection involves removing a small portion of lung tissue containing cancer cells, along with a certain area of surrounding healthy tissue.**
- **Segmentectomy involves removing a significant portion of the lung tissue, but not the entire lung lobe.**
- **Lobectomy is the removal of the entire lobe of one lung.**
- **Total pneumonectomy, which involves removing the entire lung.**

... your surgeon may also remove lymph nodes from your lungs/chest to check for cancer.

If surgery is one of your options and the cancer is spread too much you will probably go through Chemotherapy or radiation therapy in order to shrink the lung tumor it also can be used after the surgery had happened if they found that there's still a risk of cancer cells being left behind or if you still have chances of having lung cancer or any cancer in general

<https://www.mayoclinic.org/diseases-conditions/lung-cancer/diagnosis-treatment/drc-20374627#:~:text=Lung%20cancer%20surgery%20can%20involve,Radiation%20therapy>

Process of radiation therapy

Jan-19-2026

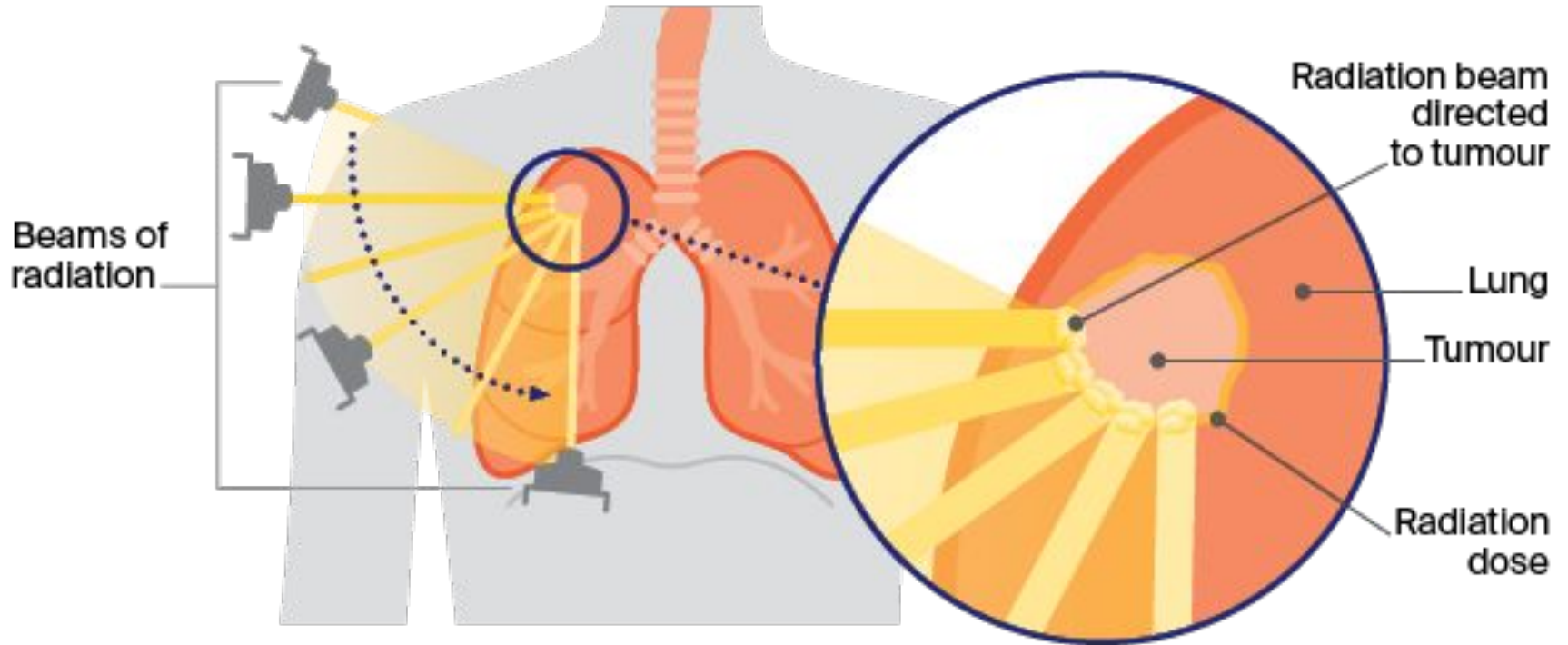
Radiation therapy can be given inside or outside of your body. The most common kind is external beam radiation therapy. This treatment uses a large machine called a linear accelerator. High-energy beams are aimed from the machine to a precise point on your body.

Radiation treatment that goes inside the body is called brachytherapy (brak-e-THER-uh-pee). Brachytherapy also is a common cancer treatment. During this therapy, a provider places a small solid implant in or near the cancer.

Radiation therapy damages cells by destroying their genetic material. Genetic material controls how cells grow and divide. Healthy cells may be damaged along with cancer cells during radiation therapy. But healthy cells can repair themselves more easily than cancer cells.

<https://www.mayoclinic.org/tests-procedures/radiation-therapy/about/pac-20385162#:~:text=Radiation%20therapy%20can%20be%20given.more%20easily%20than%20cancer%20cells.>

External beam radiation therapy



Benefits of radiation therapy

Jan-19-2026

Some pros of having radiation to treat lung cancer cancer include:

- It is extremely effective for small or early stage cancer enough to kill almost all of it without the help of any other treatment
- It can also destroy the cancer cell that surgery might not be able to detect
- It is also capable to shrink the tumor for surgery to easily destroy it
- It also doesn't put the patients health risk
- This treatment also doesn't cause you any pain
- Decrease amount of cancer symptoms.
- Hen it combined with chemotherapy it is even more effective then any of them was done alno would have

<https://www.oregoncancer.com/blog/pros-and-cons-of-treating-cancer-with-radiation-therapy#:~:text=Advantages%20of%20Radiation%20Therapy,what%20leads%20to%20side%20effects>.

Harmful effects of radiation therapy

Jan-19-2026

Since radiation also has chances of infecting healthy cells because of this reason its natural for patients to get different side effects. Not a lot of patients experience side effects what its seen as natural since not everyone experiences the same radiation and dont have the same health it and also because of the fact that not everyone are on the same stage of cancer.

- You might experience fatigue and tiredness because the amount of energy your body needs to use in order to create the cells that were killed during radiation therapy
- Minor changes may occur in the skin at the treatment site, including pain, redness, or peeling.
- You might experience different side effects cause the area of the cancer is different for different people
 - nausea
 - vomiting
 - diarrhea
 - dry mouth

part-2

- sore throat
- cough
- breathing difficulties
- swallowing problems,
- hair loss
- The development of a second cancer is rare, but the risk is higher for older people or those with specific types of cancer.

<https://www.oregoncancer.com/blog/pros-and-cons-of-treating-cancer-with-radiation-therapy#:~:text=Advantages%20of%20Radiation%20Therapy,what%20leads%20to%20side%20effects.>

Process of Targeted therapy

Feb-2-2026

Oncologists dose three main steps in performing targeted therapy.

- **Finding the Glitch:** Doctors study the genetic mutation (the "glitch") that causes a healthy cell to turn into a cancer cell.
- **Picking the Target:** Your oncologist identifies a specific part of that cell to attack—either on its outer shell or deep inside.
- **Engineering the Fix:** Using that data, scientists create a "smart" drug designed to hit only those specific areas.
- **Stopping the Growth:** This drug works by either killing the cancer cells directly or "muting" the genetic instructions that tell them to keep multiplying.

<https://my.clevelandclinic.org/health/treatments/22733-targeted-therapy>

Benefits of Targeted therapy

Feb-2-2026

Targeted therapy is a type of precision medicine that attacks specific molecules to stop cancer from growing, while sparing healthy cells. Here are the key benefits broken down into easy-to-remember points:

- **High Precision:** Unlike standard chemo, these drugs "zero in" on cancer-specific molecules, significantly limiting damage to healthy tissue.
- **Personalized Care:** Doctors use biomarker testing to tailor the treatment to your tumor's unique genetic profile.
- **Fewer Side Effects:** Because the treatment is more selective, it often results in milder side effects and a better overall quality of life.
- **Better Outcomes:** These therapies can improve survival rates and even turn some advanced cancers into manageable, chronic conditions.
- **Versatile Use:** It can be used alone or combined with surgery, radiation, or chemotherapy to make treatment more effective.

Side Effects of Targeted therapy

Feb-2-2026

Potential side effects

Targeted therapy side effects vary, here are some common ones include:

- Bleeding in your stomach or intestines, which may cause changes in your poop like bright red blood or black tarry poop
- Blood clots
- Diarrhea
- Dry skin or rash
- Elevated liver enzymes (high levels of substances like ALT, AST, ALP, and GGT in the blood)

Part-2 of side effects of targeted therapy Feb-2-2026

- Heart conditions, like [arrhythmia](#) and [cardiotoxicity](#)
- High blood pressure ([hypertension](#))
- Loss of hair color
- [Pulmonary fibrosis](#)
- Wounds (cuts) that heal slowly

<https://my.clevelandclinic.org/health/treatments/22733-targeted-therapy>

Benefits of Targeted therapy:
Are similar to radiation and chemotherapy

Conclusion Feb-19-2026

There isn't really the better treatment for lung cancer overall, but we have provided information on the different treatments so you can see which one(s) benefits you the most.

Thank you for reading this!!!!!!!!!!!!