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## About Liver Cancer

### Overview and Types

If you have been diagnosed with liver cancer or are worried about it, you likely have a lot of questions. Learning some basics is a good place to start.

- [What Is Liver Cancer?](#)

### Research and Statistics

See the latest estimates for new cases of liver cancer and deaths in the US and what research is currently being done.

- [Key Statistics About Liver Cancer](#)
  - [What's New in Liver Cancer Research?](#)
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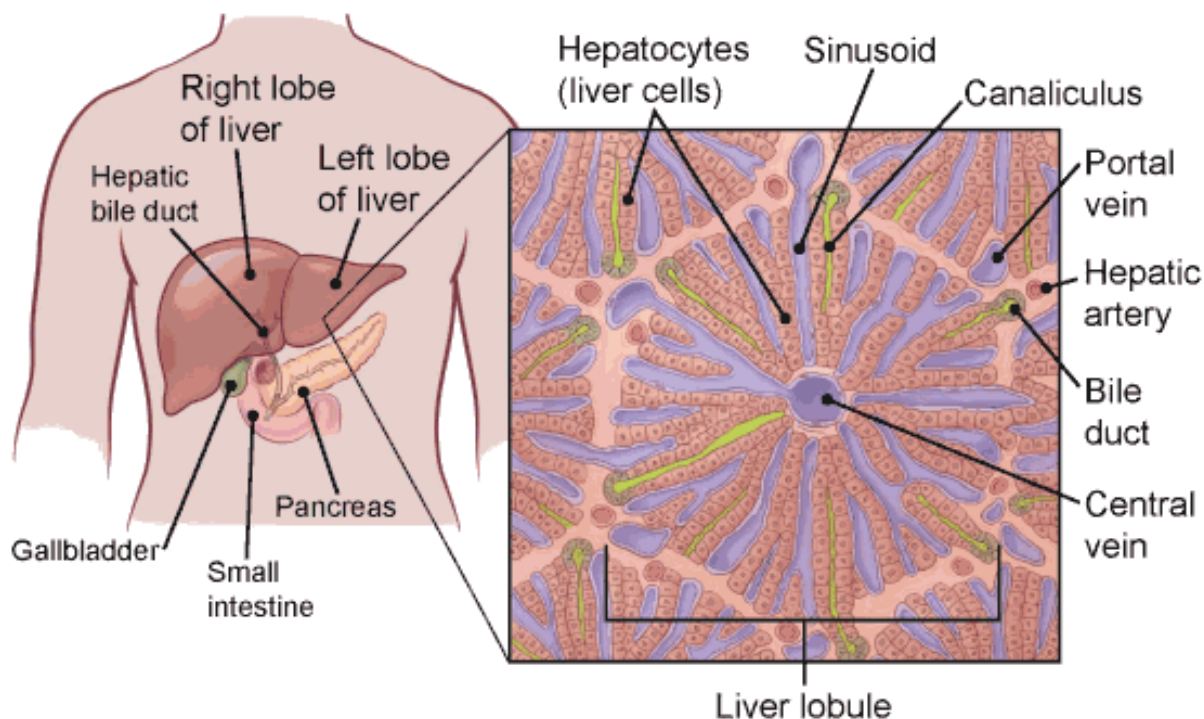
## What Is Liver Cancer?

Cancer starts when cells in the body begin to grow out of control. Cells in nearly any part of the body can become cancer, and can spread to other areas of the body. To learn more about how cancers start and spread, see [What Is Cancer?](#)<sup>1</sup>

Only cancers that **start** in the liver are called liver cancer (primary liver cancer). To understand liver cancer, it helps to know about the normal structure and function of the liver.

## About the liver

The liver is the largest internal organ. It lies under your right ribs just beneath your right lung. It is divided into lobes.



You cannot live without your liver. It has several important functions:

- It breaks down and stores many of the nutrients absorbed from the intestine that your body needs to function. Some nutrients must be changed (metabolized) in the liver before they can be used for energy or to build and repair body tissues.
- It makes most of the clotting factors that keep you from bleeding too much when you are cut or injured.
- It secretes bile into the intestines to help absorb nutrients (especially fats).
- It breaks down alcohol, drugs, and toxic wastes in the blood, which then pass from the body through urine and stool

The liver is made up mainly of cells called *hepatocytes*. It also is made up of other types of cells, including cells that line its blood vessels and cells that line small tubes in the liver called *bile ducts*. The bile ducts extend out of the liver and carry bile from the liver

to the gallbladder or directly to the intestines.

These different types of cells in the liver can form several types of malignant (cancerous) and benign (non-cancerous) tumors. These tumors have different causes, are treated differently, and have a different prognosis (outlook).

## **Benign liver tumors**

Benign tumors sometimes grow large enough to cause problems, but they do not grow into nearby tissues or spread to distant parts of the body. If they need to be treated, the patient can usually be cured with surgery.

### **Hemangioma**

The most common type of benign liver tumor, hemangiomas, start in blood vessels. Most hemangiomas of the liver cause no symptoms and do not need treatment. But some may bleed and need to be removed surgically.

### **Hepatic adenoma**

Hepatic adenoma is a benign tumor that starts from hepatocytes (the main type of liver cell). Most cause no symptoms and do not need treatment. But some eventually cause symptoms, such as pain or a mass in the abdomen (stomach area) or blood loss. Because there is a risk that the tumor could rupture (leading to severe blood loss) and a small risk that it could eventually develop into liver cancer, most experts will usually advise surgery to remove the tumor if possible.

Using certain drugs may increase the risk of getting these tumors. Women have a higher chance of having one of these tumors if they take birth control pills, although this is rare. Men who use anabolic steroids may also develop these tumors. Adenomas may shrink when the drugs are stopped.

### **Focal nodular hyperplasia**

Focal nodular hyperplasia (FNH) is a tumor-like growth made up of several cell types (hepatocytes, bile duct cells, and connective tissue cells). Although FNH tumors are benign, it can be hard to tell them apart from true liver cancers, and doctors sometimes remove them when the diagnosis is unclear. If you have symptoms from an FNH tumor, it can be removed with surgery.

Both hepatic adenomas and FNH tumors are more common in women than in men.

## Types of primary liver cancer

A cancer that starts in the liver is called *primary* liver cancer. There is more than one kind of primary liver cancer.

### Hepatocellular carcinoma (hepatocellular cancer)

This is the most common form of liver cancer in adults.

Hepatocellular cancer (HCC) can have different growth patterns:

- Some begin as a single tumor that grows larger. Only late in the disease does it spread to other parts of the liver.
- A second type seems to start as many small cancer nodules throughout the liver, not just a single tumor. This is seen most often in people with cirrhosis (chronic liver damage) and is the most common pattern seen in the United States.

Using a microscope, doctors can distinguish several subtypes of HCC. Most often these subtypes do not affect treatment or prognosis (outlook). But one of these subtypes, *fibrolamellar*, is important to recognize. This type is rare, making up less than 1% of HCCs. This type is most often seen in women younger than age 35, and often the rest of the liver is not diseased. This subtype generally has a better outlook than other forms of HCC.

Here “liver cancer” is hepatocellular carcinoma.

### Intrahepatic cholangiocarcinoma (bile duct cancer)

About 10% to 20% of cancers that start in the liver are intrahepatic cholangiocarcinomas. These cancers start in the cells that line the small bile ducts (tubes that carry bile to the gallbladder) within the liver. (Most cholangiocarcinomas actually start in the bile ducts outside the liver.)

Although the rest of this document deals mainly with hepatocellular cancers, cholangiocarcinomas are often treated the same way. For more detailed information on this type of cancer, see our document, [Bile Duct \(Cholangiocarcinoma\) Cancer<sup>2</sup>](#).

### Angiosarcoma and hemangiosarcoma

These are rare cancers that begin in cells lining the blood vessels of the liver. People who have been exposed to vinyl chloride or to thorium dioxide (Thorotrast) are more likely to develop these cancers. See the section "[Liver cancer risk factors](#)<sup>3</sup>" Some other cases are thought to be caused by exposure to arsenic or radium, or to an inherited condition known as *hereditary hemochromatosis*. In about half of all cases, no likely cause can be identified.

These tumors grow quickly and are usually too widespread to be removed surgically by the time they are found. Chemotherapy and radiation therapy may help slow the disease, but these cancers are usually very hard to treat. These cancers are treated like other sarcomas. For more information, see [Soft Tissue Sarcoma](#)<sup>4</sup>.

## Hepatoblastoma

This is a very rare kind of cancer that develops in children, usually in those younger than 4 years old. The cells of hepatoblastoma are similar to fetal liver cells. About 2 out of 3 children with these tumors are treated successfully with surgery and chemotherapy, although the tumors are harder to treat if they have spread outside the liver.

## Secondary liver cancer (metastatic liver cancer)

Most of the time when cancer is found in the liver it did not start there but has spread (metastasized) from somewhere else in the body, such as the pancreas, colon, stomach, breast, or lung. Because this cancer has spread from its original (primary) site, it is a secondary liver cancer. These tumors are named and treated based on their primary site (where they started). For example, cancer that started in the lung and spread to the liver is called *lung cancer with spread to the liver*, not liver cancer, and it is treated as lung cancer.

In the United States and Europe, secondary (metastatic) liver tumors are more common than primary liver cancer. The opposite is true for many areas of Asia and Africa.

For more information on liver metastases from different types of cancer, see specific cancer types, as well as [Advanced Cancer](#).<sup>5</sup>

**Most of the remaining content refers only to hepatocellular carcinoma.**

## Hyperlinks

1. [www.cancer.org/cancer/cancer-basics/what-is-cancer.html](http://www.cancer.org/cancer/cancer-basics/what-is-cancer.html)
2. [www.cancer.org/cancer/bile-duct-cancer.html](http://www.cancer.org/cancer/bile-duct-cancer.html)

3. [www.cancer.org/cancer/liver-cancer/causes-risks-prevention/risk-factors.html](http://www.cancer.org/cancer/liver-cancer/causes-risks-prevention/risk-factors.html)
4. [www.cancer.org/cancer/soft-tissue-sarcoma.html](http://www.cancer.org/cancer/soft-tissue-sarcoma.html)
5. [www.cancer.org/treatment/understanding-your-diagnosis/advanced-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/advanced-cancer.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

# Key Statistics About Liver Cancer

## How common is liver cancer?

The American Cancer Society's estimates for primary liver cancer and intrahepatic bile duct cancer in the United States for 2019 are:

- About 42,030 new cases (29,480 in men and 12,550 in women) will be diagnosed
- About 31,780 people (21,600 men and 10,180 women) will die of these cancers

Liver cancer incidence has more than tripled since 1980. However, rates in young adults have recently begun to decline. Liver cancer death rates have increased by almost 3% per year since 2000. Liver cancer is seen more often in men than in women.

## Where is liver cancer more common?

Liver cancer is much more common in countries in sub-Saharan Africa and Southeast Asia than in the US. In many of these countries it is the most common type of cancer. More than 700,000 people are diagnosed with this cancer each year throughout the world. Liver cancer is also a leading cause of cancer deaths worldwide, accounting for more than 600,000 deaths each year.

Visit the [American Cancer Society's Cancer Statistics Center<sup>1</sup>](#) for more key

**statistics.**

## Hyperlinks

1. <https://cancerstatisticscenter.cancer.org/>

## References

American Cancer Society. *Facts & Figures 2019*. American Cancer Society. Atlanta, Ga. 2019.

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: January 8, 2019

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# What's New in Liver Cancer Research?

Because there are only a few effective ways to prevent or treat liver cancer at this time, there is always a great deal of research going on in the area of liver cancer. Scientists are looking for causes and ways to prevent liver cancer, and doctors are working to improve treatments.

## Prevention

The most effective way to reduce the worldwide burden of liver cancer is to prevent it from happening in the first place. Some scientists believe that vaccinations and improved treatments for hepatitis could prevent about half of liver cancer cases worldwide. Researchers are studying ways to prevent or treat hepatitis infections before they cause liver cancers. Research into developing a vaccine to prevent hepatitis C is ongoing. Progress is also being made in treating chronic hepatitis.

## Screening

Several new blood tests are being studied to see if they can detect liver cancer earlier than using [AFP and ultrasound](#)<sup>1</sup>. One that is promising is called DKK1.

## Surgery

Newer techniques are being developed to make both partial hepatectomy and liver transplants safer and more effective.

### Adding other treatments to surgery

An active area of research uses *adjuvant* therapies – treatments given right after surgery – to try to reduce the chances that the cancer will return. Most of the studies so far using chemotherapy or chemoembolization after [surgery](#)<sup>2</sup> have not shown that they help people live longer. Research studies are also looking into newer drugs, like targeted therapy and may prove to be more effective. Some promising results have also been seen with [radioembolization](#)<sup>3</sup>, but these need to be confirmed in larger studies. Another area of study has been the use of anti-viral therapy in people with liver cancer related to having viral hepatitis to see if it improves outcomes after surgery.

Doctors are also studying ways to make more liver cancers resectable by trying to shrink them before surgery. Studies are now looking at different types of *neoadjuvant* therapies (therapies given before surgery), including targeted therapy, chemotherapy, ablation, embolization, and radiation therapy. Early results have been promising but have only looked at small numbers of patients.

### Laparoscopic surgery

In laparoscopic surgery, several small incisions are made in the abdomen, and special long, thin surgical instruments are inserted to view and cut out the diseased portion of the liver. It does not require a large incision in the abdomen, which means there is less blood loss, less pain after surgery, and a quicker recovery.

At this time, laparoscopic surgery is still considered experimental for liver cancer. It is being studied mainly in patients with small tumors in certain parts of the liver that can be easily reached through the laparoscope.

### Determining recurrence risk after surgery

After a partial hepatectomy, one of the biggest concerns is that the cancer might come back (recur). Knowing someone's risk for recurrence after [surgery](#)<sup>4</sup> might give doctors a



better idea of how best to follow up with them, and may someday help determine who needs additional treatment to lower this risk.

Various researchers are studying ways to predict if the cancer may come back by testing the liver cells in the surgery sample through genetic profiling. . These studies are promising but will need to be confirmed in other larger studies before it is widely used.

## **Liver transplant**

Only a small portion of patients with liver cancer are candidates for a liver transplant because of the strict criteria they need to meet (based mainly on the size and number of tumors). Some doctors are now looking to see if these criteria can be expanded, so that people who are otherwise healthy but have slightly larger tumors might also be eligible.

## **Radiation therapy**

The main problem with using radiation therapy against liver cancer is that it also damages healthy liver tissue. Researchers are now working on ways to focus radiation therapy more narrowly on the cancer, sparing the nearby normal liver tissue. One approach being studied is called brachytherapy. In this treatment, catheters (thin tubes) are placed in the tumor and then pellets that give off radiation are put into the catheters for a short time. After the treatment, both the pellets and the catheters are removed. This allows radiation to be targeted to the cancer with less harm to the normal liver.

## **Targeted therapy**

New drugs are being developed that work differently from standard chemotherapy drugs. These newer [targeted drugs](#)<sup>5</sup> act on specific parts of cancer cells or their surrounding environments.

Tumor blood vessels are the target of several newer drugs. Liver tumors need new blood vessels to grow beyond a certain size. The drug sorafenib (Nexavar), which is already used for some liver cancers that can't be removed surgically, works in part by hindering new blood vessel growth. This drug is now being studied for use earlier in the course of the disease, such as after surgery or trans-arterial chemoembolization (TACE). Researchers are also studying whether combining it with chemotherapy may make it more effective.

Regorafenib (Stivarga) is a targeted drug that has shown promise in treating liver cancers that are no longer responding to sorafenib.

Cabozantinib is another targeted drug that has been shown to reduce tumor growth and stop new blood vessel growth in some studies.

## Chemotherapy

New forms of chemotherapy combined with other treatments are being tested in clinical trials. A small number of tumors respond to chemotherapy, although it has not yet been shown to prolong survival.

Chemotherapy drugs, such as oxaliplatin, capecitabine, gemcitabine, and docetaxel, are being tested against liver cancer in clinical trials. Oxaliplatin has shown promising results in early studies when given in combination with doxorubicin and also when given with gemcitabine and the targeted therapy drug cetuximab (Erbix).

## Virus therapy

A newer approach to treatment is the use of a virus, known as *JX-594*. This started as the same virus that was used to make the smallpox vaccine, but it has been altered in the lab so that it mainly infects cancer cells and not normal cells. A solution containing the virus is injected into liver cancers, and the virus can enter the cancer cells, where it causes them to die or to make proteins that result in them being attacked by the body's immune system. Early results of this treatment against advanced liver cancer have been promising, even in patients who have already had other treatments.

## Hyperlinks

1. [www.cancer.org/cancer/liver-cancer/detection-diagnosis-staging/detection.html](http://www.cancer.org/cancer/liver-cancer/detection-diagnosis-staging/detection.html)
2. [www.cancer.org/cancer/liver-cancer/treating/surgery.html](http://www.cancer.org/cancer/liver-cancer/treating/surgery.html)
3. [www.cancer.org/cancer/liver-cancer/treating/embolization-therapy.html](http://www.cancer.org/cancer/liver-cancer/treating/embolization-therapy.html)
4. [www.cancer.org/cancer/liver-cancer/treating/surgery.html](http://www.cancer.org/cancer/liver-cancer/treating/surgery.html)
5. [www.cancer.org/cancer/liver-cancer/treating/targeted-therapy.html](http://www.cancer.org/cancer/liver-cancer/treating/targeted-therapy.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 27, 2017

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# Liver Cancer Causes, Risk Factors, and Prevention

## Risk Factors

A risk factor is anything that affects your chance of getting a disease such as cancer. Learn more about the risk factors for liver cancer.

- [Liver Cancer Risk Factors](#)
- [Do We Know What Causes Liver Cancer?](#)

## Prevention

There is no way to completely prevent cancer. But there are things you can do that might lower your risk. Learn more.

- [Can Liver Cancer Be Prevented?](#)

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# Liver Cancer Risk Factors

A risk factor is anything that affects your chance of getting a disease, such as cancer. Different cancers have different risk factors. Some risk factors, like smoking, can be changed. Others, like a person's age or family history, can't be changed.

But risk factors don't tell us everything. Having a risk factor, or even several risk factors,

does not mean that you will get the disease. And some people who get the disease may have few or no known risk factors.

Scientists have found several risk factors that make a person more likely to develop hepatocellular carcinoma (HCC).

## **Gender**

Hepatocellular carcinoma is much more common in males than in females. Much of this is probably because of behaviors affecting some of the risk factors described below. The fibrolamellar subtype of HCC is more common in women.

## **Race/ethnicity**

In the United States, Asian Americans and Pacific Islanders have the highest rates of liver cancer, followed by American Indians/Alaska Natives and Hispanics/Latinos, African Americans, and whites.

## **Chronic viral hepatitis (Hep-B or Hep-C)**

Worldwide, the most common risk factor for liver cancer is chronic (long-term) infection with hepatitis B virus (HBV) or hepatitis C virus (HCV). These infections lead to cirrhosis of the liver (see above) and are responsible for making liver cancer the most common cancer in many parts of the world.

In the United States, infection with hepatitis C is the more common cause of HCC, while in Asia and developing countries, hepatitis B is more common. People infected with both viruses have a high risk of developing chronic hepatitis, cirrhosis, and liver cancer. The risk is even higher if they are heavy drinkers (at least 6 standard drinks a day).

HBV and HCV can spread from person to person through sharing contaminated needles (such as in drug use), unprotected sex, or childbirth. They can also be passed on through blood transfusions, although this is very rare in the United States since the start of blood product testing for these viruses. In developing countries, children sometimes contract hepatitis B infection from prolonged contact with family members who are infected.

HBV is more likely to cause symptoms, such as a flu-like illness and a yellowing of the eyes and skin (jaundice). But most people recover completely from HBV infection within a few months. Only a very small percentage of adults become chronic carriers (and

have a higher risk for liver cancer). Infants and small children who become infected have a higher risk of becoming chronic carriers.

HCV, on the other hand, is less likely to cause symptoms. But most people with HCV develop chronic infections, which are more likely to lead to liver damage or even cancer.

Other viruses, such as the hepatitis A virus and hepatitis E virus, can also cause hepatitis. But people infected with these viruses do not develop chronic hepatitis or cirrhosis, and do not have an increased risk of liver cancer.

## **Cirrhosis**

Cirrhosis is a disease in which liver cells become damaged and are replaced by scar tissue. People with cirrhosis have an increased risk of liver cancer. Most (but not all) people who develop liver cancer already have some evidence of cirrhosis.

There are several possible causes of cirrhosis. Most cases in the United States occur in people who abuse alcohol or have chronic HBV or HCV infections.

### **Non-alcoholic fatty liver disease**

Non-alcoholic fatty liver disease, a condition in which people who consume little or no alcohol develop a fatty liver, is common in obese people. People with a type of this disease known as *non-alcoholic steatohepatitis* (NASH) might go on to develop cirrhosis.

### **Primary biliary cirrhosis**

Some types of autoimmune diseases that affect the liver can also cause cirrhosis. For example, there is also a disease called *primary biliary cirrhosis* (PBC). In PBC, the bile ducts in the liver are damaged and even destroyed which can lead to cirrhosis. People with advanced PBC have a high risk of liver cancer.

### **Inherited metabolic diseases**

Certain inherited metabolic diseases can lead to cirrhosis.

People with *hereditary hemochromatosis* absorb too much iron from their food. The iron settles in tissues throughout the body, including the liver. If enough iron builds up in the liver, it can lead to cirrhosis and liver cancer.

## Heavy alcohol use

Alcohol abuse is a leading cause of cirrhosis in the United States, which in turn is linked with an increased risk of liver cancer.

## Obesity

Being obese (very overweight) increases the risk of developing liver cancer. This is probably because it can result in fatty liver disease and cirrhosis.

## Type 2 diabetes

Type 2 diabetes has been linked with an increased risk of liver cancer, usually in patients who also have other risk factors such as heavy alcohol use and/or chronic viral hepatitis. This risk may be increased because people with type 2 diabetes tend to be overweight or obese, which in turn can cause liver problems.

## Certain rare diseases

Diseases that increase the risk of liver cancer include:

- Tyrosinemia
- Alpha1-antitrypsin deficiency
- Porphyria cutanea tarda
- Glycogen storage diseases
- Wilson disease

## Aflatoxins

These cancer-causing substances are made by a fungus that contaminates peanuts, wheat, soybeans, ground nuts, corn, and rice. Storage in a moist, warm environment can lead to the growth of this fungus. Although this can occur almost anywhere in the world, it is more common in warmer and tropical countries. Developed countries such as the United States and those in Europe regulate the content of aflatoxins in foods through testing.

Long-term exposure to these substances is a major risk factor for liver cancer. The risk is increased even more in people with hepatitis B or C infections.

## **Vinyl chloride and thorium dioxide (Thorotrast)**

Exposure to these chemicals raises the risk of angiosarcoma of the liver (see [What is liver cancer?](#)<sup>1</sup>). It also increases the risk of developing cholangiocarcinoma and hepatocellular cancer, but to a far lesser degree. Vinyl chloride is a chemical used in making some kinds of plastics. Thorotrast is a chemical that in the past was injected into some patients as part of certain x-ray tests. When the cancer-causing properties of these chemicals were recognized, steps were taken to eliminate them or minimize exposure to them. Thorotrast is no longer used, and exposure of workers to vinyl chloride is strictly regulated.

## **Anabolic steroids**

Anabolic steroids are male hormones used by some athletes to increase their strength and muscle mass. Long-term anabolic steroid use can slightly increase the risk of hepatocellular cancer. Cortisone-like steroids, such as hydrocortisone, prednisone, and dexamethasone, do not carry this same risk.

## **Arsenic**

Drinking water contaminated with naturally occurring arsenic, such as that from some wells, over a long period of time increases the risk of some types of liver cancer. This is more common in parts of East Asia, but it might also be a concern in some areas of the United States.

## **Infection with parasites**

Infection with the parasite that causes schistosomiasis can cause liver damage and is linked to liver cancer. This parasite is not found in the US, but infection can occur in Asia, Africa, and South America.

## **Tobacco use**

Smoking increases the risk of liver cancer. Former smokers have a lower risk than current smokers, but both groups have a higher risk than those who never smoked.

## **Factors with unclear effects on liver cancer risk**



## Birth control pills

In rare cases, birth control pills, also known as *oral contraceptives*, can cause benign tumors called *hepatic adenomas*. But it is not known if they increase the risk of hepatocellular cancer. Some of the studies that have looked at this issue have suggested there may be a link, but most of the studies were not of high quality and looked at types of pills that are no longer used. Current birth control pills use different types of estrogens, different estrogen doses, and different combinations of estrogens with other hormones. It is not known if the newer pills increase liver cancer risk.

## Hyperlinks

1. [www.cancer.org/cancer/liver-cancer/about/what-is-liver-cancer.html](http://www.cancer.org/cancer/liver-cancer/about/what-is-liver-cancer.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Do We Know What Causes Liver Cancer?

Although several risk factors for hepatocellular cancer are known (see [Liver Cancer Risk Factors](#)), exactly how these may lead normal liver cells to become cancerous is only partially understood.

Cancers develop when a cell's DNA is damaged. DNA is the chemical in each of our cells that makes up our *genes* – the instructions for how our cells function. Some genes have instructions for controlling when cells grow, divide into new cells, and die.

- Some genes that tell cells to grow and divide are called **oncogenes**.
- Genes that slow down cell division or cause cells to die at the right time are called

## tumor suppressor genes.

Cancers can be caused by DNA changes that turn on oncogenes or turn off tumor suppressor genes. Several different genes usually need to have changes for a cell to become cancerous.

Certain chemicals that cause liver cancer, such as aflatoxins, are known to damage the DNA in liver cells. For example, studies have shown that aflatoxins can damage the *TP53* tumor suppressor gene, which normally works to prevent cells from growing too much. Damage to the *TP53* gene can lead to increased growth of abnormal cells and formation of cancers.

Infection of liver cells with hepatitis viruses can also damage DNA. These viruses have their own DNA, which carries instructions on how to infect cells and produce more viruses. In some patients, this viral DNA can insert itself into a liver cell's DNA, where it may affect the cell's genes. But scientists still don't know exactly how this might lead to cancer.

Liver cancer clearly has many different causes, and there are undoubtedly many different genes involved in its development. It is hoped that a more complete understanding of how liver cancers develop will help doctors find ways to better prevent and treat them.

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Can Liver Cancer Be Prevented?

Many liver cancers could be prevented by reducing exposures to known risk factors for this disease.

## Avoiding and treating hepatitis infections

Worldwide, the most significant risk factor for liver cancer is chronic infection with hepatitis B virus (HBV) and hepatitis C virus (HCV). These viruses can spread from person to person through sharing contaminated needles (such as in drug use) and through unprotected sex, so some of these cancers may be prevented by not sharing needles and by using safer sex practices (such as consistent use of condoms).

A vaccine to help prevent HBV infection has been available since the early 1980s. The US Centers for Disease Control and Prevention (CDC) recommends that all children, as well as adults at risk get this vaccine to reduce the risk of hepatitis and liver cancer.

There is no vaccine for HCV. Preventing HCV infection, as well as HBV infection in people who have not been immunized, is based on understanding how these infections occur. These viruses can be spread through sharing contaminated needles (such as in drug use), unprotected sex, and through childbirth.

Blood transfusions were once a major source of hepatitis infection as well. But because blood banks in the United States test donated blood to look for these viruses, the risk of getting a hepatitis infection from a blood transfusion is extremely low.

People at high risk for HBV or HCV should be tested for these infections so they can be watched for liver disease and treated if needed.

According to the CDC, you are at risk of having hepatitis B if you:

- Have sex with someone who is infected
- Have multiple sex partners
- Have a sexually transmitted disease
- Are a man who has sex with other men
- Inject drugs
- Live with a person who has chronic HBV
- Travel to countries where many people have HBV
- Are exposed to blood on the job
- Get long-term hemodialysis

A baby born to a mother that is infected with HBV is also at risk for being infected.

The CDC recommends that you get tested for HCV if any of the following are true:

- You were born from 1945 through 1965 (this is because most of the people in the US that are infected with HCV were born in these years)
- You ever injected drugs (even just once or a long time ago)
- You needed medicine for a blood clotting problem before 1987
- You received a blood transfusion or organ transplant before July 1992 (when blood and organs started being screened for HCV)
- You are on long-term hemodialysis
- You are infected with HIV

Treatment of chronic HCV infection can eliminate the virus in many people.

A number of drugs are used to treat chronic HBV. These drugs reduce the number of viruses in the blood and lessen liver damage. Although they do not cure the disease, they lower the risk of cirrhosis and might lower the risk of liver cancer, as well.

## **Limiting alcohol and tobacco use**

Drinking alcohol can lead to cirrhosis, which in turn, can lead to liver cancer. Not drinking alcohol or drinking in moderation could help prevent liver cancer.

Since smoking also increases the risk of liver cancer, not smoking will also prevent some of these cancers. If you smoke, quitting will help lower your risk of this cancer, as well as many other cancers and life-threatening diseases.

## **Getting to and staying at a healthy weight**

Avoiding obesity might be another way to help protect against liver cancer. People who are obese are more likely to have fatty liver disease and diabetes, both of which have been linked to liver cancer.

## **Limiting exposure to cancer-causing chemicals**

Changing the way certain grains are stored in tropical and subtropical countries could reduce exposure to cancer-causing substances such as [aflatoxins](#). Many developed countries already have regulations to prevent and monitor grain contamination.

Most developed countries also have regulations to protect consumers and workers from certain chemicals known to cause liver cancer. For example, the US Environmental Protection Agency (EPA) limits the allowable level of [arsenic](#)<sup>1</sup> in drinking water in the

United States. But this may continue to be a problem in areas of the world where naturally occurring arsenic commonly gets into drinking water.

## Treating diseases that increase liver cancer risk

Certain [inherited diseases](#) can cause cirrhosis of the liver, increasing a person's risk for liver cancer. Finding and treating these diseases early in life could lower this risk. For example, all children in families with hemochromatosis should be screened for the disease and treated if they have it. Treatment regularly removes small amounts of blood to lower the amount of excess iron in the body.

## Hyperlinks

1. [www.cancer.org/cancer/cancer-causes/arsenic.html](http://www.cancer.org/cancer/cancer-causes/arsenic.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Liver Cancer Early Detection, Diagnosis, and Staging

## Detection and Diagnosis

Catching cancer early often allows for more treatment options. Some early cancers may have signs and symptoms that can be noticed, but that is not always the case.

- [Can Liver Cancer Be Found Early?](#)
- [Signs and Symptoms of Liver Cancer](#)
- [Tests for Liver Cancer](#)

## Stages of Liver Cancer

After a cancer diagnosis, staging provides important information about the extent of cancer in the body and anticipated response to treatment.

- [Liver Cancer Stages](#)

## Outlook (Prognosis)

Doctors often use survival rates as a standard way of discussing a person's outlook (prognosis). These numbers can't tell you how long you will live, but they might help you better understand your prognosis. Some people want to know the survival statistics for people in similar situations, while others might not find the numbers helpful, or might even not want to know them.

- [Liver Cancer Survival Rates](#)

## Questions to Ask About Liver Cancer

Here are some questions you can ask your cancer care team to help you better understand your liver cancer diagnosis and treatment options.

- [What Should You Ask Your Health Care Team About Liver Cancer?](#)

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## Can Liver Cancer Be Found Early?

It is often hard to find liver cancer early because [signs and symptoms](#) often do not appear until it is in its later stages. Small liver tumors are hard to detect on a physical exam because most of the liver is covered by the right rib cage. By the time a tumor can be felt, it might already be quite large.

There are no widely recommended screening tests for liver cancer in people who are not at increased risk. (Screening is testing for cancer in people without any symptoms.) But testing might be recommended for some people at higher risk.

Many patients who develop liver cancer have long-standing cirrhosis (scar tissue formation from liver cell damage). Doctors may do tests to look for liver cancer if a patient with cirrhosis gets worse for no apparent reason.

For people at higher risk of liver cancer due to cirrhosis (from any cause) or chronic hepatitis B infection (even without cirrhosis), some experts recommend screening for liver cancer with alpha-fetoprotein (AFP) blood tests and ultrasound exams every 6 to 12 months. In some studies, screening was linked to improved survival from liver cancer.

Ultrasound uses sound waves to take pictures of internal organs.

AFP is a protein that can be present at increased levels in patients with liver cancer. But looking at AFP levels isn't a perfect test for liver cancer. Many patients with early liver cancer have normal AFP levels. Also, AFP levels can be increased from other kinds of cancer as well as some non-cancerous liver conditions.

The American Cancer Society does not have recommendations for liver cancer screening.



## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

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# Signs and Symptoms of Liver Cancer

Signs and symptoms of liver cancer often do not show up until the later stages of the disease, but sometimes they may show up sooner. If you go to your doctor when you first notice symptoms, your cancer might be diagnosed earlier, when treatment is most likely to be helpful. Some of the most common symptoms of liver cancer are:

- Weight loss (without trying)
- Loss of appetite
- Feeling very full after a small meal
- Nausea or vomiting
- An enlarged liver, felt as a mass under the ribs on the right side
- An enlarged spleen, felt as a mass under the ribs on the left side
- Pain in the abdomen or near the right shoulder blade
- Swelling or fluid build-up in the abdomen
- Itching
- Yellowing of the skin and eyes (jaundice)

Some other symptoms can include fever, enlarged veins on the belly that can be seen through the skin, and abnormal bruising or bleeding.

People who have chronic hepatitis or cirrhosis may feel worse than usual or just have changes in lab test results, such as alpha-fetoprotein (AFP) levels.

Some liver tumors make hormones that act on organs other than the liver. These hormones may cause:

- High blood calcium levels (hypercalcemia), which can cause nausea, confusion, constipation, weakness, or muscle problems
- Low blood sugar levels (hypoglycemia), which can cause fatigue or fainting
- Breast enlargement (gynecomastia) and/or shrinkage of the testicles in men
- High counts of red blood cells (erythrocytosis) which can cause someone to look red and flushed
- High cholesterol levels

Many of the signs and symptoms of liver cancer can also be caused by other conditions, including other liver problems. Still, if you have any of these problems, it's important to see your doctor right away so the cause can be found and treated, if needed.

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Tests for Liver Cancer

If you have some of the [signs and symptoms](#) of liver cancer, your doctor will try to find if they are caused by liver cancer or something else.

## Medical history and physical exam

Your doctor will ask about your medical history to check for [risk factors](#)<sup>1</sup> and learn more about your symptoms. Your doctor will also examine you for signs of liver cancer and other health problems, probably paying special attention to your abdomen and checking your skin and the whites of your eyes looking for jaundice (a yellowish color).

If symptoms and/or the results of the physical exam suggest you might have liver cancer, other tests will probably be done. These might include imaging tests, lab tests,

and other procedures.

## Imaging tests

[Imaging tests](#)<sup>2</sup> use x-rays, magnetic fields, or sound waves to create pictures of the inside of your body. Imaging tests are done for a number of reasons, including:

- To help find suspicious areas that might be cancerous
- To help diagnose liver cancer
- To help a doctor guide a biopsy needle into a suspicious area to take a sample
- To learn how far cancer might have spread
- To help guide certain treatments in the liver
- To help determine if treatment has been effective
- To look for a possible recurrence of the cancer

People who have (or may have) liver cancer may get one or more of the following tests.

### Ultrasound

Ultrasound is often the first test used to look at the liver.

Ultrasound (ultrasonography) is the use of sound waves to create an image on a video screen. This test can show masses (tumors) growing in the liver, which then can be tested for cancer, if needed.

### Computed tomography (CT)

The [CT scan](#)<sup>3</sup> is an x-ray test that produces detailed cross-sectional images of your body. A CT scan of the abdomen can help identify many types of liver tumors. It can provide precise information about the size, shape, and position of any tumors in the liver or elsewhere in the abdomen, as well as nearby blood vessels. CT scans can also be used to guide a biopsy needle precisely into a suspected tumor (called a *CT-guided needle biopsy*). If you are found to have liver cancer, a CT of your chest may also be done to look for possible spread to the lungs.

### Magnetic resonance imaging (MRI)

Like CT scans, [MRI scans](#)<sup>4</sup> provide detailed images of soft tissues in the body. But MRI scans use radio waves and strong magnets instead of x-rays. The energy from the radio

waves is absorbed and then released in a pattern formed by the type of body tissue and by certain diseases. A computer translates the pattern into a very detailed image of parts of the body.

MRI scans can be very helpful in looking at liver tumors. Sometimes they can tell a benign tumor from a malignant one. They can also be used to look at blood vessels in and around the liver, and can help show if liver cancer has spread to other parts of the body.

## Angiography

An [angiogram](#)<sup>5</sup> is an x-ray test that looks at blood vessels. Contrast medium, or dye, is injected into an artery to outline blood vessels while x-ray images are taken.

Angiography can be used to show the arteries that supply blood to a liver cancer, which can help doctors decide if a cancer can be removed and to help plan the operation. It can also be used to help guide some types of non-surgical treatment, such as embolization (see the section [Embolization Therapy for Liver Cancer](#)<sup>6</sup>).

Angiography can be uncomfortable because a small catheter (a flexible hollow tube) must be put into the artery leading to the liver to inject the dye. Usually the catheter is put into an artery in your groin and threaded up into the liver artery. You have to stay very still while the catheter is in place. A local anesthetic is often used to numb the area before inserting the catheter. Then the dye is injected quickly to outline all the vessels while the x-rays are being taken.

Angiography may also be done with a CT scanner (CT angiography) or an MRI scanner (MR angiography). These techniques are often used instead of x-ray angiography because they can give information about the blood vessels in the liver without the need for a catheter in the artery. You will still need an IV line so that a contrast dye can be injected into the bloodstream during the imaging.

## Bone scan

A [bone scan](#)<sup>7</sup> can help look for cancer that has spread (metastasized) to bones. Doctors don't usually order this test for people with liver cancer unless you have symptoms such as bone pain, or if there's a chance you may be eligible for a liver transplant to treat your cancer. .

For more information about imaging tests see the section [Exams and Tests to Find and Diagnose Cancer](#)<sup>8</sup>.

## Other tests and procedures

Other types of tests may be done if your doctor thinks you might have liver cancer but the imaging test results aren't conclusive.

### Laparoscopy

Laparoscopy can be used for liver cancer:

- To help doctors confirm a diagnosis of cancer through biopsy
- To confirm the stage or (extent) of the cancer
- To help plan surgery or other treatments

Laparoscopy is usually done at an outpatient surgery center. In this procedure, a doctor inserts a thin, lighted tube with a small video camera on the end through a small incision (cut) in the front of the abdomen to look at the liver and other internal organs. (Sometimes more than one cut is made.) This procedure is done in the operating room. Usually you are under general anesthesia (in a deep sleep), although sometimes the person may just be sedated (made sleepy) and the area of the incision will be numbed.

Because the surgeon only makes a small incision to insert the tubes, you should not have much pain after surgery. You should be able to go home after you recover from the anesthesia.

### Biopsy

A biopsy is the removal of a sample of tissue to see if it is cancer. Sometimes, the only way to be certain that liver cancer is present is to take a biopsy and look at it under a microscope.

But in some cases, doctors can be fairly certain that a person has liver cancer based on the results of imaging tests such as CT and MRI scans. In these cases, a biopsy may not be needed. Doctors are often concerned that sticking a needle into the tumor or otherwise disturbing it without completely removing it might help cancer cells spread to other areas. This is a major concern if a liver transplant might be an option to try to cure the cancer, as any spread of the cancer might make the person ineligible for a transplant. That is why some experts recommend that patients who could be transplant candidates only have biopsies done at the center where the transplant will be done.

If a biopsy is needed, it can be done in several ways. For more information about

biopsies and how they are tested, see [Testing Biopsy and Cytology Specimens for Cancer](#)<sup>9</sup>

**Needle biopsy:** A hollow needle is placed through the skin in the abdomen and into the liver. The skin is first numbed with local anesthesia before the needle is placed. Different-sized needles may be used.

**Laparoscopic biopsy:** Biopsy specimens can also be taken during laparoscopy. This lets the doctor see the surface of the liver and take samples of abnormal-appearing areas.

**Surgical biopsy:** An incisional biopsy (removing a piece of the tumor) or an excisional biopsy (removing the entire tumor and some surrounding normal liver tissue) can be done during an operation.

## Lab tests

Your doctor could order lab tests for a number of reasons:

- To help diagnose liver cancer
- To help determine what might have caused your liver cancer
- To learn how well your liver is working, which can affect what types of treatments you can have
- To get an idea of your general health and how well your other organs are working, which also could affect what types of treatments you can have
- To see how well treatment is working
- To look for signs that the cancer has come back after treatment

## Alpha-fetoprotein blood (AFP) test

AFP is normally present at high levels in the blood of fetuses but drops to low levels shortly after birth. Levels in adults can go up from liver disease, liver cancer, or other cancers.

If AFP levels are very high in someone with a liver tumor, it can be a sign that liver cancer is present. But because liver cancer isn't the only reason for high AFP levels and many patients with early liver cancer have normal levels of AFP, it isn't very helpful in determining if a liver mass might be cancer.

This test is sometimes useful in people already diagnosed with liver cancer. The AFP level can help determine what treatment might be an option. During treatment, the test can be used to help give an idea of how well it is working, as the AFP level should go down if treatment is effective. The test can be used after treatment as well, to look for possible signs that the cancer has come back (recurred).

## Other blood tests

**Liver function tests (LFTs):** Because liver cancer often develops in livers already damaged by hepatitis and/or cirrhosis, doctors need to know the condition of your liver before starting your treatment. A series of blood tests can measure levels of certain substances in your blood that show how well your liver is working.

If the part of your liver not affected by cancer isn't working well, you might not be able to have surgery to try to cure the cancer, as the surgery might require removal of a large part of your liver. This is a common problem in people with liver cancer.

**Blood clotting tests:** The liver also makes proteins that help blood clot when you bleed. A damaged liver might not make enough of these clotting factors, which could increase your risk of bleeding. Your doctor may order blood tests such as a prothrombin time (PT) to help assess this risk.

**Tests for viral hepatitis:** Your doctor might order blood tests to check for hepatitis B and C.

**Kidney function tests:** Tests of blood urea nitrogen (BUN) and creatinine levels are often done to assess how well your kidneys are working.

**Complete blood count (CBC):** This test measures levels of red blood cells (which carry oxygen throughout your body), white blood cells (which fight infections), and platelets (which help the blood clot). It gives an idea of how well the bone marrow (where new blood cells are made) is functioning.

**Blood chemistry tests and other tests:** Blood chemistry tests check the levels of a number of substances in the blood, some of which might be affected by liver cancer. For example, liver cancer can raise blood levels of calcium, while blood glucose levels may fall. Liver cancer can also sometimes raise cholesterol levels, so this may be checked as well.

## Hyperlinks

1. [www.cancer.org/cancer/liver-cancer/causes-risks-prevention/risk-factors.html](http://www.cancer.org/cancer/liver-cancer/causes-risks-prevention/risk-factors.html)
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Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Liver Cancer Stages

After someone is [diagnosed with liver cancer](#), doctors will try to figure out if it has spread, and if so, how far. This process is called **staging**. The stage of a cancer describes how much cancer is in the body. It helps determine how serious the cancer is and how best to [treat](#)<sup>1</sup> it. Doctors also use a cancer's stage when talking about survival statistics.

Liver cancer stage ranges from stage I (1) through IV (4). As a rule, the lower the number, the less the cancer has spread. A higher number, such as stage IV, means cancer has spread more. Although each person's cancer experience is unique, cancers with similar stages tend to have a similar outlook and are often treated in much the



same way.

### How is the stage determined?

There are several staging systems for liver cancer, and not all doctors use the same system. The staging system most often used in the United States for liver cancer is the AJCC (American Joint Committee on Cancer) **TNM** system, which is based on 3 key pieces of information:

- The extent (size) of the **tumor (T)**: How large has the cancer grown? Is there more than one tumor in the liver? Has the cancer reached nearby structures like the veins in the liver?
- The spread to nearby lymph **nodes (N)**: Has the cancer spread to nearby lymph nodes?
- The spread (**metastasis**) to distant sites (**M**): Has the cancer spread to distant lymph nodes or distant organs such as the bones or lungs?

The system described below is the most recent AJCC system, effective January 2018.

Numbers or letters after T, N, and M provide more details about each of these factors. Higher numbers mean the cancer is more advanced. Once a person's T, N, and M categories have been determined, this information is combined in a process called **stage grouping** to assign an overall stage. For more information see [Cancer Staging](#)<sup>2</sup>.

Liver cancer is usually staged based on the results of the physical exam, [biopsies](#)<sup>3</sup>, and [imaging tests](#)<sup>4</sup> (ultrasound, CT or MRI scan, etc.), also called a clinical stage. If surgery is done, the **pathologic stage** (also called the **surgical stage**) is determined by examining tissue removed during an operation.

Cancer staging can be complex, so ask your doctor to explain it to you in a way you understand.

AJCC Stage	Stage grouping	Stage description*
IA	T1a	A single tumor 2 cm (4/5 inch) or smaller that hasn't grown into blood vessels (T1a).  It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
	N0	
	M0	

<b>IB</b>	<b>T1b</b>	A single tumor larger than 2cm (4/5 inch) that hasn't grown into blood vessels (T1b).
	<b>N0</b>	The cancer has not spread to nearby lymph nodes (N0) or to distant sites (M0).
	<b>M0</b>	
<b>II</b>	<b>T2</b>	Either a single tumor larger than 2 cm (4/5 inch) that has grown into blood vessels, <b>OR</b> more than one tumor but none larger than 5 cm (about 2 inches) across (T2).
	<b>N0</b>	It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
	<b>M0</b>	
<b>IIIA</b>	<b>T3</b>	More than one tumor, with at least one tumor larger than 5 cm across (T3).
	<b>N0</b>	It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
	<b>M0</b>	
<b>IIIB</b>	<b>T4</b>	At least one tumor (any size) that has grown into a major branch of a large vein of the liver (the portal or hepatic vein) (T4).
	<b>N0</b>	It has not spread to nearby lymph nodes (N0) or to distant sites (M0).
	<b>M0</b>	
<b>IVA</b>	<b>Any T</b>	A single tumor or multiple tumors of any size (Any T) that has spread to nearby lymph nodes (N1) but not to distant sites (M0).
	<b>N1</b>	
	<b>M0</b>	
<b>IVB</b>	<b>Any T</b>	A single tumor or multiple tumors of any size (any T).
	<b>Any N</b>	It might or might not have spread to nearby lymph nodes (any N).
	<b>M1</b>	It has spread to distant organs such as the bones or lungs (M1).

\* The following additional categories are not listed on the table above:

- TX: Main tumor cannot be assessed due to lack of information.

- T0: No evidence of a primary tumor.
- NX: Regional lymph nodes cannot be assessed due to lack of information.

## Other liver cancer staging systems

The staging systems for most types of cancer depend only on the extent of the cancer, but liver cancer is complicated by the fact that most patients have damage to the rest of their liver along with the cancer. This also affects treatment options and survival outlook.

Although the TNM system defines the extent of liver cancer in some detail, it does not take liver function into account. Several other staging systems have been developed that include both of these factors:

- The Barcelona Clinic Liver Cancer (BCLC) system
- The Cancer of the Liver Italian Program (CLIP) system
- The Okuda system

These staging systems have not been compared against each other. Some are used more than others in different parts of the world, but at this time there is no single staging system that all doctors use. If you have questions about the stage of your cancer or which system your doctor uses, be sure to ask.

## Child-Pugh score (cirrhosis staging system)

The Child-Pugh score measures liver function, especially in people with cirrhosis. Many people with liver cancer also have cirrhosis, and in order to treat the cancer, doctors need to know how well the liver is working. This system looks at 5 factors, the first 3 of which are results of blood tests:

- Blood levels of bilirubin (the substance that can cause yellowing of the skin and eyes)
- Blood levels of albumin (a major protein normally made by the liver)
- The prothrombin time (measures how well the liver is making blood clotting factors)
- Whether there is fluid (ascites) in the abdomen
- Whether the liver disease is affecting brain function

Based on these factors, liver function is divided into 3 classes. If all these factors are normal, then liver function is called class A. Mild abnormalities are class B, and severe abnormalities are class C. People with liver cancer and class C cirrhosis are often too sick for surgery or other major cancer treatments.

The Child-Pugh score is actually part of the BCLC and CLIP staging systems mentioned previously.

## **Liver cancer classification**

Formal staging systems (such as those described before) can often help doctors determine a patient's prognosis (outlook). But for treatment purposes, doctors often classify liver cancers more simply, based on whether or not they can be entirely cut out (resected). Resectable means "able to be removed by surgery."

### **Potentially resectable or transplantable cancers**

These cancers can be completely removed by surgery or treated with a liver transplant and the patient is healthy enough for surgery. This would include most stage I and some stage II cancers in the TNM system, in patients who do not have cirrhosis or other serious medical problems. Only a small number of patients with liver cancer have this type of tumor.

### **Unresectable cancers**

Cancers that have not spread to the lymph nodes or distant organs but cannot be completely removed by surgery are classified as unresectable. This includes cancers that have spread throughout the liver or can't be removed safely because they are close to the area where the liver meets the main arteries, veins, and bile ducts.

### **Inoperable with only local disease**

The cancer is small enough and in the right place to be removed but you aren't healthy enough for surgery. Often this is because the non-cancerous part of your liver is not healthy (because of cirrhosis, for example), and if the cancer is removed, there might not be enough liver tissue left for it to function properly. It could also mean that you have serious medical problems that make surgery unsafe.

### **Advanced (metastatic) cancers**

Cancers that have spread to lymph nodes or other organs are classified as advanced. These would include stages IVA and IVB cancers in the TNM system. Most advanced liver cancers cannot be treated with surgery.

## Hyperlinks

1. [www.cancer.org/cancer/liver-cancer/treating.html](http://www.cancer.org/cancer/liver-cancer/treating.html)
2. [www.cancer.org/treatment/understanding-your-diagnosis/staging.html](http://www.cancer.org/treatment/understanding-your-diagnosis/staging.html)
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4. [www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html)

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See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: December 14, 2017 Last Revised: December 14, 2017

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# Liver Cancer Survival Rates

Survival rates can give you an idea of what percentage of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can't tell you how long you will live, but they may help give you a better understanding of how likely it is that your treatment will be successful.

**Keep in mind that survival rates are estimates and are often based on previous outcomes of large numbers of people who had a specific cancer, but they can't predict what will happen in any particular person's case. These statistics can be confusing and may lead you to have more questions. Talk with your doctor about how these numbers may apply to you, as he or she is familiar with your situation.**

## What is a 5-year relative survival rate?

A **relative survival rate** compares people with the same type and stage of liver cancer to people in the overall population. For example, if the **5-year relative survival rate** for a specific stage of liver cancer is 30%, it means that people who have that cancer are, on average, about 30% as likely as people who don't have that cancer to live for at least 5 years after being diagnosed.

## Where do these numbers come from?

The American Cancer Society relies on information from the SEER\* database, maintained by the National Cancer Institute (NCI), to provide survival statistics for different types of cancer.

The SEER database tracks 5-year relative survival rates for liver cancer in the United States, based on how far the cancer has spread. The SEER database, however, does not group cancers by [AJCC TNM stages](#) (stage 1, stage 2, stage 3, etc.). Instead, it groups cancers into localized, regional, and distant stages:

- **Localized:** There is no sign that the cancer has spread outside of the liver. This includes AJCC stage I, II, and some stage III cancers. This includes a wide range of cancers, some of which are easier to treat than others.
- **Regional:** The cancer has spread outside the liver to nearby structures or lymph nodes. This includes some stage III cancers as well as stage IVA cancers in the AJCC system.
- **Distant:** The cancer has spread to distant parts of the body, such as the lungs or bones. This includes stage IVB cancers.

## 5-year relative survival rates for liver cancer

(Based on people diagnosed with cancers of the liver (or intrahepatic bile ducts) between 2008 and 2014.)

SEER stage	5-year relative survival rate
Localized	31%
Regional	11%
Distant	2%

All SEER stages combined	18%
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In general, survival rates are higher for people who can have [surgery](#)<sup>1</sup> to remove their cancer, regardless of the stage. For example, studies have shown that patients with small, resectable (removable) tumors who do not have cirrhosis or other serious health problems are likely to do well if their cancers are removed. For people with early-stage liver cancers who have a liver transplant, the 5-year survival rate is in the range of 60% to 70%.

## Understanding the numbers

- **People now being diagnosed with liver cancer may have a better outlook than these numbers show.** Treatments improve over time, and these numbers are based on people who were diagnosed and treated at least five years earlier.
- **These numbers apply only to the stage of the cancer when it is first diagnosed.** They do not apply later on if the cancer grows, spreads, or comes back after treatment.
- **These numbers don't take everything into account.** Survival rates are grouped based on how far the cancer has spread, but your age, overall health, how well the cancer responds to treatment, and other factors will also affect your outlook.

\*SEER = Surveillance, Epidemiology, and End Results

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Last Medical Review: March 31, 2016 Last Revised: February 1, 2019

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## What Should You Ask Your Health Care Team About Liver Cancer?

As you cope with liver cancer and its treatment, we encourage you to have honest, open discussions with your cancer care team. Ask any question, no matter how small it might seem. Here are some questions you might want to ask. Be sure to add others as you think of them.

### When you're told you have liver cancer

- What [kind](#)<sup>1</sup> of liver cancer do I have? (Some types of liver cancer carry a better prognosis than others.)
- Where in my liver is the cancer? Has it spread beyond my liver?
- What is my cancer's [stage](#), and what does that mean?
- How well is my liver functioning?
- Will I need other tests before we can decide on treatment?
- Will I need to see other doctors?

### When you're deciding on a treatment plan

- How much experience do you have treating this type of cancer?
- What are my [treatment](#)<sup>2</sup> choices?
- Can the cancer be removed with [surgery](#)<sup>3</sup>?



- What do you recommend and why?
- What is the goal of the treatment?
- What risks or side effects are there to the treatments you suggest?
- What should I do to be ready for treatment?
- How long will treatment last? What will it be like? Where will it be done?

## After treatment

- How will treatment affect my daily activities?
- What are the chances my cancer will recur with these treatment plans?
- What will we do if the treatment doesn't work or if the cancer recurs?
- What type of follow-up will I need after treatment?

In addition to these sample questions, you might want to write down some of your own. For instance, you might want to ask about second opinions or about qualifying for clinical trials.

## Hyperlinks

1. [www.cancer.org/cancer/liver-cancer/about/what-is-liver-cancer.html](http://www.cancer.org/cancer/liver-cancer/about/what-is-liver-cancer.html)
2. [www.cancer.org/cancer/liver-cancer/treating.html](http://www.cancer.org/cancer/liver-cancer/treating.html)
3. [www.cancer.org/cancer/liver-cancer/treating/surgery.html](http://www.cancer.org/cancer/liver-cancer/treating/surgery.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Treating Liver Cancer

If you've been diagnosed with liver cancer, your cancer care team will discuss your treatment options with you. It's important to weigh the benefits of each treatment option against the possible risks and side effects.

## How is liver cancer treated?

Treatments for liver cancer include:

- [Liver Cancer Surgery](#)
- [Tumor Ablation for Liver Cancer](#)
- [Embolization Therapy for Liver Cancer](#)
- [Radiation Therapy for Liver Cancer](#)
- [Targeted Therapy Drugs for Liver Cancer](#)
- [Immunotherapy for Liver Cancer](#)
- [Chemotherapy for Liver Cancer](#)

## Common treatment approaches

In creating your treatment plan, important factors to consider include the stage (extent) of the cancer and the health of the rest of your liver. But you and your cancer care team will also want to take into account the possible side effects of treatment, your overall health, and the chances of curing the disease, extending life, or relieving symptoms.

- [Treatment of Liver Cancer, by Stage](#)

## Who treats liver cancer?

Depending on your situation, you may have different types of doctors on your treatment

team. These doctors may include:

- A **surgeon**: a doctor who treats diseases with surgery.
- A **radiation oncologist**: a doctor who treats cancer with radiation therapy.
- A **medical oncologist**: a doctor who treats cancer with medicines such as chemotherapy.
- A **gastroenterologist**: a doctor who specializes in treating diseases of the digestive system, including the liver.

Many other specialists may be involved in your care as well, including nurse practitioners, nurses, psychologists, social workers, rehabilitation specialists, and other health professionals.

- [Health Professionals Associated With Cancer Care<sup>1</sup>](#)

### **Making treatment decisions**

It is important to discuss all of your treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. Some important things to consider include:

- Your age and expected life span
- Any other serious health conditions you have
- The stage (extent) of your cancer
- Whether or not surgery can remove (resect) the cancer
- The likelihood that treatment will cure the cancer or help in some other way
- Your feelings about the possible side effects from treatment

You may feel that you must make a decision quickly, but it's important to give yourself time to absorb the information you have just learned. Ask questions if there is anything you're not sure about.

If time permits, it is often a good idea to seek a second opinion. A second opinion can give you more information and help you feel more confident about the treatment plan you choose.

- [What Should You Ask Your Health Care Team About Liver Cancer?<sup>2</sup>](#)
- [Seeking a Second Opinion<sup>3</sup>](#)

## Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they're not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials.

- [Clinical Trials](#)<sup>4</sup>

## Considering complementary and alternative methods

You may hear about alternative or complementary methods that your doctor hasn't mentioned to treat your cancer or relieve symptoms. These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few.

Complementary methods refer to treatments that are used along with your regular medical care. Alternative treatments are used instead of a doctor's medical treatment. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be harmful.

Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision.

- [Complementary and Alternative Medicine](#)<sup>5</sup>

## Help getting through cancer treatment

Your cancer care team will be your first source of information and support, but there are other resources for help when you need it. Hospital- or clinic-based support services are an important part of your care. These might include nursing or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call our National Cancer Information Center at 1-800-227-2345 and speak with one of our trained

specialists.

- [Find Support Programs and Services in Your Area](#)<sup>6</sup>

### **Choosing to stop treatment or choosing no treatment at all**

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are still things you can do to help maintain or improve your quality of life.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons you might decide not to get cancer treatment, but it's important to talk to your doctors and you make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or other symptoms.

- [If Cancer Treatments Stop Working](#)<sup>7</sup>
- [Palliative or Supportive Care](#)<sup>8</sup>

*The treatment information given here is not official policy of the American Cancer Society and is not intended as medical advice to replace the expertise and judgment of your cancer care team. It is intended to help you and your family make informed decisions, together with your doctor. Your doctor may have reasons for suggesting a treatment plan different from these general treatment options. Don't hesitate to ask him or her questions about your treatment options.*

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## **Liver Cancer Surgery**

At this time, surgery, either with resection (removal of the tumor) or a liver transplant, offers the only reasonable chance to cure liver cancer. If all cancer in the liver is successfully removed, you will have the best outlook.

### **Partial hepatectomy**

Surgery to remove part of the liver is called *partial hepatectomy*. This operation is

considered for a single tumor that has not grown into blood vessels. It is only an option in patients with good liver function who are healthy enough for surgery. Unfortunately, most liver cancers cannot be completely removed. Often the cancer is in too many different parts of the liver, is too large, or has spread beyond the liver.

[Imaging tests](#)<sup>1</sup>, such as CT or MRI with angiography are done first to see if the cancer can be removed completely. Still, sometimes during surgery the cancer is found to be too large or spread too far to be removed, and the surgery has to be cancelled.

Most patients with liver cancer in the United States also have cirrhosis. In someone with severe cirrhosis, removing even a small amount of liver tissue at the edges of a cancer might not leave enough liver behind to perform essential functions.

People with cirrhosis are eligible for surgery only if the cancer is small and they still have a reasonable amount of liver function left. Doctors often assess this function by assigning a Child-Pugh score (see [Liver Cancer Stages](#)<sup>2</sup>), which is a measure of cirrhosis based on certain lab tests and symptoms.

Patients in class A are most likely to have enough liver function to have surgery. Patients in class B are less likely to be able to have surgery. Surgery is not typically an option for patients in class C.

**Possible risks and side effects:** Liver resection is a major, serious operation that should only be done by skilled and experienced surgeons. Because people with liver cancer usually have other liver problems besides the cancer, surgeons have to remove enough of the liver to try to get all of the cancer, yet leave enough behind for the liver to function adequately.

A lot of blood passes through the liver, and bleeding after surgery is a major concern. On top of this, the liver normally makes substances that help the blood clot. Damage to the liver (both before the surgery and during the surgery itself) can add to potential bleeding problems.

Other possible problems are similar to those seen with other major surgeries and can include infections, complications from anesthesia, blood clots, and pneumonia.

Another concern is that because the remaining liver still has the underlying disease that led to the cancer, sometimes a new liver cancer can develop afterward.

## Liver transplant

When it is available, a liver transplant may be the best option for some people with

small liver cancers. Liver transplants can be an option for those with tumors that cannot be removed with surgery, either because of the location of the tumors or because the liver is too diseased for the patient to withstand removing part of it. In general, it is used to treat patients with small tumors (either 1 tumor smaller than 5 cm across or 2 to 3 tumors no larger than 3 cm) that have not invaded nearby blood vessels. It can also rarely be an option for patients with resectable cancers (cancers that can be removed completely).

According to the Organ Procurement and Transplantation Network, about 1,300 liver transplants were done in people with cancer in the liver in the United States in 2012, the last year for which numbers are available. In most cases, the patients had liver cancer but some had bile duct cancer.

With a transplant, not only is the risk of a second new liver cancer significantly reduced, but the new liver will function normally.

Unfortunately, the opportunities for liver transplants are limited. Only about 6,500 livers are available for transplant each year, and most of these are used for patients with diseases other than liver cancer. Increasing awareness about the importance of organ donation is an essential public health goal that could make this treatment available to more patients with liver cancer and other serious liver diseases.

Most livers used for transplants come from people who have just died. But some patients receive part of a liver from a living donor (usually a close relative) for transplant. The liver can regenerate some of its lost function over time if part of it is removed. Still, the surgery does carry some risks for the donor. About 350 living donor liver transplants are done in the United States each year. Only a small number of them are for patients with liver cancer.

People needing a transplant must wait until a liver is available, which can take too long for some people with liver cancer. In many cases a person may get other treatments, such as [embolization](#) or [ablation](#) (described in following sections), while waiting for a liver transplant. Or doctors may suggest surgery or other treatments first and then a transplant if the cancer comes back.

**Possible risks and side effects:** Like partial hepatectomy, a liver transplant is a major operation with serious risks (bleeding, infection, blood clots, complications from anesthesia, etc.). But there are some additional risks after this surgery.

People who get a liver transplant are given drugs to help suppress their immune systems to prevent their bodies from rejecting the new organ. These drugs have their own risks and side effects, especially the risk of getting serious [infections](#)<sup>3</sup>. By



suppressing the immune system, these drugs might also allow any liver cancer that had spread outside of the liver to grow even faster than before. Some of the drugs used to prevent rejection can also cause high blood pressure, high cholesterol, and diabetes; can weaken the bones and kidneys; and can even lead to a [new cancer](#)<sup>4</sup>.

After a liver transplant, regular blood tests are done to check for signs of the body rejecting the new liver. Sometimes liver biopsies are also taken to see if rejection is occurring and if changes are needed in the anti-rejection medicines.

## Hyperlinks

1. [www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html)
2. [www.cancer.org/cancer/liver-cancer/detection-diagnosis-staging/staging.html](http://www.cancer.org/cancer/liver-cancer/detection-diagnosis-staging/staging.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/infections.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/infections.html)
4. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/second-cancers-in-adults.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/second-cancers-in-adults.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Tumor Ablation for Liver Cancer

[Ablation](#)<sup>1</sup> is treatment that destroys liver tumors without removing them. These techniques are used in patients with a few small tumors and when surgery is not a good option (often because of poor health or reduced liver function). They are less likely to cure the cancer than surgery, but they can still be very helpful for some people. These treatments are also sometimes used in patients waiting for a liver transplant.

Ablation is best used for tumors no larger than about 3 cm across (a little over an inch).

For slightly larger tumors (3 to 5 cm across), it may be used along with [embolization](#) (see next section). Because ablation often destroys some of the normal tissue around the tumor, it might not be a good choice for treating tumors near major blood vessels, the diaphragm, or major bile ducts.

People getting this type of treatment typically do not require a hospital stay. Often, ablation can be done without [surgery](#) by inserting a needle or probe into the tumor through the skin. The needle or probe is guided into place with ultrasound or CT scanning. Sometimes, though, to be sure the treatment is aimed at the right place, it may be done during surgery.

### **Radiofrequency ablation (RFA)**

This procedure uses high-energy radio waves for treatment. The doctor inserts a thin, needle-like probe into the tumor. A high-frequency current is then passed through the tip of the probe, which heats the tumor and destroys the cancer cells. This is a common treatment method for small tumors.

### **Ethanol (alcohol) ablation**

This is also known as *percutaneous ethanol injection (PEI)*. In this procedure, concentrated alcohol is injected directly into the tumor to kill cancer cells.

### **Microwave thermotherapy**

In this procedure, microwaves transmitted through the probe are used to heat and destroy the abnormal tissue.

### **Cryosurgery (cryotherapy)**

This procedure destroys a tumor by freezing it using a thin metal probe. The probe is guided into the tumor and then very cold gasses are passed through the probe to freeze the tumor, killing the cancer cells. This method may be used to treat larger tumors than the other ablation techniques, but it sometimes requires general anesthesia (where you are deeply asleep and not able to feel pain).

### **Side effects of ablation therapy**

Possible side effects after ablation therapy include abdominal pain, infection in the liver, and bleeding into the chest cavity or abdomen. Serious complications are uncommon, but they are possible.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/hyperthermia.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/hyperthermia.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Embolization Therapy for Liver Cancer

Embolization is a procedure that injects substances to try to block or reduce the blood flow to cancer cells in the liver.

The liver is unusual in that it has 2 blood supplies. Most normal liver cells are fed by branches of the portal vein, whereas cancer cells in the liver are usually fed by branches of the hepatic artery. Blocking the branch of the hepatic artery feeding the tumor helps kill off the cancer cells, but it leaves most of the healthy liver cells unharmed because they get their blood supply from the portal vein.

Embolization is an option for some patients with tumors that cannot be removed by surgery. It can be used for tumors that are too large to be treated with ablation (usually larger than 5 cm across). It can also be used with ablation. Embolization does reduce some of the blood supply to the normal liver tissue, so it may not be a good option for some patients whose liver has been damaged by diseases such as hepatitis or cirrhosis.

People getting this type of treatment typically do not stay in the hospital.

It isn't yet clear which type of embolization has a better long-term outcome.

## Arterial embolization

Arterial embolization is also known as *trans-arterial embolization* (or TAE). In this procedure a catheter (a thin, flexible tube) is put into an artery through a small cut in the inner thigh and threaded up into the hepatic artery in the liver. A dye is usually injected into the bloodstream at this time to help the doctor monitor the path of the catheter via angiography, a special type of x-ray. Once the catheter is in place, small particles are injected into the artery to plug it up.

### **Chemoembolization**

This approach, also known as *trans-arterial chemoembolization* (or TACE) combines embolization with chemotherapy. Most often, this is done by using tiny beads that give off a chemotherapy drug for the embolization. TACE can also be done by giving chemotherapy through the catheter directly into the artery, then plugging up the artery.

### **Radioembolization**

This technique combines embolization with radiation therapy and is sometimes known as *trans-arterial radioembolization*.

In the United States, this is done by injecting small beads (called *microspheres*) that have a radioactive isotope (yttrium-90) stuck to them into the hepatic artery. Brand names for these beads include TheraSphere<sup>®</sup> and SIR-Spheres<sup>®</sup>. Once infused, the beads lodge in the blood vessels near the tumor, where they give small amounts of radiation to the tumor site for several days. The radiation travels a very short distance, so its effects are limited mainly to the tumor.

### **Side effects of embolization**

Possible complications after embolization include abdominal pain, fever, nausea, infection in the liver, gallbladder inflammation, and blood clots in the main blood vessels of the liver. Because healthy liver tissue can be affected, there is a risk that liver function will get worse after embolization. This risk is higher if a large branch of the hepatic artery is embolized. Serious complications are not common, but they are possible.

### **References**

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

# Radiation Therapy for Liver Cancer

Radiation therapy uses high-energy rays to kill cancer cells. There are different kinds of radiation therapy.

## External beam radiation therapy

This type of radiation therapy focuses radiation delivered from outside the body on the cancer. This can sometimes be used to shrink liver tumors to relieve symptoms such as pain, but it is not used as often as other local treatments such as ablation or embolization. Although liver cancer cells are sensitive to radiation, this treatment can't be used at very high doses because normal liver tissue is also easily damaged by radiation.

Before your treatments start, the radiation team will take careful measurements to determine the correct angles for aiming the radiation beams and the proper dose of radiation. Radiation therapy is much like getting an x-ray, but the radiation is stronger. The procedure itself is painless. Each treatment lasts only a few minutes, although the setup time – getting you into place for treatment – usually takes longer. Most often, radiation treatments are given 5 days a week for several weeks.

With newer radiation techniques such as 3-dimensional conformal radiation therapy (3D-CRT), doctors can better target liver tumors while reducing the radiation to nearby healthy tissues. This may make it more effective and reduce side effects.

**Stereotactic body radiation therapy (SBRT)** is a technique that allows treatment to be completed in a short-time. Radiation therapy usually means getting small doses of radiation 5 days a week for several weeks, SBRT uses very focused beams of high-dose radiation given on one or a few days. Beams are aimed at the tumor from many different angles. To target the radiation precisely, the person is put in a specially designed body frame for each treatment.

## Radioembolization

As mentioned in [Embolization Therapy for Liver Cancer](#), tumors in the liver can be

treated with radiation by injecting small radioactive beads into the hepatic artery. They lodge in the liver near tumors and give off small amounts of radiation that travel only a short distance.

## Side effects of radiation therapy

Side effects of external radiation therapy can include:

- Skin changes, which range from redness (like a sunburn) to blistering and peeling where the radiation enters the body
- [Nausea and vomiting](#)<sup>1</sup>
- [Fatigue](#)<sup>2</sup>
- [Low blood counts](#)<sup>3</sup>

These improve after treatment ends.

Side effects tend to be more severe if radiation and chemotherapy are given together.

Learn more about [Radiation Therapy](#)<sup>4</sup>, visit our website.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/nausea-and-vomiting.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/nausea-and-vomiting.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fatigue.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/fatigue.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/low-blood-counts.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/low-blood-counts.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

# Targeted Therapy Drugs for Liver Cancer

As researchers have learned more about the changes in cells that cause cancer, they have been able to develop newer drugs that specifically target these changes. Targeted drugs work differently from standard chemotherapy drugs (which are described in [Chemotherapy for Liver Cancer](#)). They often have different (and sometimes less severe) side effects.

Like chemotherapy, these drugs enter the bloodstream and reach almost all areas of the body, which makes them potentially useful against cancers that have spread to distant organs. Because standard chemo has not been effective in most patients with liver cancer, doctors have been looking at targeted therapies more.

## **Sorafenib (Nexavar)**

Sorafenib is a targeted drug that works in 2 ways. It helps block tumors from forming new blood vessels, which they need to grow. It also targets some of the proteins on cancer cells that normally help them grow.

Sorafenib is a pill that is taken twice daily. The most common side effects of this drug include fatigue, rash, loss of appetite, diarrhea, high blood pressure, and redness, pain, swelling, or blisters on the palms of the hands or soles of the feet.

Less common but more serious side effects can include problems with blood flow to the heart, and perforations (holes) in the stomach or intestines.

## **Lenvatinib (Lenvima)**

Lenvatinib is a targeted drug that works by keeping tumors from forming new blood vessels, which they need to grow.

This drug can be used to treat liver cancer if it cannot be treated with surgery or if it has spread to other organs.

Lenvatinib is a pill that is taken once daily. The most common side effects of this drug include fatigue, rash, loss of appetite, diarrhea, high blood pressure, joint or muscle pain, weight loss, belly pain, or blisters on the palms of the hands or soles of the feet.

Less common but more serious side effects can include bleeding problems and losing protein in the urine.

### **Regorafenib (Stivarga)**

Regorafenib blocks several proteins that normally either help tumor cells grow or help form new blood vessels to feed the tumor. Blocking these proteins can help stop the growth of cancer cells.

This drug can be used to treat liver cancer if sorafenib is no longer helpful. It is taken as pills, typically once a day for 3 weeks, followed by a week off.

Common side effects can include fatigue, loss of appetite, hand-foot syndrome (redness and irritation of the hands and feet), high blood pressure, fever, infections, weight loss, diarrhea, and abdominal (belly) pain.

Less common but more serious side effects can include serious liver damage, severe bleeding, problems with blood flow to the heart, and perforations (holes) in the stomach or intestines.

### **Cabozantinib (Cabometyx)**

Cabozantinib is another drug that blocks several proteins, including some that help form new blood vessels.

This drug can be used to treat liver cancer if sorafenib has already been tried. It is taken as a pill once a day.

Common side effects include diarrhea, fatigue, nausea and vomiting, poor appetite and weight loss, high blood pressure, hand-foot syndrome (redness and irritation of the hands and feet), and constipation.

Less common but more serious side effects can include serious bleeding, blood clots, very high blood pressure, severe diarrhea, and holes forming in the intestines.

More information about targeted therapy drugs can be found in [Targeted Cancer Therapy](#)<sup>1</sup>.

## **Hyperlinks**

1. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/targeted-)



[therapy.html](#)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: January 15, 2019

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# Immunotherapy for Liver Cancer

Immunotherapy is the use of medicines that help a person's own immune system find and destroy cancer cells. It can be used to treat some people with liver cancer.

## Immune checkpoint inhibitors

An important part of the immune system is its ability to keep itself from attacking normal cells in the body. To do this, it uses “checkpoints” – molecules on immune cells that need to be turned on (or off) to start an immune response. Cancer cells sometimes use these checkpoints to avoid being attacked by the immune system. But newer drugs that target these checkpoints hold a lot of promise as cancer treatments.

**Pembrolizumab (Keytruda)** and **Nivolumab (Opdivo)** are drugs that target PD-1, a protein on immune system cells called T cells that normally helps keep these cells from attacking other cells in the body. By blocking PD-1, these drugs boost the immune response against cancer cells. This can shrink some tumors or slow their growth.

These drugs can be used in people with liver cancer who have previously been treated with the [targeted drug](#) sorafenib (Nexavar).

These drugs are given as an intravenous (IV) infusion, typically every 2, 3, or 4 weeks.

## Possible side effects

Side effects of these drugs can include:

- Feeling tired or weak
- Fever
- Cough
- Nausea
- Itching
- Skin rash
- Loss of appetite
- Muscle or joint pain
- Constipation or diarrhea

Other, more serious side effects occur less often:

**Infusion reactions:** Some people might have an infusion reaction while getting these drugs. This is like an allergic reaction, and can include fever, chills, flushing of the face, rash, itchy skin, feeling dizzy, wheezing, and trouble breathing. It's important to tell your doctor or nurse right away if you have any of these symptoms while getting these drugs.

**Autoimmune reactions:** These drugs work by basically removing one of the safeguards on the body's immune system. Sometimes the immune system starts attacking other parts of the body, which can cause serious or even life-threatening problems in the lungs, intestines, liver, hormone-making glands, kidneys, skin, or other organs.

It's very important to report any new side effects to your health care team promptly. If serious side effects do occur, treatment may need to be stopped and you may get high doses of corticosteroids to suppress your immune system.

To learn more about how immunotherapy drugs are used to treat cancer, see [Cancer Immunotherapy](#)<sup>1</sup>.

To learn about some of the side effects listed here and how to manage them, see [Managing Cancer-related Side Effects](#)<sup>2</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)

## References

Zhu AX, Finn RS, Edeline J, Cattan S et al. Pembrolizumab in patients with advanced hepatocellular carcinoma previously treated with sorafenib (KEYNOTE-224): a non-randomised, open-label phase 2 trial. *Lancet Oncol*. 2018 Jul;19(7):940-952. doi: 10.1016/S1470-2045(18)30351-6. Epub 2018 Jun 3.

Last Medical Review: October 2, 2017 Last Revised: November 12, 2018

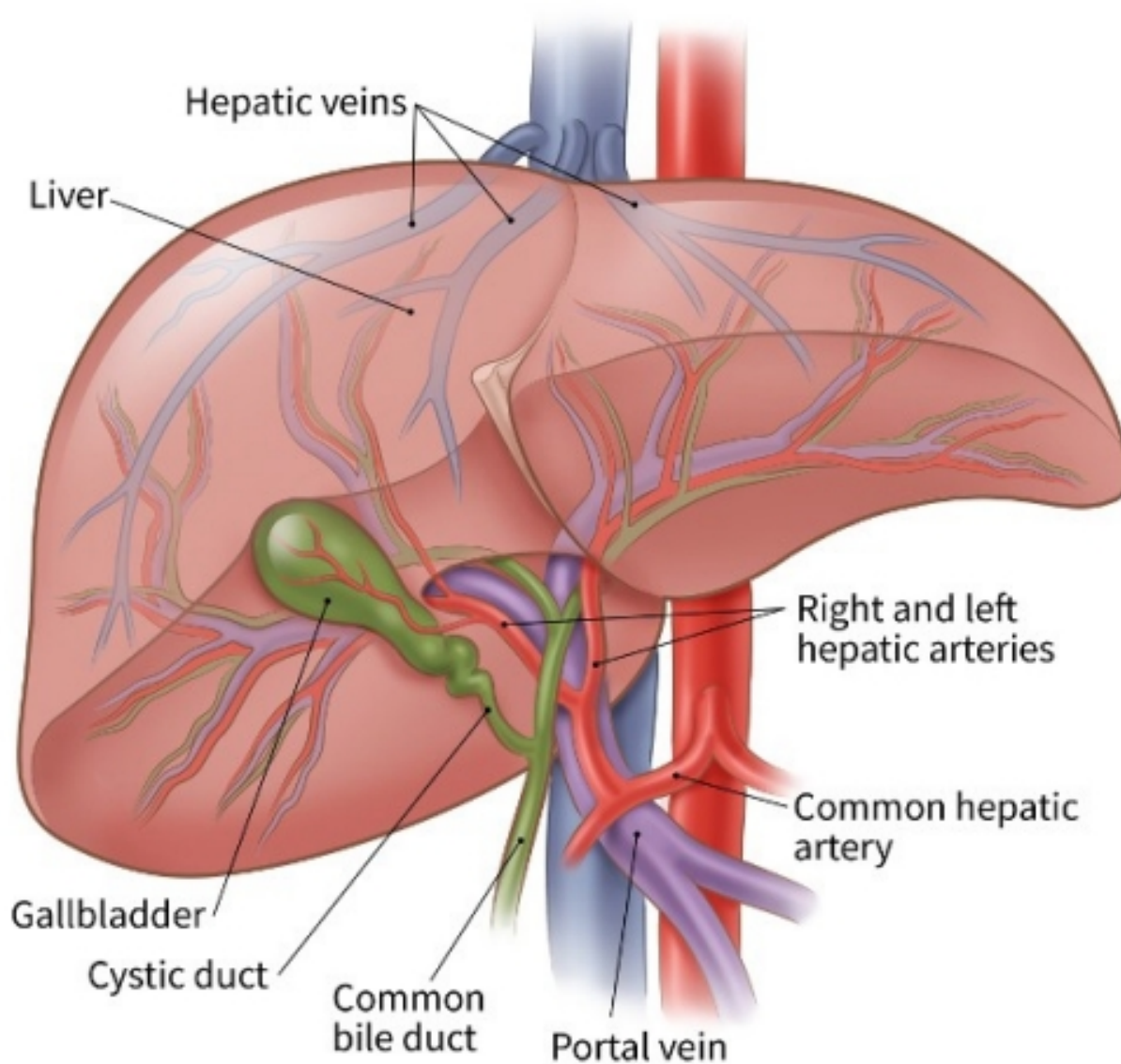
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# Chemotherapy for Liver Cancer

Chemotherapy (chemo) is treatment with drugs to destroy cancer cells. Systemic (whole body) chemotherapy uses anti-cancer drugs that are injected into a vein or given by mouth. These drugs enter the bloodstream and reach all areas of the body, making this treatment potentially useful for cancers that have spread to distant organs.

Liver cancer resists most chemo drugs. The drugs that have been most effective as systemic chemo in liver cancer are doxorubicin (Adriamycin), 5-fluorouracil, and cisplatin. But even these drugs shrink only a small portion of tumors, and the responses often do not last long. Even with combinations of drugs, in most studies systemic chemo has not helped patients live longer.

## Hepatic artery infusion



Because of the poor response to systemic chemo, doctors have studied putting chemo drugs directly into the hepatic artery to see if it might be more effective. This technique is known as *hepatic artery infusion (HAI)*. The chemo goes into the liver through the hepatic artery, but the healthy liver breaks down most of the drug before it can reach the rest of the body. This gets more chemo to the tumor than systemic chemo but doesn't increase side effects. The drugs most commonly used include floxuridine (FUDR), cisplatin, mitomycin C, and doxorubicin.

Early studies have found that HAI is often effective in shrinking tumors, but more research is still needed. This technique may not be useful in all patients because it often requires surgery to insert a catheter into the hepatic artery, an operation that many liver

cancer patients may not be able to tolerate.

## Side effects of chemotherapy

Chemo drugs attack cells that are dividing quickly, which is why they work against cancer cells. But other cells in the body, such as those in the bone marrow, the lining of the mouth and intestines, and the hair follicles, also divide quickly. These cells are also likely to be affected by chemo, which can lead to side effects.

The [side effects of chemo](#)<sup>1</sup> depend on the type and dose of drugs given and the length of time they are taken. Common side effects include:

- Hair loss
- Mouth sores
- Loss of appetite
- Nausea and vomiting
- Diarrhea
- Increased chance of infections (from low white blood cell counts)
- Easy bruising or bleeding (from low blood platelet counts)
- Fatigue (from low red blood cell counts)

These side effects usually don't last long and go away after treatment is finished. There are often ways to lessen them. For example, drugs can be given to help prevent or reduce nausea and vomiting. Be sure to ask your doctor or nurse about drugs to help reduce side effects.

Along with the possible side effects in the list above, some drugs may have their own specific side effects. Ask your health care team what you can expect.

You should report any side effects you notice while getting chemotherapy to your medical team so that you can be treated promptly. In some cases, the doses of the chemotherapy drugs may need to be reduced or treatment may need to be delayed or stopped to prevent side effects from getting worse.

Learn more about chemotherapy, explore the [Chemotherapy section](#)<sup>2</sup> of our website.

## Hyperlinks

1. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/treatment-](http://www.cancer.org/treatment/treatments-and-side-effects/treatment-)

[types/chemotherapy.html](#)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Treatment of Liver Cancer, by Stage

Although the AJCC (TNM) staging system (see [Liver Cancer Stages<sup>1</sup>](#)) is often used to describe the spread of a liver cancer precisely, doctors use a more practical system to determine treatment options. Liver cancers are categorized as: potentially resectable or transplantable, unresectable, inoperable with only local disease, and advanced.

## Potentially resectable or transplantable liver cancers (stage I and some stage II tumors)

**Potentially resectable:** If your cancer is early stage and the rest of your liver is healthy, [surgery](#) (partial hepatectomy) may cure you. Only a small number of people with liver cancer are in this category. An important factor affecting outcome is the size of the tumor(s) and if nearby blood vessels are affected. Larger tumors or those that invade blood vessels are more likely to come back in the liver or spread elsewhere after surgery. The function of the rest of the liver and your general health are also important. For some people with early-stage liver cancer, a liver transplant could be another option.

[Clinical trials<sup>2</sup>](#) are now looking at whether patients who have a partial hepatectomy will be helped by getting other treatments in addition to surgery. Some studies have found that using [chemoembolization](#) or other treatments along with surgery may help some patients live longer. Still, not all studies have found this, and more research is needed to know the value (if any) of adding other treatments to surgery.

**Potentially transplantable:** If your cancer is at an early stage, but the rest of your liver

isn't healthy, you may be able to be treated with a liver transplant. Liver transplant may also be an option if the tumor is in a part of the liver that makes it hard to remove (such as very close to a large blood vessel). Candidates for liver transplant might have to wait a long time for a liver to become available. While they are waiting, they are often given other treatments, such as [ablation](#) or [embolization](#), to keep the cancer in check.

### **Unresectable liver cancers (some T1 to T4, N0, M0 tumors)**

Unresectable cancers include cancers that haven't yet spread to lymph nodes or distant sites, but can't be removed safely by partial hepatectomy. This might be because:

- The tumor is too large to be removed safely
- The tumor is in a part of the liver that makes it hard to remove (such as very close to a large blood vessel)
- There are several tumors or the cancer has spread throughout the liver

Treatment options include [ablation](#), [embolization](#), or both for the liver tumor(s). Other options may include [targeted therapy](#), [immunotherapy](#), [chemotherapy](#) (either systemic or by hepatic artery infusion), and/or [radiation therapy](#). In some cases, treatment may shrink the tumor(s) enough so that [surgery](#) (partial hepatectomy or transplant) may become possible.

These treatments won't cure the cancer, but they can reduce symptoms and may even help you live longer. Because these cancers can be hard to treat, clinical trials of newer treatments may offer a good option in many cases.

### **Inoperable liver cancers with only local disease**

These cancers are small enough and in the right place to be removed but the patient isn't healthy enough for surgery. Treatment options include [ablation](#), [embolization](#), or both for the liver tumor(s). Other options may include [targeted therapy](#), [immunotherapy](#), [chemotherapy](#) (either systemic or by hepatic artery infusion), and/or [radiation therapy](#).

### **Advanced (metastatic) liver cancers (includes all N1 or M1 tumors)**

Advanced liver cancer has spread either to the lymph nodes or to other organs. Because these cancers are widespread, they cannot be treated with surgery.

If your liver is functioning well enough (Child-Pugh class A or B), the [targeted therapy](#)



drugs sorafenib (Nexavar) or lenvatinib (Lenvima) may help control the growth of the cancer for a time and may help you live longer. If these drugs are no longer working, other targeted drugs, such as regorafenib (Stivarga) or cabozantinib (Cabometyx), or the [immunotherapy](#) drug nivolumab (Opdivo) might be helpful.

As with localized unresectable liver cancer, clinical trials of targeted therapies, new approaches to chemotherapy (new drugs and ways to deliver chemotherapy), new forms of radiation therapy, and other new treatments may help you. These [clinical trials](#)<sup>3</sup> are also important for improving the outcome for future patients.

Treatments such as radiation might also be used to help relieve [pain](#)<sup>4</sup> and other symptoms. Please be sure to discuss any symptoms you have with your cancer team, so they can treat them effectively.

### Recurrent liver cancer

Cancer that comes back after treatment is called *recurrent*. Recurrence can be local (in or near the same place it started) or distant (spread to organs such as the lungs or bone). Treatment of liver cancer that returns after initial therapy depends on many factors, including where it comes back, the type of initial treatment, and how well the liver is functioning. Patients with localized resectable disease that recurs in the liver might be eligible for further [surgery](#) or local treatments like [ablation](#) or [embolization](#). If the cancer is widespread, [targeted therapy](#), [immunotherapy](#), or [chemotherapy](#) drugs may be options. Patients may also wish to ask their doctor whether a [clinical trial](#)<sup>5</sup> may be right for them.

Treatment can also be given to [relieve pain and other side effects](#)<sup>6</sup>. Please be sure to discuss any symptoms you have with your cancer care team, so they may be treated effectively.

### Hyperlinks

1. [www.cancer.org/cancer/liver-cancer/detection-diagnosis-staging/staging.html](http://www.cancer.org/cancer/liver-cancer/detection-diagnosis-staging/staging.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html](http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html](http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html)
4. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/pain.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/pain.html)
5. [www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html](http://www.cancer.org/treatment/treatments-and-side-effects/clinical-trials.html)
6. [www.cancer.org/treatment/treatments-and-side-effects/palliative-care/supportive-care-guide.html](http://www.cancer.org/treatment/treatments-and-side-effects/palliative-care/supportive-care-guide.html)



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See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: January 15, 2019

## Written by

The American Cancer Society medical and editorial content team  
([www.cancer.org/cancer/acs-medical-content-and-news-staff.html](http://www.cancer.org/cancer/acs-medical-content-and-news-staff.html))

Our team is made up of doctors and oncology certified nurses with deep knowledge of cancer care as well as journalists, editors, and translators with extensive experience in medical writing.

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# After Liver Cancer Treatment

## Living as a Cancer Survivor

For many people, cancer treatment often raises questions about next steps as a survivor.

- [Living as a Liver Cancer Survivor](#)
- [Lifestyle Changes After Liver Cancer](#)
- [Getting Emotional Support](#)

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## Living as a Liver Cancer Survivor

Completing treatment can be both stressful and exciting. You may be relieved to finish treatment, but find it hard not to worry about cancer growing or coming back. (When cancer comes back after treatment, it is called a [recurrence](#).<sup>1</sup>) This is a very common concern in people who have had cancer.

It may take a while before your fears lessen. But it may help to know that many cancer survivors have learned to live with this uncertainty and are leading full lives.

For others, liver cancer may never go away completely. You may still get regular treatments to try to help keep the cancer in check. Learning to live with cancer that does not go away can be difficult and very stressful. It has its own type of uncertainty. Learn more in [Managing Cancer as a Chronic Illness](#)<sup>2</sup>.

Ask your doctor for a survivorship care plan

Talk with your doctor about developing a survivorship care plan for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A schedule for other tests you might need in the future, such as early detection (screening) tests for other types of cancer, or tests to look for long-term health effects from your cancer or its treatment
- A list of possible late- or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- Diet and physical activity suggestions

## Follow-up care

Even after you have completed liver cancer treatment, your doctors will want to watch you closely. It is very important to go to all follow-up appointments. During these visits, your doctors will ask you if you are having any problems, do physical exams and blood tests, such as alpha-fetoprotein (AFP) levels, liver function tests (LFTs). Imaging tests, such as ultrasound, CT, or MRI scans might also be ordered.

If you have been treated with a surgical resection or a liver transplant and have no signs of cancer remaining, most doctors recommend follow-up with [imaging tests](#)<sup>3</sup> and blood tests every 3 to 6 months for the first 2 years, then every 6 to 12 months. Follow-up is needed to check for cancer recurrence or spread, as well as possible side effects of certain treatments.

Almost any cancer treatment can have side effects. Some might only last a few weeks or months, but others can last a long time. Don't hesitate to tell your cancer care team about any symptoms or side effects that bother you so they can help you manage them effectively.

It is important to keep health insurance. Health care costs a lot, and even though no one wants to think of their cancer coming back, this could happen.

## Follow-up after a liver transplant

A liver transplant can be very effective at treating the cancer and replacing a damaged liver. But this is a major procedure that requires intense follow-up after treatment. Along

with monitoring your recovery from surgery and looking for possible signs of cancer recurrence, your medical team will watch you closely to make sure your body is not rejecting the new liver.

You will need to take strong medicines to help prevent the rejection. These medicines can have their own side effects, including weakening your immune system, which can make you more likely to get [infections](#)<sup>4</sup>.

Your transplant team should tell you what to watch for in terms of symptoms and side effects and when you need to contact them. It is very important to follow their instructions closely.

### **Anti-viral treatment**

If you have hepatitis B or C that may have contributed to your liver cancer, your doctor may want to put you on medicines to treat or help control the infection.

### **Keeping health insurance and copies of your medical records**

Even after treatment, it's very important to keep [health insurance](#)<sup>5</sup>. Tests and doctor visits cost a lot, and even though no one wants to think of their cancer coming back, this could happen.

At some point after your cancer diagnosis and treatment, you might find yourself seeing a new doctor who does not know about your medical history. It's important to [keep copies of your medical records](#)<sup>6</sup> to give your new doctor the details of your diagnosis and treatment.

### **Can I lower my risk of liver cancer progressing or coming back?**

If you have (or have had) liver cancer, you probably want to know if there are things you can do that might lower your risk of the cancer coming back, or of getting a new skin cancer.

Adopting healthy behaviors such as not smoking, eating well, being active, and staying at a healthy weight might help as well, but no one knows for sure. However, we do know that these types of changes can have positive effects on your health that can extend beyond your risk of liver or other cancers.

### **Hyperlinks**

1. [www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence.html)
2. [www.cancer.org/treatment/survivorship-during-and-after-treatment/when-cancer-doesnt-go-away.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/when-cancer-doesnt-go-away.html)
3. [www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html](http://www.cancer.org/treatment/understanding-your-diagnosis/tests/imaging-radiology-tests-for-cancer.html)
4. [www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/infections.html](http://www.cancer.org/treatment/treatments-and-side-effects/physical-side-effects/infections.html)
5. [www.cancer.org/treatment/finding-and-paying-for-treatment/understanding-health-insurance.html](http://www.cancer.org/treatment/finding-and-paying-for-treatment/understanding-health-insurance.html)
6. [www.cancer.org/treatment/survivorship-during-and-after-treatment/be-healthy-after-treatment/keeping-copies-of-important-medical-records.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/be-healthy-after-treatment/keeping-copies-of-important-medical-records.html)

## References

See all references for Liver Cancer ([www.cancer.org/cancer/liver-cancer/references.html](http://www.cancer.org/cancer/liver-cancer/references.html))

Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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# Lifestyle Changes After Liver Cancer

You can't change the fact that you have had cancer. What you can change is how you live the rest of your life – making choices to help you stay healthy and feel as well as you can. This can be a time to look at your life in new ways. Maybe you are thinking about how to improve your health over the long term. Some people even start during cancer treatment.

## Eating better

Eating right can be hard for anyone, but it can get even tougher during and after cancer treatment. Treatment may change your sense of taste. Nausea can be a problem. You may not feel like eating and lose weight when you don't want to. Or you may have gained weight that you can't seem to lose. All of these things can be very frustrating.

Keep in mind that these problems usually get better over time.

One of the best things you can do after cancer treatment is to start healthy eating habits. Learn more in [Nutrition and Physical Activity During and After Cancer Treatment: Answers to Common Questions](#)<sup>1</sup>.

## Exercise

Studies have shown that patients who follow an exercise program tailored to their personal needs feel better physically and emotionally and can cope better, too.

If you were sick and not very active during treatment, it is normal for your fitness, endurance, and muscle strength to decline. Any physical activity plan should fit your situation. A person who has never exercised will not be able to take on the same amount of exercise as someone who plays tennis twice a week. If you haven't exercised in a few years, you will have to start slowly – maybe just by taking short walks.

## If the cancer comes back

If liver cancer does come back at some point, your treatment options will depend on where the cancer is, what treatments you've had before, and your overall health. For more on how recurrent cancer is treated, see [Treatment of liver cancer, by stage](#)<sup>2</sup>. For more general information on dealing with a recurrence, you might also want to read [Coping With Cancer Recurrence](#)<sup>3</sup>.

## Hyperlinks

1. [www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/nutrition/nutrition-and-physical-activity-during-and-after-cancer-treatment.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/staying-active/nutrition/nutrition-and-physical-activity-during-and-after-cancer-treatment.html)
2. [www.cancer.org/cancer/melanoma-skin-cancer/treating/by-stage.html](http://www.cancer.org/cancer/melanoma-skin-cancer/treating/by-stage.html)
3. [www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence/coping-with-cancer-recurrence.html](http://www.cancer.org/treatment/survivorship-during-and-after-treatment/understanding-recurrence/coping-with-cancer-recurrence.html)

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Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

## Getting Emotional Support

Some amount of feeling depressed, anxious, or worried is normal when liver cancer is a part of your life. Some people are affected more than others. But everyone can benefit from [help and support](#)<sup>1</sup> from other people, whether friends and family, religious groups, support groups, professional counselors, or others. Learn more in [Coping with Cancer](#)<sup>2</sup> or [Distress in People with Cancer](#)<sup>3</sup>.

### Hyperlinks

1. [www.cancer.org/treatment/support-programs-and-services.html](http://www.cancer.org/treatment/support-programs-and-services.html)
2. [www.cancer.org/treatment/treatments-and-side-effects/emotional-side-effects.html](http://www.cancer.org/treatment/treatments-and-side-effects/emotional-side-effects.html)
3. [www.cancer.org/treatment/treatments-and-side-effects/emotional-side-effects/distress.html](http://www.cancer.org/treatment/treatments-and-side-effects/emotional-side-effects/distress.html)

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Last Medical Review: March 31, 2016 Last Revised: April 28, 2016

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