



Liver tumours occur when abnormal cells in the liver grow in an uncontrolled way. There are several types of liver tumours in children:

- **Hepatoblastoma** usually occurs in children under 3 years of age and does not usually spread to other parts of the body.
- **Hepatocellular carcinoma** usually occurs in older children and teenagers, and often spreads to other parts of the body.
- **Undifferentiated embryonal sarcoma** of the liver usually occurs in children aged 5–10, and often spreads throughout the liver or to the lungs.
- **Infantile choriocarcinoma** starts in the developing baby and is usually found in the first few months of life.

## Risk factors

A risk factor is anything that increases a person's chance of developing a certain condition or disease, such as cancer. In adults, lifestyle and environmental factors (such as smoking or exposure to certain chemicals) can be significant risk factors for developing certain types of cancer. In children, very few risk factors have been identified that increase the chance of developing cancer. For most children with cancer, the underlying cause is unknown.

Even if your child has a risk factor, it does not mean they will develop cancer. Many children with a risk factor will never develop cancer, while others with cancer may have had no known risk factors. Even if a child with a risk factor develops cancer, it is usually hard to know how much that risk factor contributed to the development of their disease.

The causes of liver tumours are not well understood, but factors associated with a higher chance of developing liver tumours include the following.

## Genetic conditions

Several genetic conditions are associated with hepatoblastoma, including:

- Aicardi syndrome
- Beckwith–Wiedemann syndrome
- familial adenomatous polyposis
- hemihyperplasia.

Hepatocellular carcinoma is associated with genetic conditions that affect the liver, such as Alagille syndrome, glycogen storage disease, tyrosinaemia and progressive familial intrahepatic disease.

If your child is diagnosed with one of these genetic conditions, they will need specific follow-up. The health care team will advise which ongoing tests your child will need.





Cancers in children that are linked to genetic conditions may also affect the risk for other family members. Speak to your child's treatment team to see whether genetic counselling is recommended for you or your family.

For more information about genetic conditions, see the [children's cancer glossary](#) or the [Centre for Genetics Education](#).

## Certain virus infections

Children who were infected with the hepatitis B virus from their mother during birth have a higher chance of developing hepatocellular carcinoma.

## Other factors

Having a very low birth weight may increase the chance of your child developing a hepatoblastoma.

Biliary cirrhosis (a type of chronic liver disease) can increase the chance of developing hepatocellular carcinoma. Males have a higher chance of developing hepatocellular carcinoma than females.

# Symptoms

Symptoms of liver tumours may include:

- a lump, pain or swelling in the belly
- loss of appetite
- weight loss
- nausea and vomiting.

## Note about symptoms

Many conditions – including common childhood infections – can cause these symptoms, not just liver tumours. If your child has any of these symptoms and you are concerned, talk to your child's doctor.





## Diagnosis

Your child will have a number of tests to investigate their symptoms and confirm a diagnosis of a liver tumour, including:

- medical history and physical examination
- blood tests
- urine tests
- medical imaging, which may include
  - X-ray
  - ultrasound
  - computed tomography (CT) scan
  - magnetic resonance imaging (MRI)
- biopsy – where a small sample of the tumour is removed to be examined under a microscope. The sample can also be tested for genetic changes that can help determine the best type of treatment for your child.

These tests are explained in more detail in [How is cancer diagnosed?](#)

## Staging

If your child is diagnosed with a liver tumour, some of the diagnostic tests will also help to stage the tumour. Staging determines where the tumour is, how big it is and whether it has spread to other parts of the body. This is important to determine the outlook (prognosis) for your child, and to decide on the best options for treatment.

There are different ways to assess the stage or extent of disease. Two of the most common ways to stage liver cancer are used either before or after surgery.

Staging before surgery is known as the PRETEXT method. This method uses medical imaging scans to see how far the cancer has spread within the liver. The liver is imagined as being divided into 4 sections:

- Stage 1 – the cancer is in 1 section of the liver, and 3 sections that are next to each other do not have cancer.
- Stage 2 – the cancer is in 1 or 2 sections of the liver, and 2 sections that are next to each other do not have cancer.
- Stage 3 – the cancer is in 3 out of 4 sections of the liver; or it is in 2 sections of the liver, and 2 sections that are not next to each other do not have cancer.
- Stage 4 – the cancer is in all 4 sections of the liver.

Staging after surgery uses the following method:

- Stage I – the cancer had not spread outside the liver and was completely removed by surgery.
- Stage II – the cancer had not spread outside the liver, but some cancer cells remain after surgery that can be seen under a microscope.



- Stage III – the cancer cannot be removed by surgery, or visible cancer remains after surgery, or the cancer has spread from the liver to nearby lymph nodes.
- Stage IV – the cancer has spread to other parts of the body, such as the lungs or brain.

## Treatment

Treatment and care of children with cancer is usually provided by a team of health professionals called a multidisciplinary team. Members of this team are specialists in children's cancers – they understand the differences between children's cancer and adult cancer, and each team member brings different skills in managing care to meet the needs of both you and your child.

The team will be led by a childhood cancer specialist (paediatric oncologist). Other members of the team depend on the age of your child and their type of disease, and may change over time as your child's needs change. A list of team members who might make up the multidisciplinary team can be found in [The treatment team](#).

Treatment for liver tumours depends on the age of your child, the stage of the disease, the biological features of the cancer and other factors identified during diagnosis. Treatment will be tailored to your child's particular situation, and may involve one or more of the following (see [How is cancer treated](#) for more detail).

### Surgery

Your child is likely to have surgery to remove all or part of their liver. If their entire liver is removed, they will also need a liver transplant.

### Chemotherapy

Chemotherapy uses anti-cancer medicines to destroy cancer cells. It is often given as a combination of medicines to try to prevent the cancer cells from becoming resistant to just one or two medicines.

Chemotherapy medicines are given together in courses, often over a few days. Once the body has recovered from the side effects, the next course is given. Most children receive multiple courses of chemotherapy.

Chemotherapy may be used:

- before surgery (to shrink the tumour and make it easier to remove)
- after surgery (to destroy any remaining cancer cells).





Liver cancer can also be treated using a procedure called chemoembolisation of the hepatic artery. This is where chemotherapy medicines are injected through a catheter into an artery that supplies blood to the liver, and the artery is then blocked off. This keeps the chemotherapy close to the liver, which means that there may be fewer side effects, and also stops the blood supply to the tumour to prevent it from growing.

## Radiation therapy

Radiation therapy (also called radiotherapy) uses high-energy X-rays or other types of radiation to destroy cancer cells or stop them from growing. Your child may have radiation therapy to treat liver tumours.

A procedure called radioembolisation of the hepatic artery can also be used to treat liver tumours. This is where the radiation is attached to tiny beads that are injected into an artery that supplies blood to the liver, and the artery is then blocked off. This keeps the radiation close to the liver, which means that there may be fewer side effects, and also stops the blood supply to the tumour to prevent it from growing.

Radiation therapy can have long-term side effects in children. If the potential benefits outweigh the risks and radiation therapy is included in your child's treatment, special care will be taken to reduce these risks.

## Support

Diagnosis of cancer in a child is a very difficult time for the child, their family and their friends. You might feel overwhelmed, scared, anxious or angry. These are all normal feelings. It is very important to seek support from family, friends, health professionals or other services to help you, your child and your family cope with cancer.

Talk to your child's treatment team if you are having difficulties coping.

[Living with children's cancer](#) has information about physical, emotional and practical issues during and after diagnosis and treatment. There is also a page with helpful links on [where to find support](#).

The [Cancer Council](#) in your state or territory can give you general information about cancer, as well as information on resources and support groups in your local area. Call the Cancer Council Helpline from anywhere in Australia for the cost of a local call on **13 11 20**.

For additional specific information about childhood cancer, contact any of the major [children's hospitals](#)



[and networks](#) in your state or territory.

## Chance of cure

Many children with cancer are cured of the disease. Children's bodies have great capacity for healing. Also, huge improvements have been made in the treatment of childhood cancer in the past few decades. In the 1980s, around 65% of children diagnosed with cancer were alive more than 5 years after their diagnosis. Today, around 83% of children are successfully treated and become long-term survivors.

Long-term survival (also called the outlook or prognosis) and treatment options depend on a range of factors, including:

- age of your child at diagnosis
- extent or stage of the cancer
- appearance of the cancer cells under the microscope (the shape, function and structure of the cells)
- how the cancer responds to treatment
- cancer or tumour biology, which includes
  - the patterns of the cancer cells
  - how different the cancer cells are from normal cells
  - how fast the cancer cells are growing.

Talk to your child's doctor about your child's individual disease, treatment options and outlook.

## Clinical trials

Researchers are trialling new ways to diagnose and treat different types of cancer. Your child may be invited to be part of a clinical trial to test new ways of treating liver tumours.

New treatments have to go through very strict regulation and approval processes before they can be used in a clinical trial. Your child's doctor will explain everything about the trial and give you detailed written information. You will need to give special permission for your child to be part of the trial.

Participating in a clinical trial may or may not directly benefit your child, but the results of clinical trials today will help children with cancer in the future.

See [Clinical trials and research](#) for more information, including whether there are any clinical trials your



child can join.

## More information

For more information about liver tumours, see

- [Childhood liver cancer treatment \(PDQ®\)](#), from the National Cancer Institute (United States).
- [Paediatric Cancer Registry](#)

