# Understanding What Cancer Is

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## What Is Cancer? Everything You Need to Know

According to the National Cancer Institute, there were an estimated 1,735,350 new cases of cancer in 2018.

The most common types of cancer are breast cancer, lung cancer, prostate cancer, colon and rectum cancer, melanoma, bladder cancer, non-Hodgkin lymphoma, kidney cancer, endometrial cancer, leukemia, pancreatic cancer, thyroid cancer, and liver cancer.

We all know a little bit about cancer, and we've been affected by it in some way. However, cancer is pretty complicated. So, what is cancer exactly? Let's take a closer look.

### What Is Cancer?

The National Cancer Institute defines cancer as "the name given to a collection of related diseases. In all types of cancer, some of the body's cells begin to divide without stopping and spread into surrounding tissues."

Typically, our cells divide and form new cells when we need them. When our cells become old and damaged, they die, and then the new cells take their place. When cancer occurs, this system becomes broken. The cells Also abnormal, the damaged cells survive when they should have died, and cells divide when they do not need to. Tumors form when cells divide without stopping.

### What Causes Cancer?

There are a variety of risk factors that may increase the likelihood of developing cancer. However, most of the time cancer occurs in people identifiable any known risk factors.

According to the Cancer Society of Finland, cancer risk factors can be divided into four main groups:

1. Biological or internal factors, such as age, gender, skin type, and inherited factors.
2. Environmental exposure, such as fine particulate matter and radon and UV exposure.
3. Occupational risk factors, such as exposure to radioactive material and asbestos.
4. Lifestyle factors.

Lifestyle factors may include the following:

- Smoking
- Alcohol intake
- Excess sunlight exposure
- Food-related factors, such as nitrates and barbecuing food

Occupational risk factors, as well as potential exposures in the home, include:

- Asbestos
- Tar and pitch
- Certain metals
- Polynuclear hydrocarbons (i.e., benzopyrene)
- Some plastic chemicals (i.e., Vinyl chloride)

Also, certain bacteria and viruses may increase the risk of cancer; some of these include:

- Helicobacter pylori (H. pylori, causes gastritis)
- HBV, HCV (two hepatitis viruses)
- Human papillomavirus (HPV)
- Epstein-Barr virus (EBV)

Certain drugs may increase the risk of cancer; some of these include:

- Certain hormones
- Medications that cause immune deficiency
- Certain antineoplastic medications

Also, radiation can cause cancer. Examples include ionizing radiation such as X-rays and soil radon and non-ionizing radiation, such as the sun.

*Next page: How does cancer start? How does cancer spread? And more answers to "what is cancer?"*

**How Does Cancer Start?**

Cancer starts due to changes to our genes. These changes affect how the cells function – specifically how they grow and divide.

What specifically causes the cancer to start? These genetic changes can be inherited from our parents or as a result of errors which occur during cell division. When we're exposed to the causes discussed previously, this can cause changes to the DNA.

Also, genetic changes tend to affect three types of genes:

1. **Proto-oncogenes**: genes that are involved in normal cell division, when altered or more active than usual, they may cause cancer. This allows cells to grow when they should have died.
2. **Tumor suppressor genes**: involved in cell growth and division, when these genes have alterations, they tend to divide uncontrollably.
3. **DNA repair genes**: genes that fix damaged DNA, when mutated, these genes may cause mutations in other genes, which may cause cancerous cells.

**How Does Cancer Spread?**

Cancer that spreads is said to have metastasized. Metastatic cancer is cancer that has spread from the primary cancer to another area of the body. Cancer typically spreads because cells break free from the tumor, traveling to other parts of the body through the bloodstream or the lymph system.

When cancer cells travel through the lymph system, the cells are likely to settle into lymph nodes or in organs. When cells travel through the bloodstream, however, they can go anywhere in the body. Fortunately, many of these cancer cells will die, but some may settle into a new area and form new tumors.

For cancer cells to spread to different areas of the body, they must go through the following steps:

- The cells must break off from the tumor and enter the bloodstream or lymph system, where they are carried to another part of the body.
- The cell must attach to the wall of a blood or lymph vessel to move into a new organ.
- The cell must be able to grow in its new location.
- The cell must be able to avoid attacks from the immune system.

If someone has breast cancer and their cancer has metastasized to the lungs, this does not mean that they have both breast cancer and lung cancer – this means that they have metastatic breast cancer. Treatment would be specific to breast cancer, as opposed to lung cancer.

Cancer is termed cancer of unknown primary when it has spread to various places, making it challenging to locate the primary location of cancer.

**Cancer Cells vs. Normal Cells**

Normal cells grow and mature at a normal pattern. They are also specialized, depending on where they are in the body. For example, an epithelial cell is different than a smooth muscle cell.

Cancer cells are less specialized. This is why cancer cells may develop and divide without stopping. Cancer cells can ignore signals that normal cells receive to stop dividing. Also, according to the National Cancer Institute, “cancer cells can induce nearby normal cells to form blood vessels that supply tumors with oxygen and nutrients, which they need to grow. These blood vessels also remove waste products from tumors.”

The immune system keeps us healthy – it helps to remove damaged and abnormal cells. However, cancerous cells may be able to “hide” from the immune system. Tumor cells may actually use the immune system to grow – “with the help of certain immune system cells that normally prevent a runaway immune response, cancer cells can actually keep the immune system from killing cancer cells.”

**How Is Cancer Diagnosed?**

- Generally, a **biopsy** should be taken to achieve a proper diagnosis. A biopsy involves removing a sample of tissue so that a pathologist can review the tissue to see if the sample is cancerous. The biopsy may be achieved with a needle (needle biopsy), during an endoscopy or surgery.
- **Lab tests** can help to detect signs of cancer. The specific labs that would be helpful are dependent on the type of cancer that is suspected. Your physician may order blood, urine, and other body fluids to help ascertain a diagnosis. However, labs cannot diagnose cancer without a biopsy, but it can give clues.
- **CT scans** help to visualize tumors. A CT scan uses an x-ray linked to a computer to take very detailed photos.  Sometimes contrast is administered to better visualized the tumor.
- **Nuclear scans** use a tracer, which is a radioactive material, that is injected into the body. The tracer flows throughout the body, collecting in bones and organs where a tumor may be. A machine detects the radioactivity. The scanner can create pictures of the bones and organs.
- **Ultrasound** uses sound waves that bounce off the body. We are unable to hear these sound waves, but a computer can create a picture from these sound waves.
- **Magnetic resonance imaging**, also known as MRI, uses a strong magnet linked to a computer. Very detailed photos can be created, and they can be printed.
- **PET scan** also uses a tracer injection. A machine can take 3-D photos of the areas that the tracer collects in the body.
- **X-rays** use very low doses of radiation to take photos of various areas of the body.

*Next page: The signs and symptoms of cancer, how cancer is treated, and more "what is cancer?" education.*

**Cancer Signs and Symptoms**

Each type of cancer has its own list of signs and symptoms. Many of these symptoms can also be attributed to other illnesses, which can sometimes make cancer difficult to diagnose.

Here are some *general* symptoms of cancer; having these symptoms does not indicate cancer, but having them for a long time *does* indicate that you should discuss your health with a health care provider!

- **Unexplained weight loss.** Losing weight for no known reason is termed unexplained weight loss. An unexpected weight loss of 10 pounds or greater may be an indicator of cancer. Unexplained weight loss is common with pancreatic, lung, stomach, and esophageal cancers.
- **Fever.** A fever typically occurs once cancer has spread to another location. It may also occur in the early stages of leukemia and lymphoma, and when treatment affects the immune system.
- **Pain.** Pain occurs in many cancers. For example, pain is typically felt like an early symptom with bone cancer and testicular cancer. With other cancers, pain may not be experienced until the cancer has metastasized.
- **Skin changes.** Most common in skin cancer, skin changes can also occur in other types of cancers as well.
    - **Hyperpigmentation:** darker looking skin
    - **Jaundice:** yellowing of the skin
    - **Erythema:** redness of the skin
    - **Pruritis:** itching
    - Excessive hair growth

**How Is Cancer Treated?**

There are many types of cancer treatments available. There are also many factors that will dictate which type of treatment your physician will recommend. You may receive one treatment or several treatments.

- **Surgery** may be performed to remove all, or as much, of the tumor as possible.
- **Chemotherapy** is a type of drug that is administered to kill cancer cells.
- **Radiation therapy** uses high-powered energy beams, like x-rays and protons, to kill cancer cells. Radiation therapy may be performed externally or internally (brachytherapy).
- **Hormone therapy** is useful when you have a cancer that is fueled by hormones, such as breast cancer. With this type of therapy, hormones are removed or blocked so that cancer cells are unable to grow.
- **Bone marrow transplant**, also known as a stem cell transplant, allows you to use your own stem cells or stem cells from a donor.  Bone marrow is the material inside of the bones that creates red blood cells from the stem cells. Because of bone marrow transplants, you may be able to receive higher doses of chemotherapy. It may also be indicated for diseased bone marrow.
- **Cryoablation** uses a needle called a cryoprobe to kill cancer cells. The cryoprobe is inserted directly into the tumor; gas is pumped into the cryoprobe, freezing the cells. The tissue thaws then are frozen again. The process is repeated. This kills cancer cells.
- **Immunotherapy** allows the body to use its own immune system to fight cancer. According to Mayo Clinic, “cancer can survive unchecked in your body because your immune system doesn't recognize it as an intruder. Immunotherapy can help your immune system ‘see’ the cancer and attack it.”
- **Targeted drug therapy** focuses on specific cancer cells.
- **Radiofrequency ablation** uses a thin needle, which is inserted into the tumor. High-frequency energy is passed through the needle; this causes the surrounding tissues to heat up, killing cancer cells.
- **Clinical trials** are studies that are attempting to find new ways to treat cancer.

**Common Types of Cancer**

Did you know that there have been over 200 types of cancers identified? Some of these cancers are undoubtedly more common than others. Here are some of the most common types of skin cancers.

- **Brain and central nervous system tumors.** These types of tumors make up approximately 26 percent of

all childhood cancers. They are classified based on where the tumor originated; examples include gliomas, astrocytomas, and primitive neuroectodermal tumors.

- **Non-Hodgkin lymphoma.** There are various types of non-Hodgkin lymphoma, and they affect different cells and body parts. This type of cancer can affect people at any age, and the prognosis varies based on a variety of factors. Approximately 67,500 people annually are diagnosed with non-Hodgkin lymphoma.
- **Leukemia.** There are various types of leukemia, but the four most common are acute myeloid leukemia, acute lymphocytic leukemia, chronic lymphocytic leukemia, and chronic myeloid leukemia. This type of cancer typically forms inside the bone marrow, resulting in overproduction of white blood cells. Leukemia may be chronic, as it can begin very slowly without any symptoms, or acute, as the cells are unable to function normally, causing symptoms very quickly. Leukemia kills more children under the age of 20 than any other cancer. It affects approximately 45,000 people annually.
- **Breast cancer.** The most common type of cancer in women; this type of cancer may even affect men. An estimated 242,500 cases of breast cancer are diagnosed annually in women, and 2,550 annually in men. Fortunately, the death rate for breast cancer has declined since 1989, most likely due to better diagnostics.
- **Colorectal cancer.** This type of cancer affects both the colon – a part of the large intestine that helps to digest food – and the rectum. According to Everyday Health, “There will be about 146,970 new cases of colon and rectal cancers combined…” The number of young people with colorectal cancer is low, but the numbers were expected to double between the years of 1991 and 2014.
- **Lung cancer.** Lung cancer can be sub-divided into two main types – small cell and non-small cell lung cancer. This type of cancer causes approximately 160,000 deaths annually. It should come as no surprise that smoking is the biggest risk factor. Fortunately, as the amount of smokers has decreased, so has the number of lung cancer cases.
- **Prostate cancer.** This is the most prevalent type of cancer in men, typically over the age of 50. The cancer typically occurs inside the tissues of the prostate gland, which is situated near the base of the bladder and near the rectum. This cancer causes approximately 183,500 cases annually.
- **Uterine cancer.** Also known as endometrial cancer, this type of cancer affects the endometrium of the uterus. The most common symptom is abnormal vaginal bleeding; this can occur in a healthy individual for any number of reasons, but experts believe it should be taken seriously if it occurs for three cycles in a row. Uterine cancer affects approximately 55,000 people annually.

- **Skin cancer.** Skin cancer affects more than one million people per year, and it can affect any part of the skin. However, it is most common to have skin cancer in an area that has been exposed to the sun. Skin cancer is most common in the elderly and those with a compromised immune system. Examples of skin cancer include squamous cell skin cancer and basal cell skin cancer.
- **Thyroid cancer.** This butterfly-shaped gland in the neck has a host of responsibilities – it assists with metabolism, heart rate, maintaining body temperature, and fertility. Unfortunately, thyroid cancer is the most rapidly growing cancer in the U.S. Why? Perhaps because it is only now being caught. Fortunately, thyroid cancer is not a deadly cancer – it is generally treatable when it is caught. This cancer affects approximately 49,000 people annually.
- **Kidney cancer.** This type of cancer occurs approximately twice as often in men as women, most likely due to exposure to carcinogens in the workplace and a higher likelihood of smoking. This type of cancer affects approximately 62,000 people annually.
- **Bladder cancer.** This type of cancer affects men four times as often as women and experts are unsure why. Smoking appears to be the biggest risk factor. Bladder cancer affects approximately 73,000 people annually.