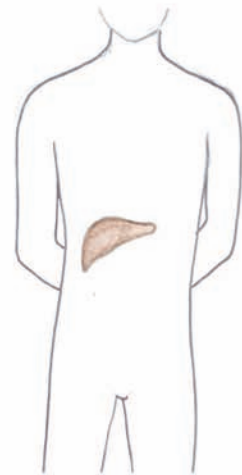


Liver Health after Childhood Cancer

Treatment for childhood cancer can sometimes damage the liver. It is important to know about how the liver functions so that you can keep your liver as healthy as possible.

What is the liver?

The liver is a triangular-shaped organ tucked under the ribcage on the right side of the body. In an average adult, the liver is about the size of a football and weighs about three pounds. The liver is responsible for filtering out toxins from the blood, aiding with digestion and metabolism, and producing many important substances, including blood-clotting proteins.



What are the signs and symptoms of liver damage?

Many people with liver damage have no symptoms at all. Some people may develop jaundice (yellowish eyes and skin), dark urine, pale (clay-colored) stools, severe itching, easy bruising or bleeding, chronic fatigue, nausea, loss of appetite, or other symptoms. The liver sometimes enlarges (hepatomegaly), and as liver damage increases, the liver may become hard (fibrosis) and scarred (cirrhosis). Eventually, there can be accumulation of fluid in the abdomen (ascites), swelling of the spleen (splenomegaly), or bleeding into the esophagus or stomach. Very rarely, liver cancer may develop.

Who is at risk?

People who had high doses of radiation (30 Gy or 3000 cGy/rads or higher) to the following areas may be at risk for liver problems:

- Upper abdomen or whole abdomen
- Liver

The following chemotherapy drugs also have the potential to cause liver damage, although the most likely time for this to happen is during treatment or shortly after treatment ends. It is very uncommon for these medicines to cause liver problems years after treatment:

- Methotrexate
- Mercaptopurine
- Thioguanine

Other risk factors include:

- Medical conditions that involve the liver, such as a liver tumor or surgical removal of a large portion of the liver
- Pre-existing liver problems
- Excessive alcohol use
- Chronic liver infection (hepatitis)
 - *see related Health Link: "Hepatitis after Childhood Cancer"*
- History of multiple transfusions
- Chronic graft-versus-host disease (as a result of bone marrow, cord blood, or stem cell transplant)

What tests are done to monitor the liver?

The following blood tests are used to monitor the liver.

- **Liver enzyme tests** monitor levels of specialized proteins that are normally present inside liver cells. If liver cells are damaged, these proteins can leak out, causing high blood levels of liver enzymes. The most common liver enzyme tests are:
 - Alanine aminotransferase (ALT), sometimes also called SGPT
 - Aspartate aminotransferase (AST), sometimes also called SGOT
- **Liver function tests** are indicators of how well the liver is working. Common liver function tests include:
 - Bilirubin (a waste product formed during the breakdown of red blood cells)
 - Albumin (a major blood protein that is produced by the liver)
 - Prothrombin Time (PT), a measure of blood clotting
- **Tests for liver infection**, including specific tests for viral hepatitis A, B, and C
- **Test to check for iron overload** (ferritin) related to multiple transfusions

What follow up is needed for those at risk?

A blood test to evaluate the liver (including ALT, AST, and bilirubin) should be done **when the survivor enters into long-term follow-up**. Those who have undergone bone marrow, cord blood, or stem cell transplant should also have a blood test to check for iron overload (ferritin). **The liver should also be checked for enlargement by a healthcare professional during yearly physical examinations**. If problems are identified, additional tests and a referral to a liver specialist may be recommended. People at risk for hepatitis may need further testing (*see related Health Link, "Hepatitis after Childhood Cancer"*).

What can I do to keep my liver healthy?

- If you do not have immunity to hepatitis A and B, get immunized against these common infections in order to protect your liver (there is currently no vaccine to protect against hepatitis C). You can find out if you have immunity to hepatitis A and B by having a blood test (Hepatitis A IgG antibody and Hepatitis B surface antibody).
- If you drink alcohol, do so in moderation.
- Drink plenty of water.
- Eat a well-balanced, high-fiber diet. Cut down on fatty, salty, smoked and cured foods.
- Do not take more than the recommended doses of medications.
- Avoid taking unnecessary medications.
- Do not mix drugs and alcohol.
- Do not use illegal street drugs.
- Check with your healthcare provider before starting any new over-the-counter medications or herbs and supplements to be sure that they do not have harmful effects on the liver.
- If you are sexually active, use barrier protection (such as latex condoms) during intimate sexual contact to prevent infection by viruses that can damage the liver.
- Avoid exposure to chemicals (solvents, aerosol cleaners, insecticides, paint thinners, and other toxins) that can be harmful to the liver. If you must use these substances, wear a mask and gloves and work in a well-ventilated area.

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Additional health information for childhood cancer survivors is available at
www.survivorshipguidelines.org

Note: Throughout this *Health Links* series, the term "childhood cancer" is used to designate pediatric cancers that may occur during childhood, adolescence, or young adulthood. *Health Links* are designed to provide health information for survivors of pediatric cancer, regardless of whether the cancer occurred during childhood, adolescence, or young adulthood.

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