



Hepatitis B

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Hepatitis B is a viral infection that primarily affects the liver. Earlier names for this disease were “long incubation” and “serum” hepatitis. Those infected with the hepatitis B virus may show no symptoms, have a self-limited acute illness, progress to acute liver failure, or develop chronic liver disease.

Prevalence and Distribution

Hepatitis B is found throughout the world and is most common in Southeast Asia, sub-Saharan Africa, Micronesia, and China. Even though hepatitis B is far less common in the USA than in these endemic countries, 0.5% of Americans are chronically infected, and hepatitis B virus is the second most common cause of acute hepatitis. There are over 5,000 new cases of hepatitis B diagnosed each year in the USA.

Mode of Transmission

The spread of hepatitis B depends on the contact of blood, semen, or saliva with open skin or mucous membranes (mouth, eyes, vagina, or rectum). Blood has the highest concentration of the hepatitis B virus. Researchers have found hepatitis B virus in almost every other body fluid as well, including urine, feces, tears, breast milk, and menstrual fluids. However, their roles in the transmission of the virus are not clearly known.

The most common modes of transmission in the USA are through injection drug use and sexual contact. A pregnant woman can also transmit the

virus to her unborn child, which is a common mode of transmission in endemic countries while an infrequent occurrence in the USA.

Symptoms and Diagnosis

The incubation period can range from 50 to 180 days, but most commonly is 70-80 days.

Cold- or flu-like symptoms characterize the first stages of the acute illness. These symptoms include headache, runny nose, cough, weakness, fatigue, poor appetite, nausea, vomiting, sore throat, and aches in the muscles and joints. The patient may have a mild fever. Some people lose their taste for cigarettes or coffee. Rarely, a person can develop arthritis or a rash. This early phase lasts between 1 and 28 days.

The second stage of the acute illness, the “icteric” phase, is characterized by yellow skin (jaundice) and eyes (scleral icterus), dark urine (often Coca-Cola or tea colored), and light or tan stools. Nausea and vomiting can continue and grow worse while other symptoms found in the first stage usually diminish. Some people complain of mild right-sided abdominal pain or itching. As in other

*Jaundice.
This African-American man developed hepatitis A from contaminated shellfish. Note the yellow hue to his eyes (called scleral icterus).
Photo courtesy of the CDC*

Table 1: Hepatitis B Serology

Clinical Status	HBsAg	Anti-HBc	Anti-HBs
Susceptible. Never infected or vaccinated	Negative	Negative	Negative
Immune due to prior infection	Negative	Positive	Positive
Immune due to prior vaccination	Negative	Negative	Positive
Acute infection	Positive	Positive	Negative
Chronic Carrier	Positive	Positive	Negative

types of hepatitis, young children are less apt to show symptoms of illness or jaundice. However, infection without symptoms can happen at any age.

The diagnosis of acute hepatitis B is made by finding hepatitis B surface antigen (HBsAg) and IgM anti-hepatitis B core antibody (anti-HBc) in the blood of an infected person. Clinical symptoms may be suggestive of hepatitis but are not unique enough to determine the type of hepatitis. Blood tests for anti-hepatitis B surface antibody (anti-HBs) and HbsAg can determine if a person is immune to hepatitis B (anti-HBs positive) or a chronic carrier (HbsAg positive and anti-HBc and anti-HBs negative).

Treatment and Complications

Most cases of acute hepatitis B do not call for hospitalization. There are no specific treatments that have been proven to decrease the length or severity of acute hepatitis B. However, certain measures do provide symptomatic relief. Most people prefer bed rest. No set rules exist about how many days or hours in a day a person should rest. People with hepatitis B should follow a high calorie diet. The diet should supply most of the calories early in the day, because nausea and vomiting tend to be worse later. Cholestyramine (Questran™), a prescription medicine, helps relieve itching. Patients should avoid substances metabolized or broken down by the liver, such as acetaminophen (Tylenol™), alcohol, and many illegal drugs.

In rare instances, the acute phase of hepatitis B can be fatal. However, most people recover clinically within 2 or 3 months. The HBsAg usually disappears from the blood in about 6 months, although in some persons it will persist for a few years. About 5% of persons infected with hepatitis B will never clear HbsAg and are called chronic carriers. Men and immunosuppressed persons are more likely to

become chronic carriers. All chronic carriers can infect others with the virus. In addition, some chronic carriers develop chronic hepatitis, cirrhosis, and hepatocellular carcinoma, all of which may lead to death. Hepatitis B virus is the most important cause of liver cancer in the USA. Chronic carriers may also have extra-hepatic disease with joint pain, arthritis, and skin rashes.

Chronic hepatitis B can be treated with interferon alfa-2b (Intron A™) or antiviral agents such as lamivudine (Epivir™, 3TC) or famciclovir (Famvir™). Exactly how best to use these medications to prevent resistance and result in long-lasting cure is still being evaluated. Therapy is monitored by PCR measurement of the amount of hepatitis B DNA in the blood.

Prevention and Control

Basic Precautionary Measures

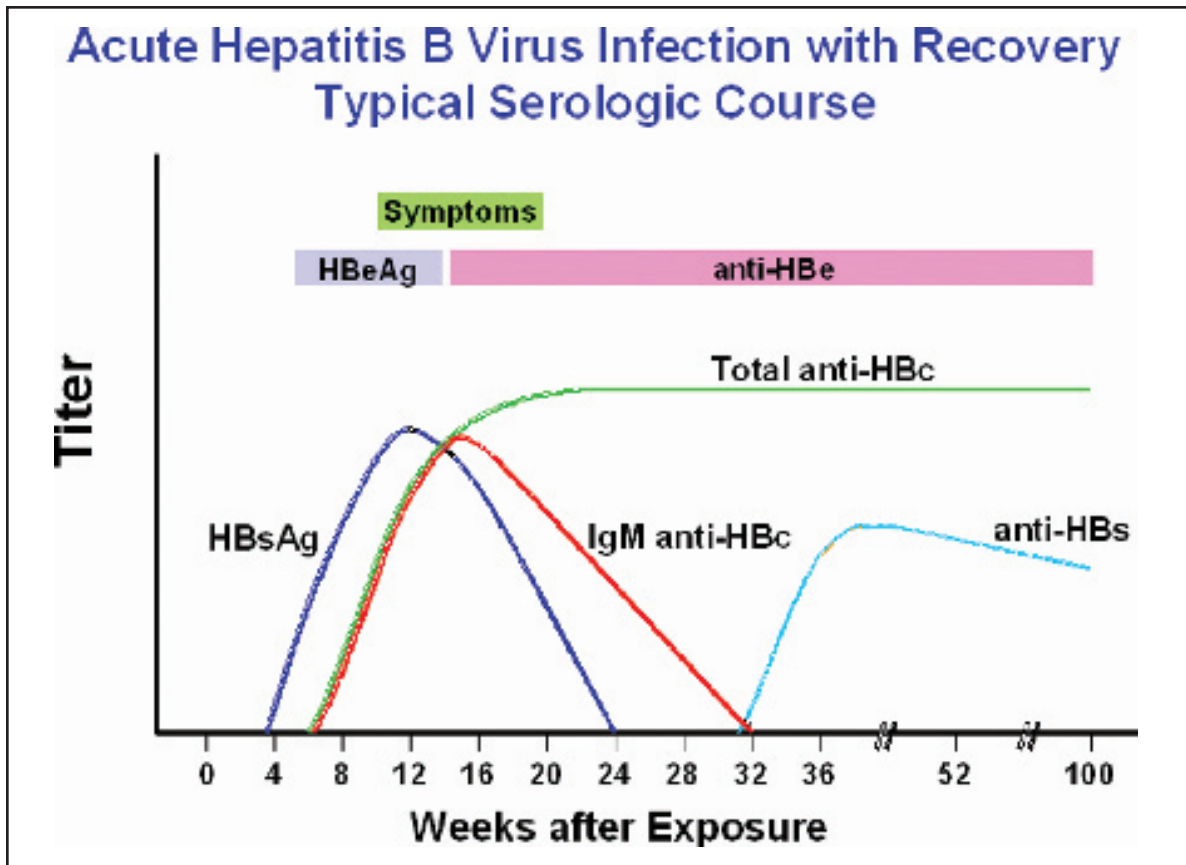
All cases of hepatitis B should be reported to the local or state health department.

Persons with hepatitis B are most infectious prior to the time of diagnosis, and many persons with hepatitis B are either chronic carriers or have asymptomatic infection. Hence the best precaution against all diseases transmitted through body fluids, including hepatitis B, is to follow basic preventive measures with all people, regardless of what is known about their medical problems.

Hands should always be washed thoroughly, especially before preparing or serving food and after diapering or using the bathroom. Gloves should always be used when handling body fluids and hands should be washed after removing the gloves.

Persons with hepatitis B do not require any special type of isolation. However, they should be instructed not to have unprotected sex. Injection drug users should not share needles and should seek help for their addiction.

Figure 1:



The Clinical Signs and Serology of Hepatitis B Infection. Flu-like symptoms usually appear 70-80 days after exposure to HBV. The timing of other clinical symptoms and serological markers is depicted here. Courtesy of the CDC

Post-Exposure Immunization

An immunization containing antibodies against hepatitis B virus, called hepatitis B immune globulin (HBIG), can prevent or lessen the severity of hepatitis in persons who have been recently exposed and are not immune. Non-immune persons who should receive HBIG include infants born to mothers with hepatitis B, sexual contacts of infected people, and those exposed directly by accidental needle stick injury. In all cases, the hepatitis B vaccine series should be started at the same time that HBIG is given.

Pre-Exposure Immunization

Active hepatitis B vaccine, which allows the body to make antibodies against hepatitis B, offers the best method of prevention. The two formulations of the vaccine available in the USA, Energix-B and Recombivax, are synthetic vaccines made from recombinant techniques using yeast. Both preparations are extremely safe. The most common side effects are pain at the injection site and mild fever. The vaccine is given intramuscularly in the deltoid muscle in a series of 3 shots, with the second and third given at 1 and 6 month intervals after the

first. Since most people respond to vaccination, post-vaccination testing for immunity is not recommended. In addition, booster doses are not usually recommended since most persons vaccinated remain immune for life.

All children and adolescents are recommended to receive the hepatitis B vaccine. The vaccine is also recommended for adults who have an increased risk for hepatitis B infection. These include:

- injection drug users;
- medical, dental, laboratory workers, and others with exposure to human blood;
- men who have sex with men;
- persons with multiple sexual partners or with sexually transmitted diseases;
- populations, such as Alaskan natives, in which hepatitis B is endemic;
- travelers to highly endemic areas if there is anticipated human blood contact or sexual or household contact with locals;
- household contacts of HbsAg-positive individuals;
- hemophilia patients;
- hemodialysis patients;
- patients for whom multiple blood transfusions or blood products are anticipated;

Table 2: Post-Exposure HBIG

Exposure	Dose	Timing
Infant born to HbsAg positive mother	0.5 mL	Within 48 hours of birth
Adult with sexual contact	2 mL	Within 14 days of last sexual contact
Adult with parental exposure	2 mL	Within 7 days of exposure, preferably 48 hours

Table 3: Hepatitis B Pre-Exposure Vaccination

Age of Person (years old)	Number of Doses	Dosing Schedule (months)*	Recombivax-HB	Energix-B
Infant (< 1)	3	0, 1, and 6	.25 mL	0.5 mL
Child (1-10)	3	0, 1, and 6	.25 mL	0.5 mL
Adolescent (11-19)	3	0, 1, and 6	0.5 mL	1.0 mL
Adults (>19)	3	0,1, and 6	1.0 mL	1.0 mL

**If a dose is missed it should be given as soon as possible. However, repeat dosing or repeating the schedule is not necessary.*

- prison inmates and staff; and
- staff and patients of institutions for the mentally disabled.

Most employee health departments provide the vaccine for workers who are at risk of exposure.

Special Considerations for Homeless Populations

Homeless people who inject drugs or have frequent sexual contacts are at high risk for hepatitis B if they are not vaccinated. Persons immunocompromised by conditions such as HIV/AIDS have a higher risk of becoming chronic carriers. All homeless children, adolescents, and adults with risk factors should receive three doses of hepatitis B vaccine to prevent hepatitis B.

Summary

Hepatitis B is a viral infection of the liver that can cause either short- or long-term illness. Initial symptoms often begin 70 to 80 days after exposure and are similar to those of a cold or flu. In the second phase, a person may develop yellow skin and eyes, dark urine, light-colored stools, and itchy skin. Complete recovery takes 2 to 3 months.

An infected person may become a “chronic carrier”. Although chronic carriers may show no symptoms of the disease, they can infect others with the virus for the rest of their lives. Chronic carriers can also develop chronic hepatitis, cirrhosis, and hepatocellular carcinoma.

Hepatitis B spreads most commonly by blood or semen. Sharing needles or having sex without using condoms transmits the virus very effectively. A person does not have to look ill or have symptoms to be able to spread hepatitis B.

There is no specific treatment for acute hepatitis B. Bed rest, high calorie food, and aspirin can help the aches and fevers. Aspirin should be avoided in children under 18 because of the risk of Reye syndrome. Prescription medications are available to relieve itching. Alcohol and drugs such as acetaminophen (Tylenol™) that are broken down by the liver should be avoided. Chronic hepatitis B can be treated with interferon- α and antiviral agents.

Prevention of hepatitis B is now possible with universal vaccination of children, adolescents, and high-risk adults. Good general infection control principles should be routinely followed to prevent further spread of infection. In addition, there is a vaccine available for persons who are not immune and have had recent exposure. ■■

Table 4: Interpretation of the Hepatitis B Panel

Test	Results	Interpretation	
HBsAg anti-HBc anti-HBs	Negative Negative Negative	Susceptible	anti-HBc = hepatitis B core antibody anti-HBcIgM = IgM antibody against HBc anti-HBs = hepatitis B surface antibody HBV = hepatitis B virus HBsAg = hepatitis B surface antigen
HBsAg anti-HBc anti-HBs	Negative Positive Positive	Immune due to natural infection	
HBsAg anti-HBc anti-HBs	Negative Negative Positive	Immune due to hepatitis B vaccination	
HBsAg anti-HBc anti-HBc IgM anti-HBs	Positive Positive Positive Negative	Acutely infected	
HBsAg anti-HBc anti-HBc IgM anti-HBs	Positive Positive Negative Negative	Chronically infected	
HBsAg anti-HBc anti-HBs	Negative Positive Negative	Four interpretations possible: May be recovering from acute HBV infection May be distantly immune and test is not sensitive enough to detect very low level of anti-HBs in serum May be susceptible with a false-positive anti-HBc May be an undetectable level of HBsAg present in the serum and the person is actually a carrier	

The Interpretation of HBV Serology. This figure is designed to help clinicians interpret the often confusing results of the serological tests for hepatitis B. Courtesy of the CDC

Hepatitis B Medication List

Generic	Brand Name	Cost
cholestyramine	Questran	\$\$\$
famciclovir	Famvir	\$\$\$
interferon alfa-2b	Intron A	\$\$\$\$\$
lamivudine	Eпивir, 3TC	\$\$\$\$\$

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