Hepatitis B
Your Patient Guide
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Dear reader,

Your doctor has diagnosed you with hepatitis B, meaning an infection of the liver. You probably have many thoughts and questions going through your head right now. With this brochure, we would like to ease your fears and worries. Although the diagnosis of hepatitis B can be scary at first, you can still lead an almost normal life.

In this brochure, we will answer questions such as what you should consider, what a possible therapy might look like, how you can protect your relatives and friends from infection, and many more. We would also like to provide you with tips on how to care for your liver. We would like to provide you with information, so you can discuss your disease and its treatment with your doctor feeling well-informed.
What is hepatitis B?

Hepatitis B is an inflammation of the liver. It is caused by the hepatitis B virus, which is transmitted from person to person.
Hepatitis B is highly contagious. Even small amounts of the virus can cause the disease. The viruses enter the body through small injuries of the skin or mucous membranes. Chronically infected individuals are a common source of infection.

Blood products are tested for hepatitis B viruses in Germany, and so transmission through blood transfusions is impossible. You also do not need to fear getting infected through hugging or using the same toilet or tableware.

The hepatitis B virus is transmitted
- through sexual contact, including vaginal, oral, and anal
- by sharing needles when using drugs or exchanging tubes when snorting drugs
- by the use of unsterile instruments during tattooing and piercing
- from mother to child in pregnancy, during birth, and when breastfeeding
The following people are particularly vulnerable to becoming infected with the hepatitis B virus:

- people with frequently changing sexual partners
- consumers of intravenously (IV) administered drugs such as heroin
- people who are employed in a hospital or other medical facilities
- people from countries in which the virus is widespread
- inmates of correctional facilities
- dialysis patients
- HIV-infected individuals

If you belong to one of these risk groups, please talk to your doctor about this.

In terms of its general population, Germany is a low-prevalence country for hepatitis B with a prevalence of 0.3%. However, since 2015, a marked increase of new cases has been observed in Germany. These numbers are considerably higher worldwide. According to data from WHO, approximately two billion people have had a hepatitis B virus infection. 3.5% of the world’s population are chronically infected with hepatitis B; that corresponds to approximately 257 million people.

To prevent infection with the hepatitis B virus (HBV), an effective, well-tolerated vaccine is available. Since 1995, a general vaccination recommendation by the Ständige Impfkommission [Standing Committee on Vaccination] (STIKO) has been in place for infants and for groups of people with an increased risk of infection.
What are the symptoms of acute hepatitis B?

The time between the initial infection with the hepatitis B virus and the occurrence of the first symptoms can be 45 to 180 days. Acute hepatitis B begins with general symptoms such as loss of appetite, feeling sick, nausea, vomiting, upper abdominal discomfort, joint pain, and fever. These symptoms are often mistaken for the flu by the affected person. Jaundice (medical term: icterus) may also develop three to ten days later. In this case, the skin turns yellow, urine is dark, and faeces are pale. In addition, unpleasant itching may develop. Within two to four weeks, these symptoms recede again. In one-third of patients, the infection progresses without any symptoms and is only detectable in the blood.

What is the progression of hepatitis B?

Whether acute hepatitis B clears or runs a chronic course depends on the person’s age and the condition of their immune system. In over 90 percent of adults, acute hepatitis B clears completely without the help of a doctor. Although the virus is still present in liver cells, it is well controlled by the immune system and does not multiply any further.

In a few patients, however, acute hepatitis B will develop into a chronic infection. In this case, parts of the virus are still detectable in the blood even six months after the initial infection. Many affected people are unaware of this chronic disease since it does not cause any major symptoms. However, if chronic hepatitis B is not treated, the liver tissue is slowly destroyed and replaced by functionless scar tissue. Liver cirrhosis with severe limitation of liver function develops. This, in turn, promotes the development of liver cancer.
How is hepatitis B detected?

A doctor diagnoses hepatitis B by means of a blood test. Various blood parameters, known as liver values, are elevated in hepatitis B.

These include
- the transaminases aspartate aminotransferase (AST) and alanine aminotransferase (ALT)
- gamma-glutamyl transferase (GGT)
- alkaline phosphatase (ALP)
- bilirubin

Furthermore, when there is an infection, components of the hepatitis B virus can be detected in the blood along with antibodies that are produced by the body to fight the virus. These parameters are referred to by the doctor as hepatitis serology. Depending on which parameters are elevated, the doctor can differentiate between an acute or a chronic hepatitis B infection. The genetic material (DNA) of the pathogen is also often determined.

If you have chronic hepatitis B, your doctor will monitor your liver values on a regular basis. The extent of the liver damage can be assessed with the aid of an ultrasound exam. An elastography of the liver is more precise. It measures the elasticity of the liver tissue in order to assess the presence and the severity of liver damage. This exam is comparable to an ultrasound exam. Furthermore, a liver biopsy for the microscopic (histological) assessment of the liver tissue may be useful. Your doctor can then assess the extent and the prognosis of chronic hepatitis B.
What complications can occur with chronic hepatitis B?

If chronic hepatitis B is not adequately treated or is not detected, severe complications may arise. These include liver cirrhosis and liver cancer.

**Liver cirrhosis**

In the case of liver cirrhosis, healthy liver tissue is replaced over the course of several years by functionless connective tissue cells. In its initial stages, doctors refer to this as liver fibrosis. At this point, liver damage may regress at least partially. In its advanced stage, liver fibrosis turns into liver cirrhosis. Patients then feel tired and exhausted; they lose weight and are not as able-bodied any more. Since the liver then has very limited function, additional and sometimes severe symptoms develop.

**Liver cancer (hepatocellular carcinoma)**

As a long-term consequence of liver cirrhosis due to chronic hepatitis B, malignant liver cancer (hepatocellular carcinoma, HCC) may develop. Therapy depends on how far advanced the cancer already is and how well the liver still functions. Under certain conditions, a liver transplant may be considered.

Patients with liver cirrhosis should have an ultrasound examination every six months in order to detect liver cancer as early as possible.
How is acute hepatitis B treated?

There is no specific medicinal therapy for an acute hepatitis B infection. You should avoid drinking alcohol, eat a balanced and low-fat diet, and not exert yourself physically. Your doctor will discontinue the use of all medicines that may damage your liver. 90 percent of acute infections clear without medicinal therapy.

How is chronic hepatitis B treated?

If you have developed chronic hepatitis B, your doctor will discuss the further course of action with you. The goal of the therapy is to suppress virus multiplication over the long term. There is an indication for medicinal treatment in all patients with chronic hepatitis B if an inflammatory activity (fibrosis) with elevated liver values (ALT) and detectable viral load (HBV DNA >2,000 IU*/ml) is present, if there is a risk of liver cirrhosis, or if liver cirrhosis has already developed. In patients with a very high viral load (HBV DNA >20,000 IU/ml) and elevated ALT levels, therapy is indicated regardless of the stage of fibrosis. This may prevent the progression of the disease and the development of liver cirrhosis or liver cancer. So-called nucleoside or nucleotide analogues (entecavir, * IU = international unit
tenofovir, telbivudine, adefovir, lamivudine) and interferon alpha (pegylated interferon alfa-2a) are available for treatment. You and your doctor will decide which medicine is best suited for you. In doing so, your doctor will consider your blood levels, possible pre-existing diseases, and any therapies that have already been carried out.

**Nucleos(t)ide analogues**

Nucleos(t)ide analogues are tablets that directly target the hepatitis B virus and suppress its further multiplication. These tablets are well tolerated, but must be taken very consistently over many years, possibly even for life. As soon as the medicines are discontinued, components of the virus and elevated liver values are often detectable again in the blood. Currently, the most potent and most frequently used nucleos(t)ide analogues are tenofovir and entecavir. Patent-free medicines, so-called generic medicines, are now available for both of these medicinal products and are often considerably less expensive than the original product. Generic medicines are comparable to the original product in terms of efficacy and side effects and may be substituted without any concerns. This is known as bioequivalency. (www.hiv.hexal.de)

**Interferon alpha**

Interferon alpha is a natural protein that is injected under the skin once a week. It stimulates your immune system to fight the hepatitis B virus. The therapy should be carried out for one year. Strong flu-like symptoms such as fever, fatigue, headaches, and muscle and joint pain may develop, especially during the first few weeks. Other possible side effects include depressed mood, restlessness, hair loss, weight loss, and a decrease in platelets and white blood cells.
Consistent intake of medicine

It is extremely important to take your medicines regularly. Otherwise, the hepatitis B virus may become resistant, meaning that it changes in such a way over the course of the therapy that the medicines are no longer effective. If you have problems with regularly taking your medicines, please talk to your doctor about this. That way, you can find a solution together.

Taking medicines regularly sounds easier than it is. Here are some tips that will make taking your medicine easier for you:

- Use medicine boxes to store daily or weekly rations of your medicine.
- Always take your medicines at a fixed time, for example, at the beginning of the evening news or together with a specific meal.
- Set a reminder for your medicines with a special ring tone on your mobile phone (Hexal service for you: the “MedPlaner” app).
- Store a small supply of your medicines at your place of work, with your partner, or in places where you regularly spend time. Remember that medicines should never get into the hands of children.\(^{13}\)
- Always carry a daily dose of your medicines with you (handbag, backpack, etc.) in case you are not home in time.
- Ask your family or close friends to remind you of your medicines.
- Talk to your doctor about what to do if you forget to take a dose of medicine despite all this.
Even if you take your medicines consistently, chronic hepatitis B generally does not clear completely. Because the genetic material of the virus is absorbed into the cell nuclei of liver cells, a constant reserve of viral genetic material is present. However, the medicines very effectively prevent multiplication of the virus so that you can lead a generally normal life.

You should visit your doctor regularly in order to monitor the success of your therapy.

Can it be cured?

When taking medicines, please always follow your doctor’s instructions and the information in the currently valid patient information leaflet for your medicine.
Diet for hepatitis B

Many patients wonder if they can delay the progression of the disease through their diet. Although there is no special “liver diet”, it is important to not place additional stress on the liver. You should, therefore, avoid drinking alcohol. You should also take medicines only after consultation with your doctor since they often place additional stress on the liver. This also includes many medicines that you can buy without a prescription at the pharmacy.

You should generally follow a balanced, nutritious, and varied diet. Nutritious eating and drinking keeps you healthy and promotes your fitness and general well-being. A special diet for hepatitis B is not necessary. Your energy or calorie intake should be balanced to avoid not only weight gain, but also weight loss. How many calories your daily diet should contain depends on your age, sex, body weight and height, and physical activity. The easiest method for monitoring your personal calorie intake is regular weighing (1-2 times per week, in the morning after getting up).

Several smaller meals during the day are recommended.

A good reference for how a nutritious diet can be successful is offered by the 10 guidelines of the Deutsche Gesellschaft für Ernährung [German Nutrition Society] (DGE).

The DGE nutrition circle distinguishes seven groups:
1. Grains, grain products, potatoes
2. Vegetables, salad
3. Fruit
4. Milk and dairy products
5. Meat, sausage, fish, and eggs
6. Oils and fats
7. Drinks
The nutrition circle of the Deutsche Gesellschaft für Ernährung (DGE) serves as a reference for a nutritious diet. It categorises the abundant supply of food into seven groups to make daily food choices easier. The larger the segment of the circle, the more food from this group you should eat. On the other hand, food from small segments should be eaten sparingly. The variety of foods within the individual groups should be taken advantage of for a diversified diet. (Source: DGE-Ernährungskreis®, Copyright: Deutsche Gesellschaft für Ernährung e. V., Bonn)

<table>
<thead>
<tr>
<th>Food</th>
<th>Reference values for adults</th>
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<tbody>
<tr>
<td><strong>Group 1:</strong> Grains, grain products, potatoes</td>
<td>daily&lt;br&gt;• 4–6 slices (200–300 g) of bread or&lt;br&gt;3–5 slices (150–250 g) of bread and 50–60 g of cereal and&lt;br&gt;• 1 portion (200–250 g) of potatoes (cooked) or&lt;br&gt;1 portion (200–250 g) of noodles (cooked) or&lt;br&gt;1 portion (150–180 g) of rice (cooked)</td>
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<tr>
<td><strong>Group 2:</strong> Vegetables and salad</td>
<td>daily&lt;br&gt;• at least 3 portions (400 g) of vegetables&lt;br&gt;300 g of cooked vegetables and 100 g of raw vegetables/salad or&lt;br&gt;200 g of cooked vegetables and 200 g of raw vegetables/salad</td>
</tr>
<tr>
<td><strong>Group 3:</strong> Fruit</td>
<td>daily&lt;br&gt;• at least 2 portions (250 g) of fruit</td>
</tr>
<tr>
<td><strong>Group 4:</strong> Milk and dairy products</td>
<td>daily&lt;br&gt;• 200–250 g of low-fat milk and dairy products and&lt;br&gt;• 2 slices (50–60 g) of low-fat cheese</td>
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<tr>
<td><strong>Group 5:</strong> Meat, sausage, fish, and eggs</td>
<td>weekly&lt;br&gt;• 300–600 g of lean meat (prepared) and lean sausage and&lt;br&gt;• 1 portion (80–150 g) of lean saltwater fish (prepared) and&lt;br&gt;• 1 portion (70 g) of fatty saltwater fish (prepared) and&lt;br&gt;• up to 3 eggs (incl. processed egg)</td>
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<tr>
<td><strong>Group 6:</strong> Oils and fats</td>
<td>daily&lt;br&gt;• 10–15 g of oil (e.g., rapeseed, walnut, or soybean oil) and&lt;br&gt;• 15–30 g of margarine or butter</td>
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<tr>
<td><strong>Group 7:</strong> Drinks</td>
<td>daily&lt;br&gt;• about 1.5 litres&lt;br&gt;preferably non-caloric/low-calorie drinks</td>
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Hepatitis B in HIV-infected individuals

If the immune system is already weakened due to HIV-infection, an acute hepatitis B infection turns into a chronic hepatitis B infection more often. Approximately 6 percent of HIV-infected individuals are also infected with the hepatitis B virus. They suffer from a so-called HBV/HIV co-infection. A hepatitis B infection can usually be treated well in HIV-infected individuals since tenofovir, a medicine often used for HIV, can also prevent the multiplication of the hepatitis B virus.
The hepatitis B virus may be transmitted to a child during pregnancy and birth. Therefore, all pregnant women have their blood tested for a possible hepatitis B infection after the 32nd week of pregnancy, in accordance with German Maternity Guidelines. If the mother is infected, the child will receive a hepatitis B vaccination immediately following the birth. The doctor will possibly recommend hepatitis B therapy to the mother during pregnancy. This can prevent an infection of the child in approximately 95 percent of cases. This also means the mother does not have to avoid breastfeeding.

Hepatitis B infection can be effectively prevented with a vaccination.

Have your family members vaccinated against hepatitis B. The genetically engineered vaccine leads to the natural production of antibodies and defence cells by the body and prevents infection. It is well tolerated. Permanent undesirable side effects of the vaccination are almost never observed.
The Standing Committee on Vaccination (STIKO) at the Robert Koch Institute recommends hepatitis B vaccination for:

- all children in the first year of life
- older children and adolescents who have not yet been vaccinated
- persons living in the same household with a hepatitis B-infected individual
- persons with pre-existing immunodeficiency or persons in whom a severe progression of a hepatitis B infection is to be expected, e.g. HIV-infected individuals, hepatitis C-infected individuals, dialysis patients
- persons working in health services, in psychiatric or comparable welfare institutions, work centres for people with disabilities, or asylum seeker reception centres
- employees of emergency medical services, police, social workers, correctional institution personnel
- intravenous drug users and inmates incarcerated for a long period
- persons with high-risk sexual behaviour
- travellers to countries with a high rate of hepatitis B

Vaccination in adults is administered as a three-dose series. Subsequent booster doses are normally not required.
Hygiene practices should be followed

If you are infected with the hepatitis B virus, you should inform all members of your household. You should adhere to general domestic hygiene practices. This means, for example, that nail clippers, tooth brushes, or razors should not be shared. During sexual intercourse, you should always use condoms and observe safer-sex practices. Persons living with you in one household should get vaccinated. If you follow these practices carefully, the risk of infection is very low.

Safer-sex practices should be followed

“Safer sex” is an effective method to prevent the transmission of hepatitis B viruses during sexual intercourse. When safer sex is practised, neither sperm nor vaginal fluid enters the body of the partner. Safer sex is practised by

- always using a condom during sexual intercourse regardless of whether it is vaginal or anal
- not letting sperm or vaginal fluid enter the mouth during oral sex

These practices should especially be followed if it is not known whether the sexual partner is infected with the hepatitis B virus.
Safer use practices should be followed

“Safer use” is an effective method to, amongst other things, minimise the risks of hepatitis B infection when taking drugs. Safer use includes the following practices:

- use your own sterile needle and syringe as well as your own clean spoon with each drug use
- use your own tube when snorting

Where can I get more information?

Internet

- **www.leberhilfe.org**: website of the Deutsche Leberhilfe [German Liver Foundation]
- **http://www.hepatitisandmore.de/hepatitis_b/**: Hepatitis & More, up-to-date information on the diagnosis, therapy, and prevention of hepatitis. A website by experts for experts

Telephone consultation

- Experts of the German Liver Foundation provide information about all liver diseases by telephone. They can be contacted at 01805-450060. The telephone consultation line is available Monday to Thursday between 2 p.m. and 4 p.m. (http://www.deutsche-leberstiftung.de/hilfe/telefonsprechstunde)
**Book recommendations**

  Recognised experts describe the how the liver functions, various liver diseases, as well as diagnostic methods and therapies. In addition, numerous tips are provided on what patients can actively do for the health of their liver.

  The book includes over 130 different recipes tailored to the needs of patients with liver diseases. In addition, the main liver diseases are briefly explained and several basic tips on nutrition are provided.
Glossary

**Hepatitis serology:** a general term for blood tests that are collected as part of the diagnosis and that allow the doctor to differentiate between vaccination status, an old, clinically cleared infection, and a still existing hepatitis B infection. HBsAg, anti-HBs, anti-HBc, HBeAg, and anti-HBe are determined.

- **HBs-antigen (HBsAg, detection of virus protein shell):** as a first serological marker, it is detectable in the blood approximately six to eight weeks after infection. If it is still detectable after six months, chronic hepatitis B is present. As long as the HBs-antigen can be detected, patients are contagious and may infect persons they come in contact with.

- **HBs-antibody (anti-HBs):** the antibody that corresponds to the HBs-antigen and is formed by the body’s immune system as a defence against the hepatitis B virus. The detection of anti-HBs with anti-HBc is considered a parameter of a cleared infection. Anti-HBs alone is considered a parameter for an existing vaccination.

- **HBc-antigen (HBcAg):** a protein from within the hepatitis B virus that can only be detected as part of a liver biopsy and not in the blood. The soluble derivative of the HBc-antigen is called HBe-antigen. It is isolated by the infected liver cells and accumulates in the blood serum.

- **HBe-antigen (HBeAg):** detectable during the acute infection for several days or weeks and indicates a high amount of virus in the blood.

- **HBe-antibody (anti-HBe):** the antibody that corresponds to the HBe-antigen and is formed by the body’s immune system as a defence against the hepatitis B virus. It is detectable in the blood for several years shortly after the disappearance of HBeAg.
• **HBc-antibody (anti-HBc):** during the determination of the HBc-antibodies, IgG and IgM antibodies are determined together during routine laboratory tests. If there is a positive detection of anti-HBc, an acute, a chronic, or a cleared, old infection with the hepatitis B virus may be present. They remain detectable for life.

If an acute hepatitis B is cleared, only the antibodies (anti-HBs, anti-HBc, and possibly anti-HBe) are still detectable in the blood. During the transition to a chronic hepatitis B infection, the HBs-antigen and anti-HBc as well as HBV DNA of the hepatitis B virus are detectable.
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