

# Hepatitis B

## What is hepatitis B?

Hepatitis B is a virus that can infect the liver. The virus can cause an acute infection, which may develop into a chronic infection over time.

The age at which someone is exposed to the virus plays a major role in determining whether the infection will resolve or become chronic.

- Most adults (95%) clear the virus on their own within six months of exposure.
- Infants and children have a significantly higher likelihood of developing a chronic infection, especially those born to a pregnant person who has hepatitis B. Without medical intervention, newborns exposed to the virus during pregnancy have a 90 percent chance of developing a chronic infection. Children exposed to the virus between the ages of one and five years have a 30 percent chance of developing a chronic infection. *Please see the section on hepatitis B in infants and pre-adolescent children for further details.*

## Acute hepatitis B infection

An acute infection begins immediately after exposure to the hepatitis B virus. In adults, this phase can last for two to six weeks. During the acute infection, the virus is highly active and can be passed to others. During this phase, there are few or no symptoms in most children (over 90 percent) and in many adults (50–70 percent). Symptoms, when they do appear, may include fatigue, loss of appetite, jaundice, (yellowing of the whites of the eyes and skin), nausea, vomiting, rash, dark urine, joint discomfort or pain, and abdominal discomfort or pain. About one percent of people in the acute phase can experience liver failure. When this occurs, symptoms of advanced liver disease, like bleeding or bruising more easily, brain fog or confusion, and jaundice, can be seen.

Most adults clear the virus on their own within six months and become immune to it. Blood tests can be done six months after diagnosis to determine whether a person is immune. Immune adults will have a not-detectable result on a hepatitis B surface antigen (HBsAg) test, a detectable result on an anti-hepatitis B surface antibody (anti-HBsAb) test and a detectable result on an anti-hepatitis B core antibody (anti-HBcAb) test. If there is no hepatitis B virus present in the blood and the antibodies have formed, it means the person has cleared the infection and they cannot pass it on to someone else. However, the virus' genetic materials still reside in their liver and can be reactivated in the future especially if the person takes medicines that profoundly suppress their immune system.

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**Published  
2022**

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## Chronic hepatitis B infection

If an acute hepatitis B infection does not clear in six months, it is considered to be chronic. Chronic hepatitis B has several phases.

**Immune tolerance:** This early phase of chronic hepatitis B is characterized by high viral replication and weak immune response, which results in high viral load.

**Immune clearance:** This phase begins when the immune system recognizes the presence of the virus in the body and attacks the infected liver cells. The immune reaction results in active liver inflammation, which can injure the liver.

In the immune clearance phase, clinical symptoms like jaundice can be seen. The symptoms often appear after the liver has already been injured. The symptoms of chronic hepatitis B can be mild to severe, depending on the extent of the liver injury. This phase can last from months to years and may end with the immune system controlling the virus.

**Immune control:** In this phase the immune system becomes stronger and starts to control the virus. This is characterized by a negative hepatitis B e-Antigen (HBeAg) test result. People who are in the inactive or immune control phase can still pass the virus to others. Anyone who has the hepatitis B virus (HBsAg positive) needs lifelong monitoring.

### Hepatitis B in infants and pre-adolescent children

Infants and children have a significantly higher likelihood of developing a chronic infection, especially those born to a pregnant parent who has hepatitis B. It is important to understand how hepatitis B transmission happens in them and how it can be prevented.

#### Transmission

When hepatitis B is passed from a pregnant parent to their child, it is known as perinatal transmission. Globally, perinatal transmission is the most common route for hepatitis B infection that results in a chronic infection. This type of transmission sometimes occurs in Canada. The reasons why this can happen are discussed in the section on the prevention of perinatal transmission below.

The risk of hepatitis B transmission through breastfeeding (chestfeeding) is negligible, especially in children who are vaccinated at birth. However, if a breastfeeding (chestfeeding) person with hepatitis B has cracked or bleeding nipples then breastfeeding should be temporarily stopped until they are healed.

Another route of transmission is known as horizontal transmission, which can occur in unvaccinated pre-adolescent children who have close contact with someone with hepatitis B. This close contact may take place in daycare, preschool and home settings.

#### Prevention during pregnancy

It is recommended that pregnant people in Canada be screened for hepatitis B so that they can be offered the care they need if their test result is positive. Hepatitis B infection in pregnancy needs to be carefully managed to

ensure the safety of the pregnant person and the fetus. Most of the commonly available hepatitis B antiviral treatments are considered safe for use in pregnancy. If a pregnant person has a high viral load, hepatitis B treatment in the third trimester can reduce the risk of transmission to the baby. The treatment can continue up to three months after delivery to stop the flaring up of hepatitis B, which occurs in 30 percent of people after delivery.

#### Prevention of perinatal transmission

In Canada, infants born to a pregnant parent who has hepatitis B are given one dose of hepatitis B antibodies (hepatitis B immunoglobulin) at birth and receive their first dose of hepatitis B vaccine within 12 hours of birth. Despite this, perinatal transmission occurs in a small percentage of babies. This can happen for several reasons: there may be a delay in administering the hepatitis B antibodies and the first dose of vaccine, hepatitis B transmission may occur while the baby is still in the parent's uterus, or the baby may not receive the rest of their hepatitis B vaccine course in the first months of life.

Experts also recommend that babies born into households where someone with hepatitis B lives, such as a parent or grandparent, should be vaccinated for hepatitis B at birth.

#### Routine infant vaccinations

The Canadian Immunization Guide recommends that children receive three doses of hepatitis B vaccine as part of their routine infant vaccinations. Children in Canada receive the vaccinations at different ages depending on where they live.

A very small number of people with chronic hepatitis B infection can completely clear the virus: if a person has a negative result on a HBsAg test, they are considered to have a functional cure from hepatitis B.

**Immune escape:** As mentioned above, the hepatitis B virus can start replicating again in some people after periods of inactivity. Reactivation can occur on its own, but it is often caused by treatments involving immunosuppression such as treatments for cancer and autoimmune disease, or organ transplant. In people who have achieved immune control, virus reactivation is detected by a rise in the amount of hepatitis B virus DNA in their blood compared with baseline and an increase in liver enzyme test results. Most reactivation cases resolve spontaneously, but if the reactivation continues and becomes chronic hepatitis B again, there is a higher risk of severe liver disease like cirrhosis and hepatocellular carcinoma.

## How is hepatitis B transmitted?

Hepatitis B is passed when virus in the blood, semen, vaginal or other bodily fluids of a person who has transmissible hepatitis B (HBsAg+) enters the body of another person. Hepatitis B is not transmissible if the person with the infection has had a positive result on an anti-HBsAb test. In Canada, most hepatitis B transmission occurs through sexual contact or in the context of sharing drug use equipment.

*Sexual transmission of hepatitis B* can occur during oral, anal or vaginal sex if virus in the blood or bodily fluids comes into contact with a person's mucous membranes or torn or cut skin. It is possible to transmit hepatitis B through touch or fingering if a person's mucous membranes or torn or cut skin is exposed to blood or bodily fluids that contains the virus on a partner's hands. Hepatitis B can also be transmitted via objects that carry the virus because hepatitis B can survive outside the body for up to seven days. This means sharing sex toys can transmit hepatitis B.

*Transmission in the context of drug use* can occur when people share equipment for injecting or snorting drugs, such as needles, straws and pipes, that has come in contact with blood or bodily

fluids that contain the hepatitis B virus. Hepatitis B can also be passed when tattooing and piercing equipment is reused or has not been sterilized.

*In the context of households,* hepatitis B can be passed through sharing personal care items, such as toothbrushes, nail clippers and razors, that may have blood containing the virus on them.

Hepatitis B can be spread through the use of unsterilized medical, dental and surgical equipment. The likelihood of this happening in Canada is very low. Occupational exposure is also possible if universal precautions to prevent transmission are not used or as a result of needle-stick injury.

## How can hepatitis B transmission be prevented?

### Vaccination

Effective hepatitis B vaccinations are available in Canada and globally to prevent the transmission of hepatitis B. Anyone who is at risk of hepatitis B should be screened; if they don't have hepatitis B and are not immune to hepatitis B because of a past infection, they should be offered a hepatitis B vaccine. Most Canadian provinces and territories started implementing universal hepatitis B vaccination for adolescents in the early to mid 1990s. Since the implementation of these programs, the reported incidence of acute hepatitis B infections has decreased in the vaccinated age cohorts.

### Other ways to prevent transmission

*Sexual transmission of hepatitis B* can be reduced with correct and consistent use of condoms. Using condoms on sex toys and during oral sex so that bodily fluids are not exchanged can reduce the risk of hepatitis B transmission. Anyone with a sexual partner who has hepatitis B should be vaccinated because people can pass the virus to others if they are HBsAg positive even when they are in the immune control phase (inactive phase). Sexually active people who are not in long-term mutually monogamous relationships should also consider getting vaccinated to prevent transmission.

*Hepatitis B transmission in the context of drug use* can be reduced by using new drug use equipment every time for preparing, injecting or snorting drugs. The equipment used to prepare, inject or snort drugs, such as needles, syringes, spoons, drug solutions or water, filters, cookers, pipes and straws used for snorting drugs, can have small amounts of blood on it that can pass hepatitis B. Even sharing equipment once can pass the virus: that's why when a person uses drugs everything should be new every time.

*Non-sexual transmission of hepatitis B* can be reduced by limiting contact with objects (needles, toothbrushes, dental floss, razors, bandages, glucometers, nail clippers) that may have come into contact with blood and other bodily fluids that contain the hepatitis B virus. These objects should be disposed of safely to avoid accidental contact that can cause hepatitis B exposure.

### **Emergency treatment (post-exposure prophylaxis)**

A person who is not vaccinated and is exposed to blood or bodily fluids that contain the hepatitis B virus should be given a shot of hepatitis B immunoglobulin (which contains antibodies) and hepatitis B vaccine within 48 hours of exposure. This can protect them from contracting hepatitis B.

### **Who can get hepatitis B?**

Certain factors may put individuals at an increased risk of hepatitis B infection. Sexual factors (such as having sexual contact with a person who has hepatitis B or having a new sexual partner or more than two sexual partners in the past year), a family history of hepatitis B and household contact with someone with hepatitis B, or being the recipient of a blood transfusion or medical procedure in Canada before 1970 are associated with an increased risk of hepatitis B infection.

Regional factors may also be associated with an increased risk of hepatitis B infection, such as birth in a region with a high prevalence of hepatitis B (such as sub-Saharan Africa, East Asia, parts of

Central and South America), travel to or residence in a high-prevalence region and exposure to blood or blood products in a high-prevalence region.

### **Who should be screened and vaccinated for hepatitis B?**

The Canadian Immunization Guide recommends that the following groups that are disproportionately affected by hepatitis B in Canada should be prioritized for screening if they do not have hepatitis B and are not immune:

- people from regions that have a high prevalence of hepatitis B such as sub-Saharan Africa, East and South Asia, eastern and southern Europe, the Pacific Islands and parts of Central and South America
- people who travel to the above regions frequently
- Indigenous people
- people who share or have shared needles and other drug use equipment
- people who have had condomless sex with someone who has hepatitis B or have had multiple sex partners in the past six months
- men who have sex with men
- anyone who has had household contact with someone with hepatitis B
- front-line healthcare workers who are at risk of occupational exposure to hepatitis B because they handle blood and blood products or are at risk of needle-stick injuries
- patients on hemodialysis, because of the risk that they may come into contact with hepatitis B via contaminated medical equipment

### **Populations at higher risk of hepatitis B in Canada**

Populations in Canada that are disproportionately affected by hepatitis B include Indigenous people, people who inject drugs, men who have sex with men (MSM), people who are street involved or homeless, and those who have been incarcerated.

### Contact tracing and partner notification

Hepatitis B is a reportable infection in Canada and must be reported to local health officials when diagnosed. When a person has a newly identified hepatitis B infection, a public health nurse or other healthcare provider may work with them to identify any of their contacts who may have been exposed to hepatitis B, including sexual partners.

Public health workers in all provinces and territories carry out the function of contact tracing for infectious disease; however, this can look different depending on the province or territory. The Public Health Agency of Canada (PHAC) recommends that all contacts of the diagnosed person should be screened to assess their status and to provide vaccine protection to those who are not immune.

Depending on local practices and capacity, the individual may be asked to inform their contacts themselves, or a public health nurse or other healthcare provider may attempt to notify contacts and encourage them to test for hepatitis B.

This is meant to encourage a person who may have been exposed to hepatitis B to get screened, in the hopes of identifying new hepatitis B infections as early as possible.

### What is the treatment for hepatitis B?

#### Acute hepatitis B does not typically require treatment

Acute infection typically resolves on its own within six months. If symptoms are severe, a healthcare provider can consider treatment to relieve the symptoms or interrupt viral replication, but there is no specific treatment for acute hepatitis B infection.

#### Treatment for chronic hepatitis B

Not everyone with chronic hepatitis B needs treatment. Treatment is required when the immune system is unable to control the virus or there is ongoing liver damage. The goal of current hepatitis B therapies is to control the replication of the virus to prevent and even reverse liver injury.

These treatments do not offer a complete cure or completely eliminate the risk of liver cancer.

In a very small number of people, treatment can result in clearing the hepatitis B virus (as determined by a negative result on the HBsAg test), which is considered a functional cure for hepatitis B.

Currently, two types of hepatitis B treatments are available: interferon-based treatments that are taken weekly by injection, and antiviral pills (nucleos(t)ide analogues) that are taken daily. A healthcare provider will recommend the treatment that is best for a person on the basis of several factors such as their medical history, clinical evaluations and access to medications.

### What do you need to know about HIV–hepatitis B coinfection?

HIV and hepatitis B share common transmission routes, including condomless sexual contact and sharing drug use equipment. Many adults at risk for hepatitis B infection are also at risk for HIV infection, and those with HIV are at increased risk for developing chronic hepatitis B if they have not been vaccinated. HIV weakens the immune system and some people with HIV who were vaccinated against hepatitis B virus in the past can lose their immunity to hepatitis B. People who have HIV or who are at risk for HIV should be tested and vaccinated for hepatitis B.

Hepatitis B progresses faster and causes more liver-related health problems, such as cirrhosis, liver cancer and liver failure, among people with HIV compared with people without HIV. Additionally, some individuals with HIV–hepatitis B coinfection have a higher risk of developing hepatotoxicity (severe liver injury) when they start HIV antiretroviral therapy than people with HIV who don't have hepatitis B. However, infection with hepatitis B does not speed up the progression of HIV or affect the response of HIV to antiretroviral therapy.

The presence of hepatitis B is an important factor in choosing medications to treat HIV. The medications used to treat hepatitis are also active against HIV. When a person is diagnosed with chronic hepatitis B, they should also be tested for HIV before they start hepatitis B treatment. Putting

someone with untreated HIV on hepatitis B therapy can create drug resistance to HIV. If someone with HIV is taking a drug combination that includes drugs that are also active against hepatitis B, they may experience a temporary worsening or reactivation of their hepatitis B infection if they change or stop their HIV treatment.

People at high risk for HIV infection may be taking medication to prevent HIV transmission, called pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP). Some of these drugs are also active against hepatitis B. It is important to monitor for hepatitis B virus in people at risk for HIV. Discontinuation of PrEP or PEP may cause a reactivation of hepatitis B infection.

### What do you need to know about hepatitis B and C coinfection?

Hepatitis B and hepatitis C share some common transmission routes, including through blood-to-blood contact, and so hepatitis B and hepatitis C coinfection is possible. Anyone who is diagnosed with hepatitis C should also be screened for hepatitis B and vice versa.

Both hepatitis B and C affect the liver. When people have two active infections of the liver, one virus dominates the other. In most cases, the hepatitis C virus is the dominant virus and the hepatitis B virus is suppressed.

There are highly effective and widely accessible treatments available to cure hepatitis C called direct-acting antivirals. Anyone with hepatitis C should discuss treatment options with their healthcare provider, including people with a hepatitis B and C coinfection. Owing to the relationship between the two viruses in the liver, when a person is cured of hepatitis C, hepatitis B virus can flare up. When people are treated for hepatitis C with direct-acting antivirals, hepatitis B treatment may be considered to stop the reactivation of hepatitis B.

### How can people with chronic hepatitis B infection live well?

Chronic hepatitis B is a lifelong condition that a person can manage by following the advice of

their healthcare provider and taking care of their overall health and liver health. Anyone who is diagnosed with a chronic hepatitis B infection should be vaccinated for hepatitis A and screened for hepatitis C to protect their liver from other types of hepatitis.

**A healthy and balanced** diet is an important way for people with hepatitis B to maintain their health. Good nutrition helps people with their overall health, especially because liver disease affects digestion and the metabolism, absorption and storage of nutrients. Eating well gives people the energy and nutrients they need to feel well, helps their immune system to function well and helps their liver to regenerate or maintain itself. Eating well means choosing a variety of foods each day, including protein and plenty of fruits and vegetables, and limiting foods high in fat and sugar. It may not be possible for some people with hepatitis B to eat healthy all the time. They might need help to develop a plan to access healthy food and meals on a regular basis.

**Being active** is part of staying healthy. Light to moderate exercise can boost energy, reduce stress and prevent weight gain. Exercise does not have to be strenuous or complicated; people can build gradually to exercising for 15–30 minutes, three times per week. Finding physical activities that people enjoy and that are simple to do will make exercising easier.

**Alcohol** can increase injury to the liver and the likelihood of developing liver cancer. People with advanced liver injury (cirrhosis) may want to stop or reduce their alcohol use.

**Prescription or non-prescription drugs or herbal supplements** should only be taken in consultation with a healthcare provider if someone has hepatitis B, as some medications and supplements can have toxic effects on the liver.

### Acknowledgement

We thank Hemant Shah, MD, MScCH HTPE, for expert review.

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## Disclaimer

Decisions about particular medical treatments should always be made in consultation with a qualified medical practitioner knowledgeable about HIV- and hepatitis C-related illness and the treatments in question.

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Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada. The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.

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