National Cancer Institute

What You Need To Know About™

Liver Cancer

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

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U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
National Institutes of Health
National Cancer Institute

About This Booklet

This National Cancer Institute (NCI) booklet is about *cancer** that starts in the *liver* (**primary liver cancer**). Each year in the United States, about 15,000 men and 6,000 women are told they have primary liver cancer. Most are over 64 years old.

This booklet is only about cancer that begins in the liver. It isn't about cancer that spreads to the liver from somewhere else.

It's common for cancer to spread (*metastasize*) to the liver from the colon, lungs, breasts, or other parts of the body. When this happens, the disease is not liver cancer. Instead, the cancer in the liver is named for the *organ* or the *tissue* in which it began. For example, colon cancer that spreads to the liver is *metastatic* colon cancer. It is not liver cancer.

In the United States, metastatic cancer in the liver is far more common than primary liver cancer.

People with metastatic cancer in the liver have different treatment options than those with primary liver cancer. Treatment depends mainly on where the cancer started. Instead of this booklet, you may want to read the NCI fact sheet *Metastatic Cancer*. The NCI Contact Center at **1–800–4–CANCER** (**1–800–422–6237**) can send you this fact sheet, as well as other information.

*Words in *italics* are in the Dictionary on page 28. The Dictionary explains these terms. It also shows how to pronounce them.

Learning about medical care for liver cancer can help you take an active part in making choices about your care. This booklet tells about:

- Diagnosis and staging
- Treatment and *supportive care*
- Taking part in research studies

This booklet has lists of questions that you may want to ask your doctor. Many people find it helpful to take a list of questions to a doctor visit. To help remember what your doctor says, you can take notes or ask whether you may use a tape recorder. You may also want to have a family member or friend go with you when you talk with the doctor—to take notes, ask questions, or just listen.

For the latest information about liver cancer, please visit the NCI Web site at **http://www.cancer.gov/cancertopics/types/liver**. Also, the NCI Contact Center can answer your questions about cancer. We can also send you NCI booklets and fact sheets. Call **1–800–4–CANCER** (**1–800–422–6237**) or instant message us through the **LiveHelp** service at **http://www.cancer.gov/help**.

This booklet is mainly about adult liver cancer. It does not deal with childhood liver cancer. Information about childhood liver cancer is available on the NCI Web site and from the NCI Contact Center.

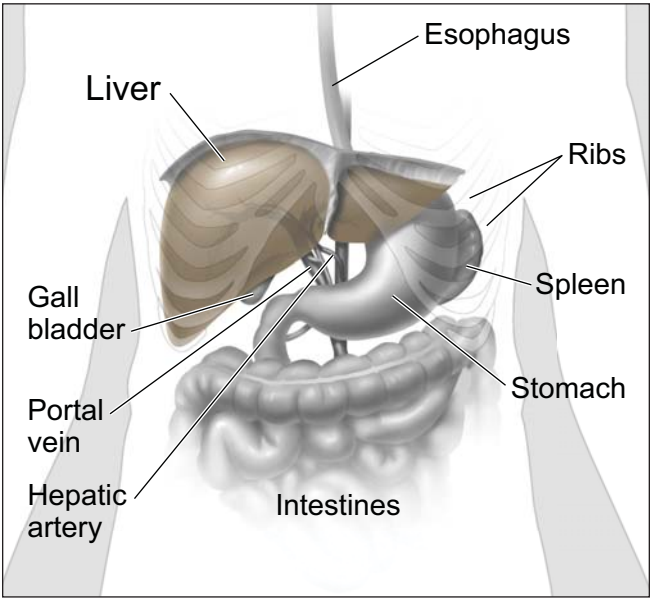
The Liver

The liver is the largest organ inside your *abdomen*. It's found behind your ribs on the right side of your body.

The liver does important work to keep you healthy:

- It removes harmful substances from the blood.
- It makes *enzymes* and *bile* that help digest food.
- It also converts food into substances needed for life and growth.

The liver gets its supply of blood from two vessels. Most of its blood comes from the *hepatic portal vein*. The rest comes from the *hepatic artery*.



Cancer Cells

Cancer begins in *cells*, the building blocks that make up tissues. Tissues make up the organs of the body.

Normal cells grow and divide to form new cells as the body needs them. When normal cells grow old or get damaged, they die, and new cells take their place.

Sometimes, this process goes wrong. New cells form when the body doesn't need them, and old or damaged cells don't die as they should. The buildup of extra cells often forms a mass of tissue called a growth, *nodule*, or *tumor*.

Growths in the liver can be *benign* (not cancer) or *malignant* (cancer). Benign tumors are not as harmful as malignant tumors:

- **Benign tumors**:
  - — are rarely a threat to life
  - — can be removed and usually don't grow back
  - — don't invade the tissues around them
  - — don't spread to other parts of the body
- **Malignant growths**:
  - — may be a threat to life
  - — sometimes can be removed but can grow back
  - — can invade and damage nearby tissues and organs (such as the stomach or *intestine*)
  - — can spread to other parts of the body

Most primary liver cancers begin in *hepatocytes* (liver cells). This type of cancer is called *hepatocellular carcinoma* or malignant *hepatoma*.

Liver cancer cells can spread by breaking away from the original tumor. They mainly spread by entering blood vessels, but liver cancer cells can also be found in *lymph nodes*. The cancer cells may attach to other tissues and grow to form new tumors that may damage those tissues. See the Staging section on page 10 for information about liver cancer that has spread.

Risk Factors

When you get a diagnosis of cancer, it's natural to wonder what may have caused the disease. Doctors can't always explain why one person gets liver cancer and another doesn't. However, we do know that people with certain *risk factors* may be more likely than others to develop liver cancer. A risk factor is something that may increase the chance of getting a disease.

Studies have found the following risk factors for liver cancer:

- **Infection with *hepatitis B virus* (HBV) or *hepatitis C virus* (HCV)**: Liver cancer can develop after many years of infection with either of these viruses. Around the world, infection with HBV or HCV is the main cause of liver cancer.

  HBV and HCV can be passed from person to person through blood (such as by sharing needles) or sexual contact. An infant may catch these viruses from an infected mother. Although HBV and HCV infections are contagious diseases, liver cancer is not. You can't catch liver cancer from another person.

  HBV and HCV infections may not cause symptoms, but blood tests can show whether either virus is present. If so, the doctor may suggest treatment. Also, the doctor may discuss ways to avoid infecting other people.

In people who are not already infected with HBV, hepatitis B *vaccine* can prevent HBV infection. Researchers are working to develop a vaccine to prevent HCV infection.

- **Heavy alcohol use**: Having more than two drinks of alcohol each day for many years increases the risk of liver cancer and certain other cancers. The risk increases with the amount of alcohol that a person drinks.
- ***Aflatoxin***: Liver cancer can be caused by aflatoxin, a harmful substance made by certain types of *mold*. Aflatoxin can form on peanuts, corn, and other nuts and grains. In parts of Asia and Africa, levels of aflatoxin are high. However, the United States has safety measures limiting aflatoxin in the food supply.
- **Iron storage disease**: Liver cancer may develop among people with a disease that causes the body to store too much iron in the liver and other organs.
- ***Cirrhosis***: Cirrhosis is a serious disease that develops when liver cells are damaged and replaced with scar tissue. Many exposures cause cirrhosis, including HBV or HCV infection, heavy alcohol use, too much iron stored in the liver, certain drugs, and certain *parasites*. Almost all cases of liver cancer in the United States occur in people who first had cirrhosis, usually resulting from hepatitis B or C infection, or from heavy alcohol use.
- ***Obesity* and *diabetes***: Studies have shown that obesity and diabetes may be important risk factors for liver cancer.

The more risk factors a person has, the greater the chance that liver cancer will develop. However, many people with known risk factors for liver cancer don't develop the disease.

Symptoms

Early liver cancer often doesn't cause symptoms. When the cancer grows larger, people may notice one or more of these common symptoms:

- Pain in the upper abdomen on the right side
- A lump or a feeling of heaviness in the upper abdomen
- Swollen abdomen (bloating)
- Loss of appetite and feelings of fullness
- Weight loss
- Weakness or feeling very tired
- Nausea and vomiting
- Yellow skin and eyes, pale stools, and dark urine from *jaundice*
- Fever

These symptoms may be caused by liver cancer or other health problems. If you have any of these symptoms, you should tell your doctor so that problems can be diagnosed and treated as early as possible.

Diagnosis

If you have symptoms that suggest liver cancer, your doctor will try to find out what's causing the problems.

You may have one or more of the following tests:

- **Physical exam**: Your doctor feels your abdomen to check the liver, *spleen*, and other nearby organs for any lumps or changes in their shape or size. Your doctor also checks for *ascites*, an abnormal buildup of fluid in the abdomen. Also, your skin and eyes may be checked for signs of jaundice.
- **Blood tests**: Many blood tests may be used to check for liver problems. One blood test detects *alpha-fetoprotein* (AFP). High AFP levels could be a sign of liver cancer. Other blood tests can show how well the liver is working.
- ***CT scan***: An *x-ray* machine linked to a computer takes a series of detailed pictures of your liver and other organs and blood vessels in your abdomen. You may receive an injection of *contrast material* so that your liver shows up clearly in the pictures. On the CT scan, your doctor may see tumors in the liver or elsewhere in the abdomen.
- ***MRI***: A large machine with a strong magnet linked to a computer is used to make detailed pictures of areas inside your body. Sometimes contrast material makes abnormal areas show up more clearly on the picture.
- ***Ultrasound test***: The ultrasound device uses sound waves that can't be heard by humans. The sound waves produce a pattern of echoes as they bounce off internal organs. The echoes create a picture (*sonogram)* of your liver and other organs in the abdomen. Tumors may produce echoes that are different from the echoes made by healthy tissues.

Biopsy

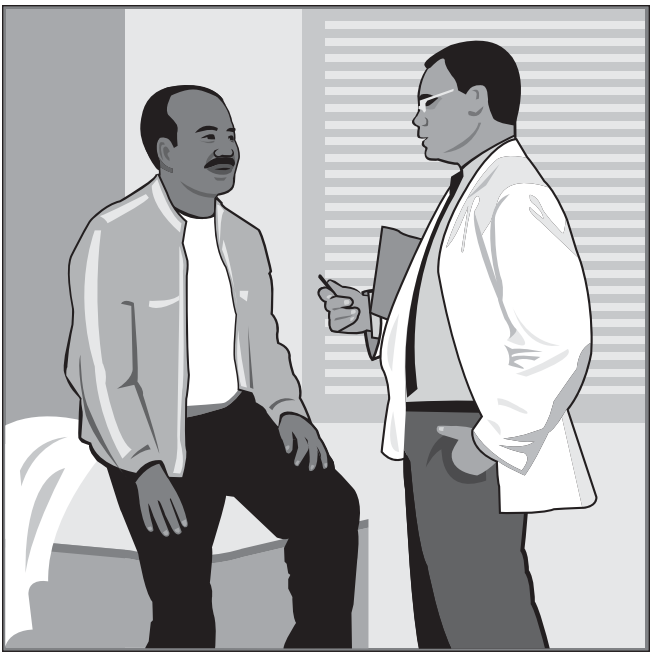
A *biopsy* usually is not needed to diagnose liver cancer, but in some cases, the doctor may remove a sample of tissue. A *pathologist* uses a microscope to look for cancer cells in the tissue.

The doctor may obtain tissue in one of several ways:

- **A needle through the skin**: The doctor inserts a thin needle into the liver to remove a small amount of tissue. CT or ultrasound may be used to guide the needle.
- ***Laparoscopic surgery***: The *surgeon* makes a few small *incisions* in your abdomen. A thin, lighted tube (*laparoscope*) is inserted through the incision. The laparoscope has a tool to remove tissue from the liver.
- **Open *surgery***: The surgeon can remove tissue from the liver through a large incision.

You may want to ask the doctor these questions before having a biopsy:

- How will the biopsy results affect my treatment plan?
- What kind of biopsy will I have?
- How long will it take? Will I be awake? Will it hurt?
- Is there a risk that a needle biopsy procedure will cause the cancer to spread? What are the chances of infection or bleeding after the biopsy? Are there any other risks?
- How soon will I know the results? How do I get a copy of the pathology report?
- If I do have cancer, who will talk with me about treatment? When?



Staging

If liver cancer is diagnosed, your doctor needs to learn the extent (stage) of the disease to help you choose the best treatment. Staging is an attempt to find out whether the cancer has spread, and if so, to what parts of the body.

When liver cancer spreads, the cancer cells may be found in the lungs. Cancer cells also may be found in the bones and in lymph nodes near the liver.

When cancer spreads from its original place to another part of the body, the new tumor has the same kind of abnormal cells and the same name as the primary tumor. For example, if liver cancer spreads to the bones, the cancer cells in the bones are actually liver cancer cells. The disease is metastatic liver cancer, not bone cancer. It's treated as liver cancer, not bone cancer. Doctors sometimes call the new tumor "distant" or metastatic disease.

To learn whether the liver cancer has spread, your doctor may order one or more of the following tests:

- **CT scan of the chest**: A CT scan often can show whether liver cancer has spread to the lungs.
- ***Bone scan***: The doctor injects a small amount of a *radioactive* substance into your blood vessel. It travels through the bloodstream and collects in the bones. A machine called a scanner detects and measures the *radiation*. The scanner makes pictures of the bones. The pictures may show cancer that has spread to the bones.
- ***PET scan***: You receive an injection of a small amount of radioactive sugar. The radioactive sugar gives off signals that the PET scanner picks up. The PET scanner makes a picture of the places in your body where the sugar is being taken up. Cancer cells show up brighter in the picture because they take up sugar faster than normal cells do. A PET scan shows whether liver cancer may have spread.

Treatment

Treatment options for people with liver cancer are surgery (including a liver *transplant*), *ablation*, *embolization*, *targeted therapy*, *radiation therapy*, and *chemotherapy*. You may have a combination of treatments.

The treatment that's right for you depends mainly on the following:

- the number, size, and location of tumors in your liver
- how well your liver is working and whether you have cirrhosis
- whether the cancer has spread outside your liver

Other factors to consider include your age, general health, and concerns about the treatments and their possible side effects.

At this time, liver cancer can be cured only when it's found at an early stage (before it has spread) and only if people are healthy enough to have surgery. For people who can't have surgery, other treatments may be able to help them live longer and feel better. Many doctors encourage people with liver cancer to consider taking part in a *clinical trial*. Clinical trials are research studies testing new treatments. They are an important option for people with all stages of liver cancer. See the Taking Part in Cancer Research section on page 26.

Your doctor may refer you to a specialist, or you may ask for a referral. Specialists who treat liver cancer include surgeons (especially *hepatobiliary* surgeons, *surgical oncologists*, and *transplant surgeons*), *gastroenterologists*, *medical oncologists,* and *radiation oncologists*. Your health care team may also include an *oncology nurse* and a *registered dietitian*.

Your health care team can describe your treatment choices, the expected results of each, and the possible *side effects*. Because cancer therapy often damages healthy cells and tissues, side effects are common. Before treatment starts, ask your health care team about possible side effects and how treatment may change your normal activities. You and your health care team can work together to develop a treatment plan that meets your needs.

Surgery

Surgery is an option for people with an early stage of liver cancer. The surgeon may remove the whole liver or only the part that has cancer. If the whole liver is removed, it's replaced with healthy liver tissue from a donor.

You and your surgeon can talk about the types of surgery and which may be right for you.

Removal of part of the liver

Surgery to remove part of the liver is called partial *hepatectomy*. A person with liver cancer may have part of the liver removed if lab tests show that the liver is working well and if there is no evidence that the cancer has spread to nearby lymph nodes or to other parts of the body.

The surgeon removes the tumor along with a margin of normal liver tissue around the tumor. The extent of the surgery depends on the size, number, and location of the tumors. It also depends on how well the liver is working.

As much as 80 percent of the liver may be removed. The surgeon leaves behind normal liver tissue. The remaining healthy tissue takes over the work of the liver. Also, the liver can regrow the missing part. The new cells grow over several weeks.

It takes time to heal after surgery, and the time needed to recover is different for each person. You may have pain or discomfort for the first few days. Medicine can help control your pain. Before surgery, you should discuss the plan for pain relief with your doctor or nurse. After surgery, your doctor can adjust the plan if you need more pain control.

It's common to feel tired or weak for a while. Also, you may have diarrhea and a feeling of fullness in the abdomen.

The health care team will watch you for signs of bleeding, infection, liver failure, or other problems.

Liver transplant

A liver transplant is an option if the tumors are small, the disease has not spread outside the liver, and suitable donated liver tissue can be found.

Donated liver tissue comes from a deceased person or a live donor. If the donor is living, the tissue is part of a liver, rather than a whole liver.

While you wait for donated liver tissue to become available, the health care team monitors your health and provides other treatments.

When healthy liver tissue from a donor is available, the transplant surgeon removes your entire liver (total hepatectomy) and replaces it with the donated tissue.

After surgery, your health care team will give you medicine to help control your pain. You may need to stay in the hospital for several weeks. During that time, your health care team monitors how well your body is accepting the new liver tissue. You'll take medicine to prevent your body's *immune system* from rejecting the new liver. These drugs may cause puffiness in your face, high blood pressure, or an increase in body hair.

Ablation

Methods of ablation destroy the cancer in the liver. They are treatments to control liver cancer and extend life. They may be used for people waiting for a liver transplant. Or they may be used for people who can't have surgery or a liver transplant. Surgery to remove the tumor may not be possible because of cirrhosis or other conditions that cause poor liver function, the location of the tumor within the liver, or other health problems.

Methods of ablation include the following:

- ***Radiofrequency ablation***: The doctor uses a special probe that contains tiny electrodes to kill the cancer cells with heat. Ultrasound, CT, or MRI may be used to guide the probe to the tumor. Usually, the doctor can insert the probe directly through your skin, and only *local anesthesia* is needed.

  Sometimes, surgery under *general anesthesia* is needed. The doctor inserts the probe through a small incision in your abdomen (using a laparoscope) or through a wider incision that opens your abdomen.

  Some people have pain or a slight fever after this procedure. Staying overnight in the hospital is not usually needed.

  Radiofrequency ablation is a type of *hyperthermia therapy*. Other therapies that use heat to destroy liver tumors include *laser* or *microwave therapy*. They are used less often than radiofrequency ablation.

- ***Percutaneous ethanol injection***: The doctor uses ultrasound to guide a thin needle into the liver tumor. Alcohol (ethanol) is injected directly into the tumor and kills cancer cells. The procedure may be performed once or twice a week. Usually local anesthesia is used, but if you have many tumors in the liver, general anesthesia may be needed.

You may have fever and pain after the injection. Your doctor can suggest medicines to relieve these problems.

Embolization

For those who can't have surgery or a liver transplant, embolization or *chemoembolization* may be an option. The doctor inserts a tiny catheter into an artery in your leg and moves the catheter into the hepatic artery. For embolization, the doctor injects tiny sponges or other particles into the catheter. The particles block the flow of blood through the artery. Depending on the type of particles used, the blockage may be temporary or permanent.

Without blood flow from the hepatic artery, the tumor dies. Although the hepatic artery is blocked, healthy liver tissue continues to receive blood from the hepatic portal vein.

For chemoembolization, the doctor injects an anticancer drug (chemotherapy) into the artery before injecting the tiny particles that block blood flow. Without blood flow, the drug stays in the liver longer.

You'll need to be sedated for this procedure, but general anesthesia is not usually needed. You'll probably stay in the hospital for 2 to 3 days after the treatment.

Embolization often causes abdominal pain, nausea, vomiting, and fever. Your doctor can give you medicine to help lessen these problems. Some people may feel very tired for several weeks after the treatment.

Targeted Therapy

People with liver cancer who can't have surgery or a liver transplant may receive a drug called targeted therapy. *Sorafenib* (Nexavar) tablets were the first targeted therapy approved for liver cancer.

Targeted therapy slows the growth of liver tumors. It also reduces their blood supply. The drug is taken by mouth.

Side effects include nausea, vomiting, mouth sores, and loss of appetite. Sometimes, a person may have chest pain, bleeding problems, or blisters on the hands or feet. The drug can also cause high blood pressure. The health care team will check your blood pressure often during the first 6 weeks of treatment.

You may want to read the NCI fact sheet *Targeted Cancer Therapies*.

Radiation Therapy

Radiation therapy uses high-energy rays to kill cancer cells. It may be an option for a few people who can't have surgery. Sometimes it's used with other approaches. Radiation therapy also may be used to help relieve pain from liver cancer that has spread to the bones.

Doctors use two types of radiation therapy to treat liver cancer:

- ***External radiation therapy***: The radiation comes from a large machine. The machine aims beams of radiation at the chest and abdomen.
- ***Internal radiation therapy***: The radiation comes from tiny radioactive spheres. A doctor uses a catheter to inject the tiny spheres into your hepatic artery. The spheres destroy the blood supply to the liver tumor.

The side effects from radiation therapy include nausea, vomiting, or diarrhea. Your health care team can suggest ways to treat or control the side effects.

You may find it helpful to read the NCI booklet *Radiation Therapy and You*.

Chemotherapy

Chemotherapy, the use of drugs to kill cancer cells, is sometimes used to treat liver cancer. Drugs are usually given by vein (*intravenous*). The drugs enter the bloodstream and travel throughout your body.

Chemotherapy may be given in an outpatient part of the hospital, at the doctor's office, or at home. Rarely, you may need to stay in the hospital.

The side effects of chemotherapy depend mainly on which drugs are given and how much. Common side effects include nausea and vomiting, loss of appetite, headache, fever and chills, and weakness.

Some drugs lower the levels of healthy blood cells, and you're more likely to get infections, bruise or bleed easily, and feel very weak and tired. Your health care team will check for low levels of blood cells. Some side effects may be relieved with medicine.

You may wish to read the NCI booklet *Chemotherapy and You*.

You may want to ask your doctor these questions before your treatment begins:

- What is the stage of the disease? Has the liver cancer spread?
- Do I have cirrhosis?
- Do I need any more tests to determine whether I can have surgery?
- What is the goal of treatment? What are my treatment choices? Which do you recommend for me? Why?
- What are the expected benefits of each kind of treatment?
- What are the risks and possible side effects of each treatment? How can side effects be managed?
- Will I need to stay in the hospital? If so, for how long?
- How will you treat my pain?
- What will the treatment cost? Will my insurance cover it?
- How will treatment affect my normal activities?
- Would a clinical trial (research study) be appropriate for me?
- How often will I need checkups?
- Can you recommend other doctors who could give me a second opinion about my treatment options?

Second Opinion

Before starting treatment, you may want a second opinion about your diagnosis, the stage of cancer, and the treatment plan. You may also want to find a medical center that has a lot of experience with treating people with liver cancer. You may even want to talk to several different doctors about all of the treatment options, their side effects, and the expected results. For example, you could discuss your treatment plan with a hepatobiliary surgeon, radiation oncologist, and medical oncologist.

Some people worry that the doctor will be offended if they ask for a second opinion. Usually the opposite is true. Most doctors welcome a second opinion. And many health insurance companies will pay for a second opinion if you or your doctor requests it. Some companies require a second opinion.

If you get a second opinion, the second doctor may agree with your first doctor's diagnosis and treatment plan. Or the second doctor may suggest another approach. Either way, you have more information and perhaps a greater sense of control. You can feel more confident about the decisions you make, knowing that you've looked at your options.

It may take some time and effort to gather your medical records and see another doctor. In most cases, it's not a problem to take several weeks to get a second opinion. The delay in starting treatment usually will not make treatment less effective. To make sure, you should discuss this delay with your doctor.

There are many ways to find a doctor for a second opinion. You can ask your doctor, a local or state medical society, a nearby hospital, or a medical school for names of specialists.

Also, you can request a consultation with specialists at the National Institutes of Health Clinical Center in Bethesda, Maryland. Specialists in the NCI Surgery Branch provide consultations and surgical care for people with liver cancer. The telephone number is 301–496–4164. The Web site is located at **http://ccr.cancer.gov/labs/lab.asp?labid=93**.

The NCI Contact Center at **1–800–4–CANCER** (**1–800–422–6237**) can tell you about nearby treatment centers. Other sources can be found in the NCI fact sheet *How To Find a Doctor or Treatment Facility If You Have Cancer*.

Supportive Care

Liver cancer and its treatment can lead to other health problems. You can have supportive care before, during, and after cancer treatment.

Supportive care is treatment to control pain and other symptoms, to relieve the side effects of therapy, and to help you cope with the feelings that a diagnosis of cancer can bring. You may receive supportive care to prevent or control these problems and to improve your comfort and quality of life during treatment.

You can get information about supportive care at **http://www.cancer.gov/cancerinfo/coping** on the NCI Web site and from the NCI Contact Center at **1–800–4–CANCER** (**1–800–422–6237**) or **LiveHelp (http://www.cancer.gov/help)**.

Pain Control

Liver cancer and its treatment may lead to pain. Your doctor or a specialist in pain control can suggest several ways to relieve or reduce pain:

- **Pain medicine**: Medicines often can relieve pain. (These medicines may make people drowsy and constipated, but resting and taking laxatives can help.)
- **Radiation therapy**: Radiation therapy can help relieve pain by shrinking the cancer.
- **Nerve block**: The doctor may inject alcohol into the area around certain nerves in the abdomen to block the pain.

The health care team may suggest other ways to relieve or reduce pain. For example, massage, *acupuncture,* or *acupressure* may be used along with other approaches. Also, you may learn to relieve pain through relaxation techniques such as listening to slow music or breathing slowly and comfortably.

More information about pain control can be found in the NCI booklet *Pain Control*.

Sadness and Other Feelings

It's normal to feel sad, anxious, or confused after a diagnosis of a serious illness. Some people find it helpful to talk about their feelings. See the Sources of Support section on page 25.

Nutrition

It's important to meet your nutrition needs before, during, and after cancer treatment. You need the right amount of calories, protein, vitamins, and minerals. Getting the right nutrition can help you feel better and have more energy.

However, you may be uncomfortable or tired, and you may not feel like eating. You also may have side effects of treatment such as poor appetite, nausea, vomiting, or diarrhea. Your doctor, a registered dietitian, or another health care provider can advise you about ways to have a healthy diet.

Careful planning and checkups are important. Liver cancer and its treatment may make it hard for you to digest food and maintain your weight. Your doctor will check you for weight loss, weakness, and lack of energy.

You may want to read the NCI booklet *Eating Hints*. It contains many useful ideas and recipes.

Follow-up Care

You'll need regular checkups (such as every 3 months) after treatment for liver cancer. Checkups help ensure that any changes in your health are noted and treated if needed. If you have any health problems between checkups, you should contact your doctor.

Sometimes liver cancer comes back after treatment. Your doctor will check for return of cancer. Checkups may include a physical exam, blood tests, ultrasound, CT scans, or other tests.

For people who have had a liver transplant, the doctor will test how well the new liver is working. The doctor also will watch you closely to make sure the new liver isn't being rejected. People who have had a liver transplant may want to discuss with the doctor the type and schedule of follow-up tests that will be needed.

The NCI has publications to help answer questions about follow-up care and other concerns. You may find it helpful to read the NCI booklet *Facing Forward: Life After Cancer Treatment*. You may also want to read the NCI fact sheet *Follow-up Care After Cancer Treatment*.

Sources of Support

Learning that you have liver cancer can change your life and the lives of those close to you. These changes can be hard to handle. It's normal for you, your family, and your friends to need help coping with the feelings that a diagnosis of cancer can bring.

Concerns about treatments and managing side effects, hospital stays, and medical bills are common. You may also worry about caring for your family, keeping your job, or continuing daily activities.

Here's where you can go for support:

- Doctors, nurses, and other members of your health care team can answer questions about treatment, working, or other activities.
- Social workers, counselors, or members of the clergy can be helpful if you want to talk about your feelings or concerns. Often, social workers can suggest resources for financial aid, transportation, home care, or emotional support.
- Support groups also can help. In these groups, patients or their family members meet with other patients or their families to share what they have learned about coping with the disease and the effects of treatment. Groups may offer support in person, over the telephone, or on the Internet. You may want to talk with a member of your health care team about finding a support group.
- Information specialists at **1–800–4–CANCER** (**1–800–422–6237**) and at **LiveHelp** (**http://www.cancer.gov/help**) can help you locate programs, services, and publications. They can send you a list of organizations that offer services to people with cancer.

For tips on coping, you may want to read the NCI booklet *Taking Time: Support for People With Cancer.*

Taking Part in Cancer Research

Cancer research has led to real progress in liver cancer detection and treatment. Because of research, people with liver cancer can look forward to a better quality of life. Continuing research offers hope that, in the future, even more people with this disease will be treated successfully.

Doctors all over the world are conducting many types of clinical trials (research studies in which people volunteer to take part). Clinical trials are designed to find out whether new approaches are safe and effective.

Doctors are studying many types of treatment and their combinations:

- **Liver transplant**: The National Institute of Diabetes and Digestive and Kidney Diseases, an agency of the National Institutes of Health, is sponsoring the Adult to Adult Living Donor Liver Transplantation Cohort Study. This trial will study whether it's better to transplant a whole liver from a deceased donor or a part of a liver from a living donor.
- **Radiofrequency ablation and chemotherapy**: Doctors are studying the combination of radiofrequency ablation with an anticancer drug.
- **Targeted therapy**: Doctors are studying new targeted therapies with people who have liver cancer.

Even if the people in a trial do not benefit directly, they may still make an important contribution by helping doctors learn more about liver cancer and how to control it. Although clinical trials may pose some risks, doctors do all they can to protect their patients.

If you're interested in being part of a clinical trial, talk with your doctor. You may want to read the NCI booklet *Taking Part in Cancer Treatment Research Studies*. It describes how treatment studies are carried out and explains their possible benefits and risks.

The NCI Web site includes a section on clinical trials at **http://www.cancer.gov/clinicaltrials**. It has general information about clinical trials as well as detailed information about specific ongoing studies of liver cancer. The NCI Contact Center at **1–800–4–CANCER** (**1–800–422–6237**) and at **LiveHelp** at **http://www.cancer.gov/help** can answer questions and provide information about clinical trials.

Dictionary

Definitions of thousands of terms are on the NCI Web site in the NCI Dictionary of Cancer Terms. You can access it at **http://www.cancer.gov/dictionary**.

Abdomen (AB-doh-men): The area of the body that contains the pancreas, stomach, intestines, liver, gallbladder, and other organs.

Ablation (a-BLAY-shun): In medicine, the removal or destruction of a body part or tissue or its function. Ablation may be performed by surgery, hormones, drugs, radiofrequency, heat, or other methods.

Acupressure (AK-yoo-PREH-sher): The application of pressure or localized massage to specific sites on the body to control symptoms such as pain or nausea. It is a type of complementary and alternative medicine.

Acupuncture (AK-yoo-PUNK-cher): The technique of inserting thin needles through the skin at specific points on the body to control pain and other symptoms. It is a type of complementary and alternative medicine.

Aflatoxin (A-fluh-TOK-sin): A harmful substance made by certain types of mold (*Aspergillus flavus* and *Aspergillus parasiticus*) that is often found on poorly stored grains and nuts. Consumption of foods contaminated with aflatoxin is a risk factor for primary liver cancer.

Alpha-fetoprotein (AL-fuh-FEE-toh-PROH-teen): AFP. A protein normally produced by a fetus. AFP levels are usually undetectable in the blood of healthy adult men or women (who are not pregnant). An elevated level of AFP suggests the presence of either a primary liver cancer or germ cell tumor.

Ascites (uh-SY-teez): Abnormal buildup of fluid in the abdomen that may cause swelling. In late-stage cancer, tumor cells may be found in the fluid in the abdomen. Ascites also occurs in patients with liver disease.

Benign (beh-NINE): Not cancerous. Benign tumors may grow larger but do not spread to other parts of the body.

Bile: A fluid made by the liver and stored in the gallbladder. Bile is excreted into the small intestine, where it helps digest fat.

Biopsy (BY-op-see): The removal of cells or tissues for examination by a pathologist. The pathologist may study the tissue under a microscope or perform other tests on the cells or tissue.

Bone scan: A technique to create images of bones on a computer screen or on film. A small amount of radioactive material is injected into a blood vessel and travels through the bloodstream; it collects in the bones and is detected by a scanner.

Cancer (KAN-ser): A term for diseases in which abnormal cells divide without control. Cancer cells can invade nearby tissues and can spread to other parts of the body through the blood and lymph systems.

Cell: The individual unit that makes up the tissues of the body. All living things are made up of one or more cells.

Chemoembolization (KEE-moh-EM-boh-lih-ZAY-shun): A procedure in which the blood supply to the tumor is blocked surgically or mechanically and anticancer drugs are administered directly into the tumor. This permits a higher concentration of drug to be in contact with the tumor for a longer period of time.

Chemotherapy (KEE-moh-THAYR-uh-pee): Treatment with drugs that kill cancer cells.

Cirrhosis (seh-ROH-sis): A type of chronic, progressive liver disease in which liver cells are replaced by scar tissue.

Clinical trial: A type of research study that tests how well new medical approaches work in people. These studies test new methods of screening, prevention, diagnosis, or treatment of a disease.

Contrast material: A dye or other substance that helps to show abnormal areas inside the body. It is given by injection into a vein, by enema, or by mouth. Contrast material may be used with x-rays, CT scans, MRI, or other imaging tests.

CT scan: A series of detailed pictures of areas inside the body taken from different angles. The pictures are created by a computer linked to an x-ray machine. Also called CAT scan, computed tomography scan, computerized axial tomography scan, and computerized tomography.

Diabetes (dy-uh-BEE-teez): Any of several diseases in which the kidneys make a large amount of urine. Diabetes usually refers to diabetes mellitus in which there is also a high level of glucose (a type of sugar) in the blood because the body does not make enough insulin or use it the way it should.

Embolization (EM-boh-lih-ZAY-shun): The blocking of an artery by a clot or foreign material. Embolization can be done as treatment to block the flow of blood to a tumor.

Enzyme: A protein that speeds up chemical reactions in the body.

External radiation therapy (RAY-dee-AY-shun THAYR-uh-pee): A type of radiation therapy that uses a machine to aim high-energy rays at the cancer from

outside of the body. Also called external beam radiation therapy.

Gastroenterologist (GAS-troh-EN-teh-RAH-loh-jist): A doctor who specializes in diagnosing and treating disorders of the digestive system.

General anesthesia (A-nes-THEE-zhuh): Drugs that cause loss of feeling or awareness and put the person to sleep.

Hepatectomy (HEH-puh-TEK-toh-mee): Surgery to remove all or part of the liver.

Hepatic artery (heh-PA-tik AR-tuh-ree): The major blood vessel that carries blood to the liver.

Hepatic portal vein (heh-PA-tik POR-tul VAYN): A blood vessel that carries blood to the liver from the stomach, small and large intestines, spleen, pancreas, and gallbladder. Also called portal vein.

Hepatitis B virus (HEH-puh-TY-tis VY-rus): A virus that causes hepatitis (inflammation of the liver). It is carried and passed to others through blood or sexual contact. Also, infants born to infected mothers may become infected with the virus.

Hepatitis C virus (HEH-puh-TY-tis VY-rus): A virus that causes hepatitis (inflammation of the liver). It is carried and passed to others through blood or sexual contact. Also, infants born to infected mothers may become infected with the virus.

Hepatobiliary (heh-PA-toh-BIH-lee-AYR-ee): Having to do with the liver, bile ducts, and/or gallbladder.

Hepatocellular carcinoma (heh-PA-toh-SEL-yoo-ler KAR-sih-NOH-muh): A type of adenocarcinoma, the most common type of liver tumor.

Hepatocyte (heh-PA-toh-site): A liver cell.

Hepatoma (HEH-puh-TOH-ma): A liver tumor.

Hyperthermia therapy (HY-per-THER-mee-uh THAYR-uh-pee): A type of treatment in which body tissue is exposed to high temperatures to damage and kill cancer cells or to make cancer cells more sensitive to the effects of radiation and certain anticancer drugs.

Immune system (ih-MYOON SIS-tem): The complex group of organs and cells that defends the body against infections and other diseases.

Incision (in-SIH-zhun): A cut made in the body to perform surgery.

Internal radiation therapy (in-TER-nul RAY-dee-AY-shun THAYR-uh-pee): A type of radiation therapy in which radioactive material sealed in needles, seeds, wires, or catheters is placed directly into or near a tumor. Also called brachytherapy, radiation brachytherapy, and implant radiation therapy.

Intestine (in-TES-tin): The long, tube-shaped organ in the abdomen that completes the process of digestion. The intestine has two parts, the small intestine and the large intestine. Also called bowel.

Intravenous (IN-truh-VEE-nus): IV. Into or within a vein. Intravenous usually refers to a way of giving a drug or other substance through a needle or tube inserted into a vein.

Jaundice (JAWN-dis): A condition in which the skin and the whites of the eyes become yellow, urine darkens, and the color of stool becomes lighter than normal. Jaundice occurs when the liver is not working properly or when a bile duct is blocked.

Laparoscope (LA-puh-ruh-SKOPE): A thin, tube-like instrument used to look at tissues and organs inside the abdomen. A laparoscope has a light and a lens for viewing and may have a tool to remove tissue.

Laparoscopic surgery (LA-puh-ruh-SKAH-pik SER-juh-ree): Surgery done with the aid of a laparoscope. A laparoscope is a thin, tube-like instrument with a light and a lens for viewing. It may also have a tool to remove tissue to be checked under a microscope for signs of disease.

Laser (LAY-zer): A device that concentrates light into an intense, narrow beam used to cut or destroy tissue. It is used in microsurgery, photodynamic therapy, and for a variety of diagnostic purposes.

Liver: A large organ located in the upper abdomen. The liver cleanses the blood and aids in digestion by secreting bile.

Local anesthesia (A-nes-THEE-zhuh): Drugs that cause a temporary loss of feeling in one part of the body. The patient remains awake but cannot feel the part of the body treated with the anesthetic.

Lymph node (limf node): A rounded mass of lymphatic tissue that is surrounded by a capsule of connective tissue. Lymph nodes filter lymph (lymphatic fluid), and they store lymphocytes (white blood cells). They are located along lymphatic vessels. Also called a lymph gland.

Malignant (muh-LIG-nunt): Cancerous. Malignant tumors can invade and destroy nearby tissue and spread to other parts of the body.

Medical oncologist (MEH-dih-kul on-KAH-loh-jist): A doctor who specializes in diagnosing and treating cancer using chemotherapy, hormonal therapy, and biological therapy. A medical oncologist often is the main health care provider for someone who has cancer. A medical oncologist also gives supportive care and may coordinate treatment given by other specialists.

Metastasize (meh-TAS-tuh-size): To spread from one part of the body to another. When cancer cells metastasize and form secondary tumors, the cells in the metastatic tumor are like those in the original (primary) tumor.

Metastatic (meh-tuh-STA-tik): Having to do with metastasis, which is the spread of cancer from one part of the body to another.

Microwave therapy (MY-kroh-WAYV THAYR-uh-pee): A type of treatment in which body tissue is exposed to high temperatures to damage and kill cancer cells or to make cancer cells more sensitive to the effects of radiation and certain anticancer drugs. Also called microwave thermotherapy.

Mold: A form of fungus. Some molds can cause disease in humans.

MRI: Magnetic resonance imaging (mag-NEH-tik REH-zuh-nunts IH-muh-jing). A procedure in which radio waves and a powerful magnet linked to a computer are used to create detailed pictures of areas inside the body. These pictures can show the difference between normal and diseased tissue. MRI makes better images of organs and soft tissue than other scanning techniques, such as computed tomography (CT) or x-ray. MRI is especially useful for imaging the brain, the spine, the soft tissue of joints, and the inside of bones. Also called NMRI and nuclear magnetic resonance imaging.

Nodule (NOD-yool): A growth or lump that may be cancerous or noncancerous.

Obesity (oh-BEE-sih-tee): A condition marked by an abnormally high, unhealthy amount of body fat.

Oncology nurse (on-KAH-loh-jee): A nurse who specializes in treating and caring for people who have cancer.

Organ: A part of the body that performs a specific function. For example, the heart is an organ.

Parasite (PAYR-uh-SITE): An animal or plant that gets nutrients by living on or in an organism of another species.

Pathologist (puh-THAH-loh-jist): A doctor who identifies diseases by studying cells and tissues under a microscope.

Percutaneous ethanol injection (per-kyoo-TAY-nee-us EH-thuh-nol in-JEK-shun): An injection of ethanol (alcohol) through the skin directly into the tumor to kill cancer cells.

PET scan: A procedure in which a small amount of radioactive glucose (sugar) is injected into a vein, and a scanner is used to make detailed, computerized pictures of areas inside the body where the glucose is used. Because cancer cells often use more glucose than normal cells, the pictures can be used to find cancer cells in the body. Also called positron emission tomography scan.

Radiation (RAY-dee-AY-shun): Energy released in the form of particles or electromagnetic waves. Common sources of radiation include radon gas, cosmic rays from outer space, and medical x-rays.

Radiation oncologist (RAY-dee-AY-shun on-KAH-loh-jist): A doctor who specializes in using radiation to treat cancer.

Radiation therapy (RAY-dee-AY-shun THAYR-uh-pee): The use of high-energy radiation from x-rays, gamma rays, neutrons, protons, and other sources to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body (external-beam radiation therapy), or it may come from radioactive material placed in the body near cancer cells (internal radiation therapy). Systemic radiation therapy uses a radioactive substance, such as a radiolabeled monoclonal antibody, that travels in the blood to tissues throughout the body. Also called irradiation and radiotherapy.

Radioactive (RAY-dee-oh-AK-tiv): Giving off radiation.

Radiofrequency ablation (RAY-dee-oh-FREE-kwen-see uh-BLAY-shun): A procedure that uses radio waves to heat and destroy abnormal cells. The radio waves travel through electrodes (small devices that carry electricity). Radiofrequency ablation may be used to treat cancer and other conditions.

Registered dietitian (dy-eh-TIH-shun): A health professional with special training in the use of diet and nutrition to keep the body healthy. A registered dietitian may help the medical team improve the nutritional health of a patient.

Risk factor: Something that may increase the chance of developing a disease. Some examples of risk factors for cancer include age, a family history of certain cancers, use of tobacco products, certain eating habits, obesity, lack of exercise, exposure to radiation or other cancer-causing agents, and certain genetic changes.

Side effect: A problem that occurs when treatment affects healthy tissues or organs. Some common side effects of cancer treatment are fatigue, pain, nausea, vomiting, decreased blood cell counts, hair loss, and mouth sores.

Sonogram (SON-o-gram): A computer picture of areas inside the body created by bouncing high-energy sound waves (ultrasound) off internal tissues or organs. Also called ultrasonogram.

Sorafenib (soh-RAF-eh-nib): A drug used to treat advanced kidney cancer and a type of liver cancer that cannot be removed by surgery. Also called Nexavar.

Spleen: An organ that is part of the lymphatic system. The spleen makes lymphocytes, filters the blood, stores blood cells, and destroys old blood cells. It is located on the left side of the abdomen near the stomach.

Supportive care: Care given to improve the quality of life of patients who have a serious or life-threatening disease. The goal of supportive care is to prevent or treat as early as possible the symptoms of a disease, side effects caused by treatment of a disease, and psychological, social, and spiritual problems related to a disease or its treatment. Also called comfort care, palliative care, and symptom management.

Surgeon: A doctor who removes or repairs a part of the body by operating on the patient.

Surgery (SER-juh-ree): A procedure to remove or repair a part of the body or to find out whether disease is present. An operation.

Surgical oncologist (SER-jih-kul on-KAH-loh-jist): A doctor who performs biopsies and other surgical procedures in cancer patients.

Targeted therapy (TAR-geh-ted THAYR-uh-pee): A type of treatment that uses drugs or other substances, such as monoclonal antibodies, to identify and attack specific cancer cells. Targeted therapy may have fewer side effects than other types of cancer treatments.

Tissue (TISH-oo): A group or layer of cells that work together to perform a specific function.

Transplant (TRANZ-PLANT): A surgical procedure in which tissue or an organ is transferred from one area of a person's body to another area, or from one person (the donor) to another person (the recipient).

Transplant surgeon (TRANZ-PLANT SER-jun): A doctor who specializes in transplantation surgery. The surgeon replaces a patient's organ with an organ from another person.

Tumor (TOO-mer): An abnormal mass of tissue that results when cells divide more than they should or do not die when they should. Tumors may be benign (not cancerous), or malignant (cancerous). Also called neoplasm.

Ultrasound (UL-truh-SOWND): A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echo patterns are shown on the screen of an ultrasound machine, forming a picture of body tissues called a sonogram. Also called ultrasonography.

Vaccine: A substance or group of substances meant to cause the immune system to respond to a tumor or to microorganisms, such as bacteria or viruses. A vaccine can help the body recognize and destroy cancer cells or microorganisms.

X-ray: A type of high-energy radiation. In low doses, x-rays are used to diagnose diseases by making pictures of the inside of the body. In high doses, x-rays are used to treat cancer.

National Cancer Institute Services

You may want more information for yourself, your family, and your doctor. The NCI offers comprehensive research-based information for patients and their families, health professionals, cancer researchers, advocates, and the public.

- **Call** the NCI Contact Center at **1–800–4–CANCER** (**1–800–422–6237**)
- **Visit** us at **http://www.cancer.gov** or **http://www.cancer.gov/espanol**
- **Chat** using **LiveHelp**, NCI's instant messaging service, at **http://www.cancer.gov/livehelp**
- **E-mail** us at **cancergovstaff@mail.nih.gov**
- **Order** publications at **http://www.cancer.gov/publications** or by calling **1–800–4–CANCER**
- **Get help** with quitting smoking at **1–877–44U–QUIT** (**1–877–448–7848**)

National Cancer Institute Publications

NCI provides publications about cancer, including the booklets and fact sheets mentioned in this booklet. Many are available in both English and Spanish.

You may order these publications by telephone, on the Internet, or by mail. You may also read them online and print your own copy.

- **By telephone**: People in the United States and its territories may order these and other NCI publications by calling the NCI Contact Center at **1–800–4–CANCER** (**1–800–422–6237**).
- **On the Internet**: Many NCI publications may be viewed, downloaded, and ordered from **http://www.cancer.gov/publications** on the Internet. People in the United States and its territories may use this Web site to order printed copies. This Web site also explains how people outside the United States can mail or fax their requests for NCI booklets.
- **By mail**: NCI publications may be ordered by writing to the address below:

  Publications Ordering Service
  National Cancer Institute
  P.O. Box 24128
  Baltimore, MD 21227

Clinical Trials

- *Taking Part in Cancer Treatment Research Studies*

Finding a Doctor, Support Groups, or Other Organizations

- *How To Find a Doctor or Treatment Facility If You Have Cancer* (also in Spanish)
- *Cancer Support Groups*
- *National Organizations That Offer Services to People With Cancer and Their Families* (also in Spanish)

Cancer Treatment and Supportive Care

- *Radiation Therapy and You* (also in Spanish)
- *Understanding Radiation Therapy: What To Know About External Beam Radiation Therapy* (also in Spanish)
- *Chemotherapy and You* (also in Spanish)
- *Eating Hints for Cancer Patients* (also in Spanish)
- *Pain Control* (also in Spanish)

Coping with Cancer

- *Taking Time*: *Support for People with Cancer*
- *Managing Radiation Therapy Side Effects: What To Do When You Feel Weak or Tired (Fatigue)* (also in Spanish)

Life After Cancer Treatment

- *Facing Forward*: *Life After Cancer Treatment* (also in Spanish)
- *Follow-up Care After Cancer Treatment*
- *Facing Forward*: *Ways You Can Make a Difference in Cancer*

Advanced or Recurrent Cancer

- *Coping With Advanced Cancer*
- *When Cancer Returns*

Complementary Medicine

- *Thinking about Complementary & Alternative Medicine: A guide for people with cancer*
- *Complementary and Alternative Medicine in Cancer Treatment* (also in Spanish)

Caregivers

- *When Someone You Love Is Being Treated for Cancer: Support for Caregivers*
- *When Someone You Love Has Advanced Cancer: Support for Caregivers*
- *Facing Forward: When Someone You Love Has Completed Cancer Treatment*
- *Caring for the Caregiver: Support for Cancer Caregivers*

The National Cancer Institute

The National Cancer Institute (NCI), part of the National Institutes of Health, is the Federal Government's principal agency for cancer research and training. NCI conducts and supports basic and clinical research to find better ways to prevent, diagnose, and treat cancer. The Institute also supports education and training for cancer research and treatment programs. In addition, NCI is responsible for communicating its research findings to the medical community and the public.

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NATIONAL® CANCER INSTITUTE

NIH Publication No.09-5009
Revised February 2009
Printed May 2009