

A Guide to Hepatitis B

Keeping
Your Liver
Healthy



By: Alan Franciscus, Editor-in-Chief

Table of Contents

Introduction	2
Hepatitis B Facts	2
Your Liver and Hepatitis.	2
HBV Transmission and Prevention	3
HBV Prevention Guidelines	3
Post-Exposure Prophylaxis.	4
HBV Disease Progression	4
HBV Diagnosis and Monitoring.	6
HBV Treatment	8
Managing Drug Side Effects	10
HBV Management	11
Healthy Liver Tips	11
Conclusion	12
Hepatitis Resources	13

Foreword

It is difficult for anyone living with a chronic illness, but it is even more challenging for people living with chronic hepatitis B (HBV) because of the silent nature of the disease—that is, the virus can be causing damage to your body and you might not even know it. That's why it's important to educate yourself about HBV, work closely with your medical team and take the necessary steps to stay healthy. Every day you will be faced with making important decisions that will affect your emotional and physical health. We hope that this Guide will give you the necessary information to start you on your way to living well with HBV. Remember that you don't have to make all of the lifestyle changes outlined in the Guide at once. In fact, you don't have to make any changes until you are ready.

Alan Franciscus
Editor-in-Chief, HBV Advocate.org



1. Introduction

Hepatitis B is a blood-borne virus. It enters the body through direct blood exposure and through sexual contact. Fewer than 5% of adults infected with HBV become carriers and remain infected with HBV for longer than six months. For people who are infected with HBV at birth or as young children, the risk of becoming chronically infected may be as high as 90%.

Worldwide an estimated 2 billion persons have been infected and 400-800 million are chronically infected with HBV, up to 25% of whom also have chronic hepatitis C and as a consequence may develop serious liver damage. Complications from HBV is the 10th leading cause of death worldwide. HBV is responsible for up to 70% of all cases of liver cancer worldwide. In 2007, the U.S. Centers for Disease Control and Prevention (CDC) estimated that 43,000 Americans were newly infected with HBV. It is also estimated that between 2 and 3 million Americans have chronic HBV infection, of whom 65% do not know they have it. Health Canada estimates that there are approximately 250,000 Canadians with chronic hepatitis B, and approximately 1,100 new hepatitis B cases were reported in 2007 (CLF 2009). Asians and immigrants from other areas of the world where hepatitis B is endemic have higher rates of infection; most are infected at birth or as young children. For instance, 1 in 8 Vietnamese Americans; 1 in 10 Chinese Americans and 1 in 12 Korean Americans are believed to be infected with chronic hepatitis B.

Most people infected with HBV do not have symptoms and lead normal lives. However, in about 25% of cases HBV can cause serious liver damage – including fibrosis and cirrhosis – usually over several years or decades. In severe cases, hepatitis B can lead to liver failure, liver cancer and death. An effective vaccine is available to prevent HBV. There are also various treatments that can help control chronic HBV infection and slow or stop disease progression.

Hepatitis B Facts

- 2 to 3 million Americans are estimated to be chronically infected with HBV.
- An estimated 3,000-4,000 Americans die each year due to complications related to hepatitis B.
- Health Canada estimates that 250,000 Canadians are chronically infected with HBV.
- Immigrants from Asia, the Middle East, and parts of Africa—and their children—are at higher risk for HBV infection.

2. Your Liver and Hepatitis

The liver is the largest internal organ. It is located behind the ribcage on the right side of the abdomen. The liver is responsible for some 500 bodily functions. It processes almost everything you eat, breathe, or absorb through the

skin. Liver cells produce bile, which enables the body to digest food and absorb nutrients. The liver plays an important role in metabolism, including the storage of vitamins, minerals, and sugars. It synthesizes several important proteins, including hormones, blood proteins, and clotting factors. The liver also plays a role in detoxification, filtering drugs and toxins (poisons) and eliminating toxic byproducts of normal metabolism.

Hepatitis is a general name for inflammation of the liver. It may be caused by viruses, toxic chemicals, alcohol, drugs, or other factors. HBV attacks and replicates in liver cells. As liver damage progresses, the organ may no longer be able to carry out its normal activities. Because the liver is responsible for so many important functions, liver disease can lead to a variety of different symptoms and conditions.

Hepatitis B is one of the three most common types of viral hepatitis; the others are hepatitis A and hepatitis C. Hepatitis A is most common. The hepatitis A virus (HAV) is usually transmitted through food or water contaminated by HAV-infected feces, but may also be contracted through household and sexual (anal/oral) contact. There is no treatment for hepatitis A, but the body usually clears the virus and it does not cause chronic infection. Hepatitis C (formerly known as non-A/non-B hepatitis) is a blood-borne virus like hepatitis B. HCV is much more likely than HBV to become chronic in adults. Although the long-



term effects of hepatitis B and hepatitis C are similar in many respects, the diseases are caused by two distinct viruses that are not related. Both hepatitis A and hepatitis B can be prevented by vaccines; there is currently no vaccine for hepatitis C.

3. HBV Transmission and Prevention

HBV is transmitted by direct blood-to-blood contact and when someone comes into contact with bodily fluids during sexual activity. The most common transmission routes of hepatitis B include sharing drug equipment, sexual transmission, vertical (mother-to-child transmission), and horizontal (person-to-person).

The most common transmission route of HBV in the United States is through sexual contact with an HBV-infected person. HBV is present in semen and vaginal fluids, and hepatitis B may be transmitted through sexual activity. HBV is much more likely than HCV to be sexually transmitted. Transmission may be more likely during a woman's menstrual period. HBV transmission rates are particularly high among men who have sex with men.

Another transmission route is sharing drug equipment for both injection and non-injection drugs (including needles, cookers, tourniquets, cocaine straws, and crack pipes). Needles used for tattooing and body piercing may also spread the virus. Sharing personal items such as razors, toothbrushes, and nail files is a less likely but still possible transmission route. This can happen when a small amount of HBV-infected blood remains on an item after use and is transferred to another person who uses the same item. In the past, many people contracted HBV through blood transfusions; however, a test for HBV in donated blood has been in use since 1972 and a test for HCV became available in 1992. Today, blood transfusions are considered safe. Health-care workers may be exposed to HBV through needle-sticks and other accidental exposures on the job.

Vertical or perinatal transmission from HBV-infected mothers to their infants before or during birth accounts for the majority of infections worldwide in areas where HBV is endemic (i.e., restricted to a specified region, locality or group). Transmission is more likely if the mother has a high level of HBV in her blood;

mothers coinfecting with HCV or HIV in addition to HBV also appear to be more likely to transmit hepatitis B to their babies. Although hepatitis B surface antigen, a particle of the virus, is present in breast milk, there is no evidence that hepatitis B is transmitted through breastfeeding if the infant is vaccinated.

Studies indicate that horizontal HBV transmission is common between young children in areas where the virus is endemic, probably due to scratching and biting. Although HBV is detectable in saliva, hepatitis B is not known to be transmitted by sneezing, coughing, or sharing eating utensils or drinking glasses; household transmission of HBV is uncommon. There are no documented cases of HBV transmission through urine, feces, sweat, tears, or vomit. In one-third or more cases, people have no identifiable risk factors and the route of hepatitis B transmission is unknown.

4. HBV Prevention Guidelines

HBV Vaccination

The CDC recently revised their vaccine recommendations in an effort to eliminate hepatitis B from the United States. The list of recommendations to vaccinate against HBV and therefore to eliminate it include:

- Vaccination at birth
- Screening of all pregnant women
- Vaccination of all previously unvaccinated children and adolescents

Concentrations of HBV in Body Fluids

High	Moderate	Low/Not Detectable
Blood	Semen	Urine
Serum	Vaginal fluid	Feces
Wounds	Saliva	Sweat
		Tears
		Breast milk



- Vaccination of previously unvaccinated adults at risk for HBV infection

The CDC recommends that the following groups should be vaccinated against HBV:

- **Sexual exposure:**
 - ◆ Sexual contacts of HBV positive persons
 - ◆ People who have been sexually active with more than one sexual partner within the last 6 months
 - ◆ People seeking STD services
 - ◆ Men who have sex with men
- **Blood mucous exposure:**
 - ◆ Current or recent injection drug users
 - ◆ Household contact
 - ◆ Residents and staff of facilities for developmentally disabled Americans
 - ◆ Healthcare and public safety workers who may come into contact with blood and/or bodily fluids
 - ◆ People with kidney disease-hemodialysis
- **Others:**
 - ◆ International travelers who travel to countries that have higher or intermediate levels of HBV
 - ◆ Persons with chronic liver

disease

- ◆ Persons with HIV
- ◆ All persons seeking protection from HBV infection

Hepatitis B can be prevented with a vaccine. The vaccine is administered as a series of three injections given over six months (the second injection one month after the first, and the third injection five months later). A two-dose vaccine has been approved for adolescents aged 11-15.

A combination HAV and HBV vaccine (Twinrix) is also available. The Food and Drug Administration recently approved accelerated dosing of Twinrix (3 shots within 30 days followed by a booster in one year).

More Prevention:

- Infants born to HBV-infected mothers should receive the hepatitis B vaccine and HBV immune globulin (HBIG) within 12 hours of birth. This can reduce the rate of chronic infection in the infant from 90% to about 10%.
- Practice safer sex, including the use of latex condoms and barriers.
- Do not share needles to inject drugs; obtain new needles from a needle exchange or – if you must share – clean needles thoroughly with bleach.
- Do not share drug equipment such as cocaine straws or crack

pipes.

- Tattooists, piercers, and acupuncturists should use new needles for each client.
- Manicurists and barbers should disinfect tools between customers or use disposable, single-use items.
- Do not share personal items such as razors, toothbrushes, nail files, or pierced earrings.
- Exercise universal precautions in health-care settings, including the use of latex gloves.
- Properly dispose of used needles, bandages, and menstrual supplies; clean and disinfect spilled body fluids.
- Cover all cuts, sores, and rashes.

5. Post-Exposure Prophylaxis

If a person has recently been exposed to HBV, post-exposure prophylaxis using the HBV vaccine plus injected antibodies (HBV immune globulin, or HBIG) can help prevent the development of hepatitis B or reduce the length and severity of illness. This protocol should be implemented within 72 hours after exposure. HBIG plus the HBV vaccine can also prevent chronic hepatitis B in infants born to HBV-positive mothers.

6. HBV Disease Progression

Acute and Chronic HBV

After exposure to HBV, the incubation period usually lasts 30-90 days. The initial



phase of hepatitis B is called acute infection. Clearance of HBV following an acute infection usually takes 2-12 months, during which time a person may experience fatigue and abdominal tenderness.

In a majority of people infected with HBV (especially adults), the immune system can clear the virus. But some HBV-infected adults – estimated at less than 5 to 6% – will become chronically infected, meaning the virus remains in the body after six months. Among people infected with HBV as infants or children, this number is much higher – up to 90% for infants and 30% for children ages 1-5. HBV genetic material (DNA) remains in the nuclei of the cells of everyone infected with the virus, even when HBV infection cannot be detected in the blood. As a result, HBV may reactivate if people's immune systems are damaged or if they receive immunosuppressive drugs such as steroids or chemotherapy. A majority (75%) of people with chronic hepatitis B have no symptoms of liver disease, but this situation can change at any time during the course of infection.

Hepatitis B Symptoms

Most people with HBV experience few or no symptoms; in fact, 65% are unaware that they carry the virus. An estimated 30% of people with acute hepatitis B have no symptoms, and most people with chronic HBV also have few or no symptoms. If they do occur, symptoms of acute hepatitis B may include fatigue (unusual, prolonged tiredness), fever, malaise (a flu-like feeling), nausea,

vomiting, loss of appetite (anorexia), abdominal pain or bloating, indigestion, headaches, itching (pruritus), and muscle or joint aches. Rarely, HBV may be associated with rheumatological problems such as polyarteritis nodosa.

Some people with either acute or late-stage chronic hepatitis B may develop jaundice (yellowing of the skin and whites of the eyes), dark urine, and pale-colored stools, caused by a high level of bilirubin (a pigment) in the body. Some people also develop high levels of certain liver enzymes, especially ALT.

Late-Stage Disease

In a minority of people with hepatitis B, the disease progresses over years or decades, with increasing liver damage. An estimated 20-30% of people with chronic HBV will develop cirrhosis. In severe cases, a person may experience liver failure, liver cancer and require a liver transplant. Liver damage may include:

- *Inflammation* – an immune response to infection or injury characterized by infiltration of white blood cells, swelling, and functional impairment of liver cells. People with liver inflammation may – but do not always – have elevated liver enzyme levels.
- *Necrosis* – the death of liver cells (hepatocytes).
- *Fibrosis* – the development of scar tissue within the liver

which, if extensive, may begin to interfere with the smooth flow of blood through the liver.

- *Cirrhosis* – a process in which liver cells are destroyed and replaced with scar tissue. Extensive scar formation can impair the flow of blood through the liver.
 - ◆ Compensated cirrhosis is when the liver is scarred but can still work relatively normally; people with compensated cirrhosis usually exhibit few symptoms.
 - ◆ Decompensated cirrhosis is when the liver is so damaged that it cannot function properly. People with decompensated cirrhosis may develop complications such as bleeding varices (ruptured blood vessels in the esophagus, stomach, and the gastrointestinal system), abdominal fluid accumulation (ascites), easy bleeding or bruising, mental impairment (hepatic encephalopathy), and coma.
- *Hepatocellular carcinoma (HCC)* – a type of liver cancer that may occur in people with chronic hepatitis. Liver cancer typically occurs in people with cirrhosis, but some individuals with hepatitis B who develop liver cancer do not have cirrhosis. HCC accounts for 70% of deaths related to chronic HBV.



7. HBV Diagnosis and Monitoring

Various tests are used to diagnose hepatitis B and to assess the stage of disease and the extent of liver damage.

Antibody and Antigen Tests

Hepatitis B is diagnosed and staged by looking at a complex combination of HBV antigens and antibodies.

- Tests are available to measure three HBV-associated proteins or antigens: HBsAg (surface), HBcAg (core), and HBeAg (“e” antigen).
- The immune system produces three corresponding antibodies: called anti-HBs (surface), anti-HBc (core), and anti-HBe (“e” antibody).

Antibodies

The presence of anti-HBs antibodies when HBsAg is absent shows that a person does not have active disease.

People who have been exposed to HBV and have successfully cleared the infection test positive for both anti-HBs and anti-HBc.

People who have received the HBV vaccine have anti-HBs but not anti-HBc.

Antigens

The presence of HBeAg often indicates that the virus is actively replicating and that a person is highly infectious and at risk for liver damage. Traditionally, the

loss of HBeAg has been used as an indication that treatment is effective. However, when people have had hepatitis B for many years, they may test negative for HBeAg, but still have an active infection and high viral load. *This is called HBeAg-negative hepatitis B.* These cases result when HBV mutate and are able to replicate without HBeAg.

Hepatitis B Serology*

Hepatitis B surface antigen (HBsAg): A protein on the surface of HBV; it can be detected in serum (blood) during acute or chronic HBV infection. The presence of HBsAg indicates a person is infectious. The body normally produces antibodies to HBsAg (anti-HBs) as part of its immune response to fight the infection. HBsAg is the antigen used to make hepatitis B vaccine.

Hepatitis B surface antibody (anti-HBs or HBsAb): The presence of anti-HBs is generally interpreted as indicating recovery and immunity from HBV infection. Anti-HBs also develops in people who have been successfully vaccinated against hepatitis B.

Total hepatitis B core antibody (anti-HBc or HBcAb): Positivity indicates a recent or current infection with HBV (≤ 6 months).

Hepatitis B “e” antigen (HBeAg): This antigen, which can make up part of the virus’s nucleus, is found in serum during acute and chronic hepatitis B. Its presence can indicate that the virus is

replicating rapidly and that the person has high levels of HBV. However, it is possible to be infected and have a high viral load if this antigen is absent. This can happen in adults who have had hepatitis B infection for many years. This is called HBeAg-negative hepatitis B.

Hepatitis B “e” antibody (HBeAb or anti-HBe): This antibody is produced by the immune system during acute HBV infection or during active viral replication. Spontaneous conversion from HBeAg to anti-HBe (known as seroconversion) can indicate lower viral load in patients undergoing antiviral or interferon treatment.

*adapted from <http://www.cdc.gov/NCIDOD/DISEASES/hepatitis/b/faqb.htm>

Viral Load Tests

Viral load tests measure the amount of HBV DNA (genetic material) circulating in the blood. A detectable viral load indicates that HBV is actively replicating. In people with abnormal liver enzyme levels, higher HBV DNA viral load over a long period of time appears to be associated with more severe liver disease. Viral load tests are also useful as an indication of how well antiviral treatment is working.

Biochemical Liver Tests

Biochemical liver tests are a rough indication of the degree of liver inflammation. A hepatic panel includes measurements of various substances in the blood. Many – but not all – people with acute or chronic hepatitis B develop elevated levels of two liver enzymes called



alanine aminotransferase (ALT, formerly known as SPGT) and aspartate aminotransferase (AST, formerly known as SGOT). ALT and AST are released into the blood when the liver is damaged. Elevated liver enzyme levels are often the first sign of liver problems, and a decrease in ALT often indicates that treatment is working. This is called a biochemical response. However, many people with hepatitis B have persistently normal liver enzyme levels. In addition, some people have normal ALT levels even though they have background cirrhosis.

Another common measurement is bilirubin level. Bilirubin is a pigment that is continuously produced as a byproduct of the natural breakdown of red blood cells. A high bilirubin level causes jaundice. Bilirubin level indicates the degree of liver function, as do serum albumin level and measurement of the time it takes for blood to clot. Because test results can vary from

lab to lab, it is recommended that the same laboratory be used each time so that results can be compared. Keep copies of your lab results for future reference.

Genotype Tests

HBV has several different genotypes or strains, lettered A through H. Different HBV genotypes are associated with varying levels of viral replication, liver disease progression, and treatment success. In the United States, the following genotypes are commonly found: genotype A (38%), genotype B (19%), genotype C (28%), genotype D (12%). HBV genotype testing is becoming more common because some genotypes respond better to certain drugs than others. For example, genotypes A and B may respond better to interferon treatment than genotypes C and D.

Researchers are also finding that viral mutations, and risk of liver damage, may

depend on the type of genotype an individual has, although more studies are needed to confirm this.

Liver Biopsy

Biopsies are done to assess the extent of inflammation and the amount of scarring of the liver. Biopsy is the most reliable indicator of liver damage and is used to help make decisions about treatment. Some doctors do not recommend biopsies for people with chronic hepatitis B unless the decision to treat is unclear. In the most common biopsy procedure, percutaneous biopsy, the abdominal skin and muscle on the right side of the body are numbed and a long, thin needle is quickly inserted into the liver to draw out a small sample of tissue, which is examined under a microscope. Complications from liver biopsies are rare. If you are anxious about the procedure, ask your doctor for a mild tranquilizer prior to the biopsy and for pain medication afterwards.

Treatments Approved by the FDA to Treat Chronic Hepatitis B

<i>Generic Name</i>	<i>Trade Name</i>	<i>Manufacturer</i>	<i>Date Approved for Hepatitis B</i>
Interferon alfa-2b	INTRON® A	Merck/Schering	1991
Lamivudine	EPIVIR-HBV®	GlaxoSmithKline	1998
Adefovir dipivoxil	HEPSERA™	Gilead Sciences	2002
Entecavir	BARACLUDE™	Bristol-Myers Squibb	2005
Peginterferon alfa-2a	PEGASYS®	Genentech/Roche	2005
Telbivudine	TYZEKA™	Idenix/Novartis	2006
Tenofovir	VIREAD™	Gilead Sciences	2008



8. HBV Treatment

There are currently two types of drug treatments for chronic hepatitis B: interferon and antivirals. Hepatitis B treatment is more likely to be beneficial if a person has elevated liver enzymes (ALT), and low viral load. Treatment for people with very low HBV DNA levels and normal ALT levels is not usually recommended because this shows there is little liver damage occurring. Many people chronically infected with HBV may never require treatment, but they should have their HBV DNA (viral load), ALT levels, and overall health monitored regularly at least every six months to once a year. Everyone infected with chronic hepatitis B should also be monitored on a regular basis for liver cancer.

The FDA approved pegylated interferon (peginterferon alfa-2a, Pegasys), a genetically engineered product based on natural immune system proteins. Pegylation is a process by which polyethylene glycol is attached to standard interferon in order to prolong its activity in the body so fewer HBV can escape its effects. This interferon drug that is produced by Genentech requires one weekly injection over 48 weeks. This interferon has replaced conventional interferon (interferon-alpha 2b), which was less effective and required three weekly injections.

In the primary clinical trial of 814 HBeAg-positive patients who were treated with Pegasys for 48 weeks, the following results were achieved.¹

- 25% had loss of serum (HBV DNA or viral load)
- 30% had loss of HBeAg ('e' antigen); increased to 34% 24 weeks after stopping therapy
- 27% had antibodies to HBeAg ('e' antigen); increased to 32% 24 weeks after stopping therapy
- 4% had loss of HBsAg (surface antigen)
- 39% had normalization of ALT (liver enzymes) levels
- 38% had improvement in liver histology (liver health)
- ~80% had durability of response (long term response)

The best predictor of treatment response in people with HBeAg is the pre-treatment ALT level. Pegylated interferon appears to be more successful in HBeAg-positive patients with genotypes A and B, but this information needs to be confirmed in more studies.

Studies also show that people with HBeAg-negative hepatitis B, who also have elevated ALTs and detectable viral load, also benefit from pegylated interferon. Sixty-three percent experienced a lowered viral load with pegylated interferon, 38 percent achieved normal ALT levels; 48% had histologic improvement and about 20% had a long term response.

Because interferon stimulates the body's immune response, interferon can temporarily worsen liver inflammation (a

"flare"). Most experts recommend that people with decompensated cirrhosis should not be treated with interferon.

Pegylated interferon has not yet been approved for children with hepatitis B.

Warning: *In March of 2008, both the European Health Agency (CHMP) and Health Canada issued a warning about combining interferon with Tenofovir (Sebivo, Tyzeka) because of the risk of peripheral neuropathy.*

Antivirals

Due to the high rate of HBV drug resistance in some HBV medications, tenofovir, entecavir and Pegasys are recommended as the first line of treatment.

Tenofovir (Viread), was approved by the FDA in August 2008. It has been used successfully against HIV for years. Viread (tenofovir disoproxil fumarate) is a nucleotide analog reverse transcriptase and HBV polymerase inhibitor that blocks an enzyme that the hepatitis B virus needs to replicate in liver cells. The recommended dose for chronic hepatitis B is one 300-mg tablet a day. The rate of drug resistance after 3 years was 0%.

In the phase II clinical trial of 266 HBeAg-Positive patients who were treated for 48 weeks, the following results were achieved.¹

- 76% had loss of serum (HBV DNA or viral load)
- 21% had antibodies to HBeAg ('e' antigen)



- 3.2% had loss of HBsAg (surface antigen)
- 68% had normalization of ALT (liver enzymes) levels
- 74% had improvement in liver histology (liver health)

In 375 patients (HbeAg-negative) who were treated for 48 weeks, 93% achieved loss of HBV DNA (viral load), 76% had normalization of ALT levels and 72% showed improvement of liver histology.

Entecavir (Baraclude) is another antiviral that works best when patients have never been treated with an antiviral (called treatment naïve).

Entecavir resistance is 1.2% after one year in treatment-naïve patients. However, in patients who have already developed lamivudine resistance, entecavir resistance reaches 57% after six years.

The following HBV medications are not recommended as first line of therapy because of the high rate of HBV drug resistance:

Lamivudine (Epivir-HBV) is an antiviral drug that inhibits HBV replication. The drug is typically taken daily. Unfortunately, lamivudine treatment leads to the development of lamivudine-resistant HBV mutants at a rate of 14 – 32% after one year, and 60 – 70% after 5 years. Once a patient has developed viral resistance to lamivudine, he or she may also develop resistance to similar antivirals such as entecavir. Lamivudine is the only antiviral approved by the FDA for treatment of children.

Adefovir (Hepsera) is a pill taken daily. Adefovir appears to work well against both wild or non-mutated HBV and lamivudine-resistant HBV as long as adefovir is added to ongoing lamivudine treatment. HBV

drug resistance after 5 years is 29%. The drug is associated with kidney toxicity in some people.

Telbivudine (Tyzeka) is a pill taken daily. HBV drug resistance of telbivudine is 25% in people with HBeAg positive after two years of treatment and 11% in people with HBeAg negative after two years of use.

Warning: In 2007, Canada's drug safety commission issued a warning against taking the antiviral telbivudine (brand name Tyzeka in the U.S. and Sebivo in Canada) with interferon. Ten percent of patients treated with the drug combination developed peripheral neuropathy – weakness, numbness, tingling and burning sensations in the arms and/or legs – about three months after treatment began.

Drug/Brand name	Resistance
Interferon	• None
Lamivudine (Epivir-HBV)	• 14 - 32% at Year 1; • 60 - 70% at year 5
Adefovir (Hepsera)	• 0% at year 1; • 29% at year 5
Entecavir (Baraclude)	• 1.2% in treatment naïve at year 6; • 57% in lamivudine resistant at year 6
Peginterferon alfa-2a (Pegasys)	• None
Telbivudine (Tyzeka)	• 25% in HBeAg positive at year 2; • 11% in HBeAg negative at year 2
Tenofovir (Viread)	• 0% at year 4



Alternative Therapies

In addition to pharmaceutical drugs, some people use alternative and complementary therapies for hepatitis B. Herbs often used for chronic hepatitis include milk thistle (silymarin), licorice root (glycyrrhizin), and phyllanthus. Herbal remedies should be treated like drugs, since they may have side effects and can interact with other herbs and conventional medications. Many herbs can be toxic to the liver, including chaparral, germander, kava kava, and plants that contain pyrrolizidine alkaloids. (Herbal therapies are discussed in more detail in a separate fact sheet from the Hepatitis C Support Project: See the section Hepatitis C and Complementary and Alternative Medicine (CAM) at www.hc-advocate.org/hepatitis/factsheets.asp.) Nutritional supplements suggested for hepatitis B include vitamin C, vitamin E, glutathione, N-acetyl-cysteine, S-adenosylmethionine (SAM-e), and thymic factors. Make sure to contact a reputable herbalist or nutritionist and inform all your health-care providers about any herbs, supplements, or other alternative therapies you are using.

Clinical Trials

The process of testing a new drug involves establishing its safety and toxicity in humans (Phase I trials), measuring its safety and tolerability (Phase II trials), and comparing the new drug to current standard treatments or placebo (Phase III trials). After the FDA has granted approval and the new drug is marketed, ongoing studies are done to refine the

treatment for maximum safety and effectiveness (Phase IV, or post-marketing trials). Clinical trials can be a good way to obtain free medication; some trials also may cover the costs of laboratory tests (although they may not provide the results to you or your doctor). Be aware that clinical trial participants typically are randomized to receive either the experimental drug or a standard treatment or placebo (an inactive substance used as a control); you may not be chosen to receive the new drug or the most effective dosage. Read all the clinical trial information and make sure that you fully understand the terms and conditions before you give your informed consent to participate.

Medications that are in clinical development include:

- **Nucleoside analogues:** emtricitabine, clevudine, amdoxovir, and pradefovir
- **Non-nucleoside:** Nov-205, Hep-eX-B, nitazoxanide, UT 231-B and Bay 41-4109

Visit www.clinicaltrials.gov to find a clinical trial in your area

9. Managing Drug Side Effects

Interferon Side Effects

Interferon and pegylated interferon, on the other hand, have many well-documented side effects that include flu-like symptoms, fatigue, nausea, diarrhea, headache, muscle and joint aches, depression, and anxiety; less common side

effects include hair loss and thyroid dysfunction.

Antiviral Side Effects

Antiviral drugs used to treat HBV have few side effects. Some of the drugs used to treat chronic hepatitis B are excreted through the kidneys so a person on HBV medications should have their kidney function checked on a regular basis.

Side effects of antivirals are uncommon, but may include nausea, diarrhea, and headache; rarer side effects include low blood cell counts, peripheral neuropathy (nerve damage in the hands and feet), and pancreatitis (inflammation of the pancreas).

Some physical symptoms may be reduced with low-dose ibuprofen (do not take if you have cirrhosis) or acetaminophen (high doses can be toxic to the liver). People experiencing psychological symptoms such as depression, anxiety, or irritability may find antidepressants helpful. Some people find that injecting interferon just before bedtime lets them sleep through the worst side effects. Vary where you inject your interferon to prevent skin irritation or a rash at the injection site. To manage gastrointestinal symptoms, eat small, frequent healthy meals or snacks rather than three large meals each day, and avoid spicy or fatty foods.

Many people find that side effects are worse when they first start taking a new drug but diminish somewhat over time.



Talk to your health-care provider about other ways to manage treatment side effects, and inform him or her if your symptoms get worse.

10. HBV Management

Chronic hepatitis B can be a difficult disease to manage. However, there are steps you can take to cope with the disease and keep your liver as healthy as possible.

Medical management of chronic hepatitis B is a complicated process that requires many tests at certain time points. The tests include various antigen and antibody tests to check for HBV status, an alpha-feta protein test to check for liver cancer, an HBV DNA test to check for viral load, and ultrasound to check for liver cancer, a complete blood chemistry and other important tests.

To find out more about the recommended blood work and tests to manage chronic hepatitis B see the HBV Advocate's fact sheet *HBV: How Frequently to Monitor Chronic Hepatitis B*.

It is important to find a doctor who is knowledgeable about hepatitis B; hepatologists and gastroenterologists specialize in liver disease. If you are not comfortable with your doctor, ask family or friends to recommend someone they like.

11. Healthy Liver Tips

- Get regular health check-ups, including biochemical liver tests.

- Avoid or limit consumption of alcohol and recreational drugs.
- Take no more than the recommended doses of medications.
- Be careful when using multiple drugs, herbs, or drugs and herbs together.
- Eat a healthy, well-balanced diet based on www.mypyramid.gov
- Get regular, moderate exercise.
- Inform all your health-care providers about all drugs, herbs, supplements, and alternative therapies you are using.
- Inform all your doctors and other health-care providers about your hepatitis B, especially if you need cancer treatment or steroid therapy.

Nutrition

Because the liver processes everything you eat and drink, a healthy, well-balanced diet is important. A healthy diet should follow the general guidelines based on the Food Guide Pyramid – www.mypyramid.gov. Such a diet is low in sugar, fat and sodium, high in complex carbohydrates, and has adequate protein. Processed foods often contain chemical additives, so reduce consumption of canned, frozen, and other preserved foods. Eat organic fruits and vegetables to avoid pesticides and fertilizers. Read labels and become familiar with ingredients. Many doctors recommend that people with hepatitis avoid raw or undercooked shellfish such as oysters and

clams, because they may contain infectious organisms or toxins. A well-balanced diet should contain all essential vitamins and minerals; avoid taking high-dose supplements – especially those containing vitamin A, vitamin D, or iron, which can be harmful to the liver. Consult a licensed dietitian for specific dietary recommendations and seek medical advice before undertaking any unconventional diet.

Alcohol, Drugs, and Toxins

People with hepatitis B – especially those with fibrosis and cirrhosis – should avoid consuming alcohol.

Certain drugs – prescription, over-the-counter, recreational and herbal remedies can be harmful to the liver (hepatotoxic), especially when taken in high doses or used in combination. People with HBV should inform their health-care providers about all drugs, herbal remedies, and supplements they are taking. Avoid or reduce consumption of recreational drugs. Do not exceed recommended drug doses.

Because the liver processes toxins, avoid exposure to toxic liquids and fumes such as solvents, paint thinners, pesticides, and aerosol sprays. If it is necessary to use such chemicals, work in a well-ventilated area, cover your skin, and wear gloves and a protective face mask.



General Wellness

Exercise – Regular aerobic exercise can improve overall fitness and may help reduce fatigue, stress, and depression. Most people with chronic hepatitis B can safely engage in moderate exercise. Avoid exercise if you are feeling very ill. People with advanced cirrhosis should be cautious about lifting weights. All people with chronic hepatitis B should consult their health-care provider before starting an exercise program.

Stress management – Controlling stress is a major factor in managing any chronic disease. Exercise, meditation, and time management can all help reduce stress. Try to maintain a realistic picture of your health and a positive attitude. There is evidence that stress can actually harm the liver so learn methods to reduce any stress.

Managing fatigue – Fatigue and low energy levels are reported by some people with HBV. Learn your limits and try not to overextend yourself. Alternate strenuous activities with more restful ones. Take naps as needed and get enough sleep at night. Remember that your health is important; learn to say “no” to friends and family who have unrealistic expectations of your energy level.

Time management – Plan activities in advance and try to make realistic work and play schedules. Many people find it helpful to use a daily planner to

help schedule and remember activities. Don't forget to plan restful activities.

Meditation – Many people find meditation (a method of relaxation and clearing and focusing the mind) to be a useful tool in coping with chronic hepatitis B. Meditation can reduce stress and help you maintain a healthy outlook on life. There are many meditation traditions, some of which are simple and easy to learn.

Support Groups and Therapy

Many people with hepatitis B feel isolated and find it difficult to cope with the effects of living with a chronic illness. A support group can offer a safe space to discuss the emotional issues surrounding chronic hepatitis. In addition, information shared by peers can be helpful in making decisions, managing symptoms, and developing coping strategies. Unfortunately, there are few HBV support groups. Many people find help by joining the Hepatitis Information Support List which operates a list-serve. Some people also find therapy with a psychologist or social worker to be beneficial.

The Internet

The Internet contains a wealth of information – both good and bad. Always check the sources of the information you find online. Look for dates and references. Be skeptical of web sites that use the word “cure.” Remember that not all the information you find on the Internet is correct. Talk to your doc-

tor about any information you are concerned about. Common sense can go a long way! Visit the Hepatitis C Support Project web site at www.hbvadvocate.org and see the resource list for other recommended sites.

12. Conclusion

While hepatitis B can have serious consequences, most people infected with HBV do not develop chronic disease and those who do can lead normal lives. A minority of people chronically infected with HBV develop progressive disease that can lead to serious liver damage, including cirrhosis, liver cancer, and liver failure. New drugs for HBV are being developed. Universal HBV vaccination presents the best hope for controlling the spread of hepatitis B. Beyond medical treatment, if you have HBV there are several steps you can take – including getting regular medical care, avoiding alcohol and drugs, eating a healthy diet, engaging in moderate exercise, managing stress and fatigue, and joining a support group – to keep your liver as healthy as possible and to improve your overall quality of life.

¹ AASLD Practice Guidelines, Chronic Hepatitis B: Update 2009





13. Hepatitis Resources

Listserve

- Hepatitis Information Support List: www.hblist.org/

Web sites

- CDC Hepatitis Branch home page: www.cdc.gov/nci-dod/diseases/hepatitis
- Hepatitis B Foundation: 215-489-4900; www.hepb.org
- American Liver Foundation www.liverfoundation.org
- Hepatitis Central: www.hepatitiscentral.com
- Hepatitis Foundation International: 800-891-0707; www.hepfi.org
- Hepatitis Information Network: www.hepnet.com
- HIV and Hepatitis: www.hivandhepatitis.com

Books

- *Living with Hepatitis B: A Survivor's Guide*. By Gregory T. Everson, MD and Hedy Weinberg. Hatherleigh Press (800-528-2550).
- *The First Year—Hepatitis B: An Essential Guide for the Newly Diagnosed*. By William Finley Green. Marlowe & Company.

Be Sure to Check Out All of These Other HBV Publications

www.hbvadvocate.org/hepatitis/factsheets.asp

- *What is Hepatitis B*
- *Hepatitis B: What You Need to Know*
- *A Guide to Hepatitis and Disability*
- *Hepatitis A: What You Need to Know*

Easy B's

- *100 Infants*
- *100 People*
- *Acute Hepatitis B*
- *Biopsy*
- *Core Antigen*
- *HBeAg-Negative Hepatitis B*
- *Hepatitis B and Alcohol*
- *Hepatitis B Treatment*
- *Sex and Hepatitis B*
- *Tattoos*
- *The Liver*
- *What Are Antivirals?*
- *What Do Antigens & Antibodies Mean?*
- *What Is AFP?*
- *What Is Alt?*
- *What Is the "e" antigen (HBeAG)?*
- *What Is Pegylated Interferon?*

FAQ's

- *Frequently Asked Questions about Hepatitis B*

Foreign Language HBV Publications

- Chinese
- Hmong
- Korean
- Russian
- Somali
- Spanish
- Vietnamese

The information in this fact sheet is designed to help you understand and manage HBV and is not intended as medical advice. All persons with HBV should consult a medical practitioner for diagnosis and treatment of HBV.

Executive Director,
Editor-in-Chief, HCSP Publications
Alan Franciscus

Managing Editor / Webmaster
C.D. Mazoff, PhD



For more information about hepatitis B, visit the following websites.
Hepatitis B Foundation: www.hepb.org • HIVandHepatitis.com