An Overview

Pathogens are often spread through unwashed hands. That is why you should always be sure to wash your hands thoroughly (→ Chapter II).

Blood can always be contaminated with hepatitis and HIV viruses and should therefore always be treated as potentially infectious. The rule of thumb here: pay special attention to even the smallest amounts of residual blood – even dried blood – and not just during intravenous drug use (→ Chapter II.3, Fact Sheet on Blood Awareness in the Appendix).

A sufficient supply of sterile injection materials must be on hand and available 24 hours a day. It should be noted here that intravenous cocaine users have especially substantial needs.

When setting up for intravenous injection: Be sure to use a clean surface. Use your own sterile syringe and needle, your own filter, your own spoon, and your own water. Disinfect the insertion site with alcohol prior to injection (→ Fact Sheet on Injection in the Appendix).

When snorting: Be sure to use a clean surface. Use your own tube or straw.
When smoking or freebasing: Use your own tube or straw and your own mouthpiece.

Wash hands thoroughly.
Use a sterile syringe with a filter or use a piece of your own cigarette filter, if necessary. Do not remove the cigarette filter with your teeth after use, but instead use your washed hands.
Do not share/loan/pass along the filter.
Use your own spoon. Clean it thoroughly before use (with water, with disinfecting wipe).
Use sterile water or – if not available – use fresh water directly from the tap. (→ Chapter II.2)

During sexual intercourse involving penetration – whether vaginal or anal – always use a good-quality condom; always use lubrication for anal penetration.
Do not take any sperm into your mouth, do not swallow any sperm.
Do not take any menstrual blood into your mouth, do not swallow any menstrual blood.
Sex workers: Always use a condom, even during oral sex (to avoid sexually transmitted diseases).

You can get vaccinated against hepatitis A and B.
There is no vaccination against hepatitis C and HIV. (→ Chapter I.2.7)

Hepatitis-contaminated injections often go unnoticed (no symptoms). But the earlier a contaminated injection is discovered and treated, the better your chances of recovery. As a result, it is important to get tested. (→ Chapter I.2)

The chances of success in the treatment of hepatitis viruses among drug users are similar to those for patients with no addictions (→ Chapter III).
Therefore, it is important to seek good advice from a qualified professional (→ Chapter III.1.6).

Please note: It is possible to become reinfected with hepatitis C.
FOREWORD

Approx. 70,000 people are infected with the hepatitis C virus in Switzerland. About two thirds of all new infections occur in people who use intravenous drugs. The health damage associated with hepatitis C infections among a significant portion of the population and the financial burdens for the health care system and the public purse are often not fully appreciated among the expert community.

The Swiss Federal Office of Public Health (FOPH) has made it a top priority to reduce the number of new infections, to make it easier to access hepatitis C treatments, and to simultaneously contribute to the improved flow of information between qualified professionals and drug users.

As a component of the hepatitis C awareness campaign designed by Infodrog (the Swiss Office for the Coordination of Addiction Facilities), this manual is intended to provide all of the professional groups involved in addiction treatment with the necessary basic information about hepatitis. The aim is to enable qualified people to put their knowledge to work in the skilled counseling and treatment of drug users. Training sessions are also being held for this purpose in order to provide qualified people with additional comprehensive information and prevention materials, which will make it possible for them to conduct periodic hepatitis C awareness campaigns without a lot of effort and expense.

Building on the "Swiss Hep CH Manual" by the Swiss Office for Harm Reduction and Survival Aid (2005) and the German "Hepatitis C and Drug Use Manual" by the Hepatitis and Drug Use Coalition for Action (2006), the newest developments in prevention and therapy were discussed among a group of experts. In order to best provide practice-oriented information the chapters have been streamlined and reduced to the most important topics concerning "Hepatitis | Prevention | Treatment". The manual, as well as the other information and prevention materials, will also be available online at (www.hepCH.ch).

I would like to thank Dr. Virginie Masserey, Dr. Catherine Ritter, Dr. Martine Monnat, Dr. Philip Bruggmann, Dr. Samuel Erny and Prof. Dr. Andreas Cerny for sharing their expertise in the development of this manual. At the same time I would like to express my thanks to the qualified people at the contact and drop-in centres, the heroin and substitution programs, the prisons, as well as the outpatient clinics and hospitals, for their work day in and day out. I want to encourage you to use the manual and the information and prevention materials and to make hepatitis an ongoing topic requiring our attention.

Federal Office of Public Health (FOPH)
Department of National Prevention Programs
The Director ad interim

Dr. Martin Büechi, dipl. nat.
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I. Hepatitis
1. GENERAL INFORMATION

WHAT IS HEPATITIS?

1.1 The most important information in brief

Hepatitis (inflammation of the liver) is also often called jaundice. This is misleading because the yellowing of the skin is merely one of many symptoms of the disease, which does not occur with every form of hepatitis and can also be observed in the case of other diseases.

Causes of hepatitis

The most common cause of hepatitis in the industrialized countries is excessive alcohol consumption. Infection with hepatitis viruses is the second most common cause. Inflammation of the liver is occurring ever more commonly as the result of fatty deposits due to obesity and poor diet. Hepatitis cases are less commonly associated with infections with other microorganisms, which can also lead to hepatitis, especially in people with compromised immune systems. The hepatitis virus needs the cells of the human liver as a host.

An acute infection can often go unnoticed or may be associated with exhaustion, nausea, vomiting, and pain in the right upper abdomen.

A chronic infection can last for years and may lead to cirrhosis of the liver or liver cancer (hepatocellular carcinoma).

In the case of cirrhosis of the liver, the liver forms scar tissue to replace dead liver tissue (with increasing impairment of liver function). Advanced cirrhosis of the liver represents a severe disruption of liver function and can lead to various syndromes with highly diverse symptoms.

Detection of viral infections

In cases of suspected viral hepatitis the treating physician will initially make a simple primary diagnosis. This will include a blood test for the detection of antibodies, which the immune system has formed in response to the virus and/or the direct detection of viral components.

Who should be tested for hepatitis?

In general, hepatitis tests should be conducted on anyone exhibiting possible symptoms of the disease, such as yellowing of the skin, fatigue, and nausea. The infection rates for hepatitis diseases are high among drug users. The earlier an infection is discovered and treated, the better the chances of recovery.

The different forms of viral hepatitis

Hepatitis A

- **Route of transmission of the virus:** Through fecal contamination of water, food or people. Through oral and oral-anal sexual contact.
- **Progression:** Approx. 50-70 % of infected adults will develop symptoms of the disease (nausea, yellowing of the skin, etc.). The infection never becomes chronic and always leads to lifelong immunity, i.e. it is not possible to become reinfected.
- **Treatment:** There is no accepted medicinal anti-viral treatment.
- **Vaccination:** The hepatitis A vaccination and the combination hepatitis A and B vaccination have been shown to be safe and effective.
**Hepatitis B**
- **Route of transmission of the virus:** Through contaminated blood, through unprotected sexual intercourse, through the joint use of the same injection materials, through the joint use of the same shaving utensils, toothbrushes or tattooing equipment, as well as from infected mothers to their newborns (through the transfer of blood during birth, as well as percutaneous or permucosal absorption, i.e. through wounds of the skin or mucosa).
- **Progression:** Symptoms of acute hepatitis B occur in 50–70 % of adults, whereby the progression is different depending on age: babies infected at birth usually develop a chronic infection, which only occurs in 5–10 % of cases among adolescents and adults; however, such an infection can lead to cirrhosis of the liver or liver cancer. Immunity is only guaranteed if the person fully recovers from an infection. Liver failure is rare (in approx. 1 % of cases).
- **Treatment:** There are two types of anti-viral treatment: treatment with interferon (injection) or with anti-viral medications (tablets). The indication for each treatment and the chances of success depend on the person’s current immune status.
- **Vaccination:** The hepatitis B vaccination is safe and effective (for adults 3 injections, for adolescents 2 injections).

**Hepatitis C**
- **Route of transmission of the virus:** Chiefly through contaminated blood: through blood transfusions (prior to 1990), through injured skin (percutaneous) or injured mucosa (permucosal), e.g. through the joint use of the same shaving utensils, toothbrushes or tattooing equipment.
- **Progression:** Infections with the hepatitis C virus lead to acute hepatitis in only approx. 10–20 % of those affected, i.e. the disease usually progresses with no symptoms. Chronic inflammation occurs in 70–80 % of those affected, which in turn leads to cirrhosis of the liver in 5–50 % of those infected after 5–50 years, and some of these will develop liver cancer. A reinfection is possible after successful treatment and recovery from the disease! Fulminant hepatitis (rapid progression up to and including liver failure) is possible in cases of co-infections with hepatitis A and hepatitis B, which can be prevented with the corresponding vaccination(s).
- **Treatment:** The currently accepted medicinal anti-viral treatment is the combination of interferon (subcutaneous) and ribavirin with a 50–90 % chance of recovery, depending on the genotype of the virus.
- **Vaccination:** There is no vaccination available.

**Hepatitis D**
The hepatitis D virus can only reproduce by using the viral envelope of the hepatitis B virus. As a result, hepatitis D only occurs in conjunction with a hepatitis B infection. Transmission occurs through the same routes as with hepatitis A, especially through the fecal-oral route.

**Hepatitis E**
Hepatitis E is rare in Switzerland and the other industrialized countries. People who have travelled to affected areas in Asia or Africa are especially at risk. The hepatitis E virus behaves in a way that is similar to that of the hepatitis A virus and can cause similar illnesses. It is transmitted through the fecal-oral route and can lead to an acute but never to a chronic inflammation.
<table>
<thead>
<tr>
<th></th>
<th>Hepatitis A</th>
<th>Hepatitis B</th>
<th>Hepatitis C</th>
<th>Hepatitis D</th>
<th>Hepatitis E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route of transmission</td>
<td>oral</td>
<td>percutaneous/permucosal</td>
<td>percutaneous/permucosal</td>
<td>percutaneous/permucosal</td>
<td>oral</td>
</tr>
<tr>
<td>Fecal contamination of water, food or people</td>
<td>Contaminated blood, unprotected sexual intercourse, from the mother to her newborn</td>
<td>Contaminated blood</td>
<td>Like hep B and only found in conjunction with hep B (coinfection or suprainfection)*</td>
<td>Like hep A</td>
<td></td>
</tr>
<tr>
<td>Incubation time</td>
<td>15-50 days</td>
<td>1-6 months</td>
<td>50 days-6 months</td>
<td>1-6 months</td>
<td>15-50 days</td>
</tr>
<tr>
<td>Progression</td>
<td>Symptoms in 50-70 % of those affected (nausea, etc.)</td>
<td>Very different, depending on age</td>
<td>Usually without symptoms, long-term effects are cirrhosis of the liver and liver cancer</td>
<td>Like hep B</td>
<td>Like hep A; progression can be severe in pregnant women</td>
</tr>
<tr>
<td>Acute hepatitis</td>
<td>Yes</td>
<td>In 50-70 % of all infections in the adult age group</td>
<td>Rare (in 5-10 % of those affected)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Chronic hepatitis</td>
<td>Never</td>
<td>In 5 % of adults and 90 % of children during birth</td>
<td>In 70-80 % of those affected</td>
<td>Yes</td>
<td>Never</td>
</tr>
<tr>
<td>Reinfection</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Preventive vaccination</td>
<td>Yes</td>
<td>Adults 3/adolescents 2 injections; also protects against hep D</td>
<td>No</td>
<td>Yes. Vaccination against hep B also protects against hep D</td>
<td>Yes</td>
</tr>
<tr>
<td>Treatment</td>
<td>No</td>
<td>Anti-viral medications and interferon; varying success rates &lt; 50 %</td>
<td>Interferon and ribavirin; 50-90 % successful</td>
<td>Interferon and anti-viral medications; low success rates</td>
<td>No</td>
</tr>
</tbody>
</table>

* When an infection with both viruses occurs at the same time or when a person with hepatitis B becomes infected with hepatitis D as well.

**Coinfections**

A coinfection is a case in which several pathogens are simultaneously active. In the case of a coinfection with HIV/HBV and/or HIV/HCV and/or HIV/HBV/HDV the person has become infected with HIV as well as HBV and/or HCV and/or HDV. These combinations are quite common because HIV and some of the hepatitis viruses are transmitted through the same routes. Coinfections can also be described as those infections in which there are at least two hepatitis pathogens involved, e.g. HBV/HCV. The most common coinfection among drug users is HIV/HCV.

### 1.2 Structure and function of the liver

The liver, which is the largest internal organ of the human body, is located in the right upper abdomen directly below the diaphragm; it consists of a right and a left hepatic lobe and weighs 1,500-2,000 grams. Due to the fact that the liver itself is not sensitive to pain, liver diseases often go completely unnoticed. Only the exterior of the organ is
surrounded by a membrane that is sensitive to pain, such that any increase in size (due to an inflammation, for example) is expressed as tensional pain.

The liver is an organ that is very well supplied with blood. Although it only makes up about 4% of total body weight, about 28% of the blood in the body flows through it and it uses about 20% of the body’s total oxygen. The blood flows in from two main sources: blood vessels, transporting nutrient-rich blood from the intestines, and arteries of the greater blood circulation system from the heart. After flowing through the liver, the blood from both of these systems flows back into the greater blood circulation system to be distributed to the rest of the body through the heart.

As the most important metabolic organ of the human body, the liver is involved in a vast number of very different metabolic processes. It converts nutrients, such as fats, proteins, and sugars into building blocks for the body; it stores important substances produced by the body, such as sugars, vitamins, trace elements, and minerals, and supplies them to other organs. In addition to blood coagulation factors and enzymes, it also produces several hormones; in addition, it is also involved in the activation and decomposition of hormones. In order to absorb the fats from nutrients the liver produces approx. 600 ml of bile daily, which is stored in the gall bladder and released into the intestines. As a detoxification organ the liver breaks down toxins (alcohol!) and medications and eliminates them along with the bile.

Moreover, a healthy liver also has an enormous ability to repair itself, i.e. it can rapidly regenerate damaged or destroyed hepatic tissue.

1.3 What does hepatitis mean?

"Hepatitis" comes from hepar, the Greek word for the "liver" while the suffix "itis" always stands for "inflammation" in medical terminology. Thus, "hepatitis" (plural: hepatitides) is generally used to describe all forms of liver inflammations, but does not reveal anything about their cause or type.

Hepatitis is also often referred to as jaundice. This is misleading because the yellowing of the skin is merely one of many symptoms of the disease, which does not occur with every form of hepatitis and can also be observed in the case of other diseases.

The various terms for the disease:

- **Acute infection**: Infestation of the body with microorganisms with or without signs of disease.
- **Acute illness (acute hepatitis)**: Infestation of the body with microorganisms with signs or symptoms of disease.
- **Chronic infection**: Condition following the acute infection or illness, when the microorganism continuously remains in the body (for longer than 6 months) with or without signs of disease.
- **Chronic illness**: Condition following the acute infection or illness, when the microorganism continuously remains in the body (for longer than 6 months) with symptoms or signs of disease.
1.4 Causes of hepatitis

The most common cause of hepatitis in the Western countries is excessive alcohol consumption. Alcohol causes direct harm to the liver, while the liver is the main organ responsible for breaking down alcohol in the human body. The threshold values for liver damage with regular alcohol consumption are 40-60 g and 20 g of pure alcohol daily in men and women, respectively. A standard glass holds 10 g of pure alcohol, which corresponds to 3 dl of beer, 1 dl of wine or 2 cl of spirits.

The second most common cause of hepatitis is infection with hepatitis viruses. Inflammation of the liver due to fatty changes is increasingly gaining significance in the industrialized countries. The main risk factors are obesity and elevated blood fat values due to poor diet. Hepatitis cases are less commonly associated with infections due to other microorganisms, which can also lead to hepatitis, especially in people with compromised immune systems. Examples of these include cytomegalovirus (CMV), Epstein-Barr virus (EBV, which is the pathogen that causes infectious mononucleosis, i.e. Pfeiffer’s disease), the varicella zoster virus (VZV, which causes chicken pox and shingles), and the herpes simplex virus (HSV). In such cases the inflammation of the liver is usually accompanied by the inflammation of other organs. Such combinations can be life-threatening in persons with compromised immune systems (e.g. persons infected with HIV). Pathogens, such as the yellow fever virus or the ebola virus, are hardly an issue for us; however, they can be of importance in connection with travel to Africa (Democratic Republic of Congo, Congo-Brazzaville, Sudan, Gabon, Ivory Coast or Uganda). Inflammations caused by bacteria can also lead to hepatitis; examples include: brucellosis (transmissible through milk), leptospirosis (transmissible through the urine of rats), and typhoid fever. Even protozoa can ultimately cause hepatitis. Usually other organs are also affected in such cases.

In rare cases hepatitis can also occur as a medication-related side effect, such as iron or copper deficiencies, or autoimmune phenomena, in which the immune system attacks the body’s own cells.

This manual is chiefly concerned with hepatitides, which are caused by hepatitis viruses.

1.5 Progression forms of hepatitis

In the case of viral inflammations of the liver, a basic distinction is made between acute infections and chronic infections.

An acute infection can often go unnoticed (asymptomatic) or can be associated with exhaustion, nausea, vomiting, weight loss, and pain in the right upper abdomen. In rare cases fever may also occur. After about a week approximately one third of patients will experience jaundice with a yellowing of the ocular mucosa (subicterus) and the skin (icterus). These symptoms usually clear up in two to six weeks. In rare cases acute liver failure may occur with a fatal outcome (fulminant progression). The yellowing of the skin occurs as the result of a deficiency of bilirubin excretion. Bilirubin is a normal byproduct of the blood pigment (hemoglobin) and is normally excreted with the bile via the liver into the stool. If there is a disruption in the excretion of biliru-
bin, then a portion of it is stored in the ocular mucosa and in the skin, while another portion is excreted via the kidneys. As a result, the urine will turn brown, while the stool will turn pale because it lacks bilirubin, which is otherwise responsible for giving the stool its brown color. Because there is a lack of biliary acid the absorption of fats through the intestinal cells is also disrupted, which may result in diarrhoea.

During this phase the patients will often feel considerably better than they did at the outset of the illness, even though they may still appear to be very ill. The risk of infection (infectivity) also goes down at this point; it is directly related to the number of viruses in the blood and/or stool.

A chronic infection (> 6 months) can last for years and may lead to cirrhosis of the liver. As liver function becomes increasingly impaired, the liver forms scar tissue to replace dead liver tissue. Liver cancer (hepatocellular carcinoma) may also develop. However, only a portion of acute inflammations of the liver become chronic infections. This depends especially on the type of virus; e.g. hepatitis B results in a chronic infection in 5-10 % of adults; in the case of hepatitis C the figure is approx. 70-80 %.

Infections with the hepatitis B, C, and D viruses can become chronic with possible long-term effects. Under such circumstances it is very important to prevent or minimize any additional harmful influences as much as possible. Medications that are harmful to the liver (e.g. paracetamol = Panadol) and especially alcohol consumption should be kept to moderate and controlled levels. A patient’s disposition, blood test results, and tissue pattern will not always match. Thus, for example, in the case of chronic hepatitis C a large number of viruses or large viral load (→ Chapter I.2.4) may be measured from time to time, which is the expression of intensive virus replication, without any evidence of a pronounced inflammation of the liver in the analysis of the tissue. It is also possible that disposition and Labouratory test results are satisfactory even as the cirrhosis of the liver progresses.

Advanced cirrhosis of the liver means a severe disruption in liver function. It can lead to clinical pictures with varying symptoms. In addition to persistent fatigue, an increasing drop in performance capabilities, feelings of pressure and fullness in the stomach, as well as itchy skin in some cases, the following signs may occur:

- Decrease in musculature
- Small, spider-web-shaped blood vessels (spider angiomas) under the surface of the skin, especially around the cleavage.
- Redness on the surface of the hands and soles of the feet (palmar or plantar erythema)
- Yellowing of the skin
- Feminization in men. Men also form small amounts of female sex hormones in the adrenal cortex. These are rapidly broken down in a healthy liver. But this degradation process is impaired in a cirrhotic liver (surrounded by fibrous scar tissue), such that potent concentrations of female sex hormones gradually build up. This results in growth of the breast glands (gynecomastia), degeneration of the testicles (testicular atrophy) and changes in hair patterns (abdominal alopecia). In some cases erectile dysfunction (impotentia coeundi) may occur, also followed sometimes by infertility (impotentia generandi).
- Menstrual disorders in women, including a complete absence of menstruation (amenorrhea).
Peritoneal fluid excess (ascites) as the result of multiple pathological processes. Because the flow of blood from the hepatic portal vein through the liver is severely impeded, due to inflammatory and fibrous scar tissue changes within that organ, a high level of pressure is built up there (portal hypertension). This causes clear blood plasma (transudates) to be forced out of the portal vein into the open abdominal cavity. This process is facilitated by the fact that certain levels of blood proteins (albumins) are too low. A healthy liver produces sufficient amounts of albumins, which pull water into the blood vessels. However, a vicious cycle can occur, in which control processes due to hormones play a role, leading to a replacement of the forced out fluid within the circulatory system and maintenance of the portal hypertension. It is possible to administer medications that counter the development of portal hypertension (Propranolol). Certain medications are able to lower portal hypertension slightly (beta blockers and nitrates).

Circulatory anastamoses: A very small blood vessel (esophagogastric junction) leads from the hepatic portal vein under the mucosa of the food pipe (esophagus) to the upper vena cava. This junction becomes severely expanded under portal vein pressure, resulting in esophageal varices. These varices can burst and lead to life-threatening hemorrhages.

Blood coagulation disorders: The liver is no longer able to produce enough coagulation factors. In addition, portal hypertension leads to a swelling of the spleen, where the blood platelets are broken down rapidly. This results in a cumulative shortage of blood platelets. Both factors – shortage of coagulation factors and a drop in the number of platelets – increase the risk of hemorrhage.

Hepatic encephalopathy (disease of the brain): Impairment of cognitive function can occur in some patients with portal hypertension. In some cases hepatic encephalopathy develops due to considerable impairment of liver function. Substances absorbed by the intestinal cells are no longer able to be modified or purified by the diseased liver or they make their way directly from the hepatic portal vein via the circulatory anastamoses into the circulatory system instead of being processed within the liver. Of special significance here is ammonia, which is formed during the break down of proteins by bacteria within the intestine and is converted into urea within the healthy liver. Ammonia increases the permeability of the cerebral vessels, such that blood plasma is leaked into the brain. This is the main cause of sudden death with liver failure. A chronic progression leads to a gradual dying off of the nerve cells (cerebral atrophy) with increasingly pronounced disorders. Memory and attention deficit disorders are followed by sleep disorders as well as restlessness and disorientation. The impairment of fine motor coordination, which becomes noticeable through changes in handwriting among other things, is followed by articulation problems, walking instability, involuntary rhythmic eye movements, and failure of the reflexes.

Treatment is aimed especially at reducing the accumulation of ammonia. This is achieved by reducing the supply of proteins, regularly emptying the bowels (e.g. with lactulose) and reducing the number of bacteria in the intestines through treatment with antibiotics. Improvement does occur in the case of chronic forms, but the long-term prognosis tends to be unfavourable. Hemorrhaging in the gastrointestinal region, especially from the varices of the esophagus, can have a rapid deteriorative effect on hepatic encephalopathy.
THE FIVE HEPATITIS VIRUSES

1.6 Hepatitis viruses

Viruses can only infest very specific host organisms, which have certain features on the surface of their cells that enable the virus to dock. Hepatitis viruses need the human liver as a host. During infection the DNA of the virus is infiltrated into the cells. It influences the metabolism of the liver cell such that new viruses are produced.

The details on how damage occurs due to an infection with hepatitis viruses have not been determined for all of the known pathogens to date. Hepatitis A, B, C, D, and E differ in fundamental aspects, such as genetic structure, routes of transmission, riskiness or treatability.

1.7 Hepatitis A

The hepatitis A virus (HAV) is transmitted via the fecal-oral route. The viruses are present in the feces of the infected person and the infection via the oral route occurs, for example, through oral-anal sexual practices, contaminated sex toys and joints, as well as through food, beverages, contaminated objects or body parts. During the incubation period, i.e. the timespan between the infection with the virus and the onset of the disease (with hepatitis A an average of 25-30 days) the virus is also detectable for a short time in the blood, which is why in very rare cases it is possible to transmit the disease via the blood route. An infected person is contagious from the second half of the incubation period (in other words, before the onset of the disease) up until one week following the onset of the disease.

Nowadays infections of this type occur most commonly while travelling in countries with low hygiene standards. Thus, hepatitis A is also often referred to as "traveller's hepatitis".

**Route of transmission of the virus**

The hepatitis A virus (HAV) is transmitted via the fecal-oral route. The viruses are present in the feces of the infected person and the infection via the oral route occurs, for example, through oral-anal sexual practices, contaminated sex toys and joints, as well as through food, beverages, contaminated objects or body parts. During the incubation period, i.e. the timespan between the infection with the virus and the onset of the disease (with hepatitis A an average of 25-30 days) the virus is also detectable for a short time in the blood, which is why in very rare cases it is possible to transmit the disease via the blood route. An infected person is contagious from the second half of the incubation period (in other words, before the onset of the disease) up until one week following the onset of the disease.

Nowadays infections of this type occur most commonly while travelling in countries with low hygiene standards. Thus, hepatitis A is also often referred to as "traveller's hepatitis".

**Progression of the infection**

The incubation period is 15-50 days (average 25-30 days). The infection often progresses in small children with no symptoms, with acute hepatitis developing in only about 5 % of cases. By comparison, approx. 50-70 % of infected adults will develop symptoms of the disease (nausea, etc.). Fulminant hepatitis (rapid progression up to and including liver failure) is rare with pure hepatitis A infections (0.1 %), but is more common in combination with another form of hepatitis.

The infection never becomes chronic and always leads to life-long immunity.

**Diagnosis**

The detection of antibodies against the hepatitis A virus makes it possible to distinguish between a new infection (detection of immunoglobulin M; IgM) and immunity (detection of immunoglobulin G; IgG). The IgM antibodies can be detected 5-10 days following infection (in other words, prior to the development of symptoms) and then for about another 4-6 months.
Incidence

According to the reports received by the Swiss Federal Office of Public Health (FOPH) 250-350 cases of acute hepatitis A occurred annually in the years prior to 2000. Since 2001, the number of cases has dropped to less than 200 per year. Due to the fact that only some of the infected persons will become acutely ill, the number of new infections each year is 2-4 times higher than the number of cases of acute hepatitis A. Injecting drug users used to be commonly affected; the numbers among this population group have gone down in recent years. Nowadays it is chiefly travellers to high-risk regions (Asia, Africa, Central and South America) who become infected.

Treatment

There is no accepted medicinal anti-viral treatment.

Vaccination

Whoever has been vaccinated against hepatitis A (2 doses; for the combined A/B vaccination: 3 doses) is protected for at least several years, but most probably for decades. The protection provided by the vaccination takes effect approx. 10-14 days after the first dosage of the vaccination (active immunization).

In addition to active immunization there is also passive immunization. This involves injecting a person with serum containing protective antibodies (immunoglobulins). But the duration of effect is only a few months. The administration of immunoglobulins within 7 days following contact with an infected person can prevent the onset of the disease in 85% of cases. Following a possible at-risk situation, vaccination within the first 7 days is currently recommended with preference given to passive immunization. The hepatitis A vaccination introduced in 1992 and the combination hepatitis A and B vaccination introduced in 1997 have been shown to be highly effective and safe. In the case of drug users, anyone who is HAV Ab-negative (hepatitis A virus antibodies-negative) should be vaccinated. This is also applicable to any personnel coming into close contact with drug users.

Prevention through hygiene

The risk is especially high while travelling in at-risk countries. The following rules should be observed while there in order to avoid contact with infected feces and contaminated water:

- Drink bottled beverages only; do not consume any ice cubes or ice cream; eat only fruits that you have peeled yourself; exercise caution when eating salads and raw seafood.
- Wash your hands with soap more often than you would at home, especially after each time you use the toilet. The virus can survive for a very long time. The virus can be killed by boiling potentially contaminated objects (20 min. at 85-90° or steaming them for 90 seconds) and foodstuffs (4 min. at 85-90°).

1.8 Hepatitis B

Route of transmission of the virus

The hepatitis B virus (HBV) is transmitted through contaminated blood and genital secretions (sperm and vaginal mucous). This occurs mainly during unprotected oral-genital or anal sexual intercourse, through the joint use of the same injection materials, and through the joint use of the same shaving utensils, tooth brushes, and tattooing equipment. Transmission is also possible from an infected mother to her newborn during childbirth. Infections through blood transfusions occur only in very rare cases in Switzerland because a policy of testing the blood for hepatitis B viruses (HBs antigens) has been in place for decades now.

Contaminated blood or secretions reach the blood circulation system with the prick of
a needle or through a wound or through the mucosa (unprotected sexual contact). An infected person is already contagious several weeks before the onset of the disease and remains so throughout its entire duration. The more viruses there are in the blood, the more contagious the carrier is.

**Progression of the infection**

The incubation period is 1-6 months (60-90 days on average). Depending on the age of the person, the infection can lead to different symptoms (acute hepatitis B) and differing chronic progressions with corresponding outcomes.

In the case of newborns (transmission through the mother) and small children an infection will rarely if ever lead to an acute illness, but it will become chronic in 70-90 % of cases.

Infections among adolescents and adults lead to acute hepatitis in 20-50 % of cases and become chronic in 5-10 % of cases, regardless of whether or not an acute illness occurs.

Following an infection duration of 5-50 years, a chronic hepatitis illness associated with cirrhosis of the liver and hepatocellular carcinoma may occur in 10-40 % of cases.

**Diagnosis**

There are seven laboratory tests for the detection of antibodies, viral proteins, primarily that of the HBsAg envelope, as well as viral DNA. These make it possible to distinguish between new infections, chronic infections, and immunity. The laboratory tests show whether immunity has come about due to a vaccination or based on having successfully recovered from the disease. The HBsAg test result will be positive at 2 weeks following infection at the earliest, but normally after 5-9 weeks (in other words, prior to the occurrence of symptoms); in rare cases the result will not be positive until 6-9 months following an infection.

**Incidence**

Between 1988-1995 the FOPH received reports of 350-500 cases of acute hepatitis B each year; between 1996-2000 there were only 200-250 cases reported each year. Since 2000 there have been fewer than 200 cases reported annually, whereby about 70 % involved men aged 25 to 29. Only a portion of infected persons became acutely ill and were thus reported to the FOPH. It is estimated that the number of unreported new infections is about 4-10 times higher (500-1000 persons per year).

While the most common reason for an infection used to be intravenous drug use, nowadays it is unprotected sexual contact (hetero- and homosexual). Even a single sexual encounter can result in an infection. In Switzerland it is estimated that approx. 20,000 people (1 person for every 200-400 inhabitants) suffer from chronic hepatitis B. A large number of them show no symptoms, while a smaller number suffer from cirrhosis of the liver or liver cancer.

**Treatment**

Patients with chronic hepatitis B are usually treated with a medicinal regimen. There are currently two types of anti-viral substances available for treatment. On the one hand there is pegylated interferon (administered as a subcutaneous injection, once a week for a period of one year) and on the other hand there are oral anti-viral medications. Experienced specialists (in infectology, gastroenterology, hepatology or internal medicine) should establish the indication. Treatment requires continuous meticulous monitoring. At about 20-30 %, the likelihood of completely recovering from hepatitis B is considerably lower than that of hepatitis C. In cases where a complete cure is unsuccessful, the aim is to lower the viral load in the blood. This will stop the inflammatory processes underway in the liver and the associated damage to the liver. This treatment
goal is achieved in practically 100 % of patients. It should be mentioned here that there are also patients who have been shown to have hepatitis B in the blood, but who demonstrate no signs of inflammation of the liver. These patients do not have chronic hepatitis B, but instead are considered to be inactive hepatitis B surface antigen-positive (HBsAg+) carriers, who usually require no medicinal treatment.

### Vaccination

The hepatitis B vaccination is highly effective and safe. Children and adults receive 3 injections, while adolescents receive 2 injections at the adult dosage. The same is true for the combined A + B vaccination in children. There are approved combination vaccinations, e.g. against hepatitis A and B, but also combinations against hepatitis B and other pathogens.

Since 1982 the hepatitis B vaccination has been recommended for all at-risk groups and general vaccination campaigns have been conducted for all 11- to 15-year-olds in Switzerland since 1998.

**Drug users should always be encouraged and motivated to get vaccinated.** An initial preventive dose of vaccination should be administered upon initial contact even without having any lab results available because this will greatly reduce the costs associated with tests and treatment. In the case of a positive anti-HBc result the person has already become infected and a vaccination is no longer necessary.

Any personnel, who come into contact with drug users while on the job, should also be vaccinated against hepatitis B. In the case of high-risk situations, the administration of the vaccination and the immunoglobulins (active and passive immunization) within 24-48 hours following blood-to-blood contact with contaminated blood can protect against the illness (→Chapter II.1.7).

### Testing within the blood donor service

All donated blood and blood products have been tested for HBsAg since 1980 in Switzerland. Since then transfusion-related infections have been extremely rare. Based on the so-called diagnostic window the residual risk per donation is about 1:300,000. In the case of a person infected with hepatitis B the HBs antigen is not able to be detected until a few days after the infection took place.

### Testing of pregnant women

Since 1985 with restrictions and since 1996 with no restrictions the recommendation in effect within Switzerland has been to test all pregnant women for the HBs antigen with immediate vaccination (and passive immunization) of the newborn in cases where the mother is infected.

### Prevention through hygiene

The rules of safer sex (which are also applicable for the prevention of HIV infections) are to be strictly followed. It is also necessary to avoid sharing and exchanging potentially infected syringes and injection materials. Cuts, punctures, and scrapes with sharp instruments should also be avoided. This is especially applicable during drug use, but also in the case of receiving a tattoo, a piercing, and especially in the case of health treatments under insufficient hygienic conditions involving the injection of substances.

The virus can survive in the environment at room temperature for at least a week. Contaminated objects must therefore be carefully washed and potentially contaminated objects should not be shared (toothbrushes, razors, nail clippers, manicuring tools, etc.).
1.9 Hepatitis C

Route of transmission of the virus
The hepatitis C virus (HCV) is most commonly transmitted through contaminated blood, which enters the body through a wound in the skin or mucosa. In most cases the infection will occur with the joint use of injection materials for intravenous drug use, in rarer cases while receiving a tattoo, and in exceptional cases due to the joint use of razors and toothbrushes. Hepatitis C, unlike hepatitis B, is not a sexually transmitted disease. Transmission from the mother to her newborn can occur during childbirth with a likelihood of approx. 5 %. Unlike in the developing countries, the risk of becoming infected through a blood transfusion in Switzerland is next to nil. The majority of infected persons and untreated cases are contagious within one or more weeks following the onset of the disease.

Testing within the blood donor service
Testing of all donated blood and blood products for anti-HCV was introduced in Switzerland in 1990. The highly sensitive PCR method (below: Diagnosis) has been available since 1999. The current residual risk of infection through a transfusion is approx. 1-1.4 million per transfusion. This corresponds to approx. one case within 5-10 years for blood donated immediately following infection if the PCR results are still negative (diagnostic window).

Progression of the infection
The incubation period is between 20 days and 6 months. The infection with the hepatitis C virus usually progresses without any symptoms and leads to acute hepatitis in only about 10-20 % of infected persons. However, it leads to a chronic infection in about 70-80 % of infected persons and chronic hepatitis will occur in 5-50 years in 5-50 % of infected persons. A portion of infected persons suffer from cirrhosis of the liver or hepatocellular carcinoma.

Diagnosis
The first step is to test the blood for the presence of antibodies against the hepatitis C virus (screening test). A positive result must be confirmed through a more specific method (confirmation test). The diagnosis is not certain unless this test also turns out positive. The test for antibodies will show positive within 15 weeks (on average 7-8 weeks) following the infection or within 6 weeks following the onset of symptoms. Unlike the test for antibodies, the PCR method (polymerase chain reaction) can already detect the DNA of the virus 1-3 weeks following the infection. Thus, the PCR method must be conducted in cases of suspected acute or chronic infections even when the test for antibodies is negative.

Incidence
According to reports received by the FOPH from Laboratories and physicians the number of cases of persons with hepatitis C stagnated at around 50-65 cases per year from 1992 to 2000. Starting in 2000 an increase of approx. 80-90 cases per year was observed. In 2002 alone 133 cases were discovered, many of them during a hepatitis C awareness campaign (more testing among drug users). In 2003 the number of cases dropped back down to 90. This tendency is supported by the numbers for the year 2006 with 65 cases. As with hepatitis A and B, only a portion of the persons infected with hepatitis C will develop symptoms, such that the number of new infections can be assumed to be 5 to 10 times higher. It is estimated that the number of new infections is 300-1000 per year. Since the 80s the main group affected by new infections has been intravenous drug users (proportion: 60-80 %). Sixty per cent of these are men, most of them between the
ages of 25 and 29. Nevertheless, there are still a lot of people with chronic infections, who became infected through blood transfusions prior to the introduction of the corresponding tests for antibodies.

**Chronic infection**

HCV infections can progress in many cases for years and even decades without any clinical symptoms. This enables us to estimate that only about half of the estimated 50,000-70,000 infected persons are aware of their infection.

**Treatment**

The currently accepted medicinal anti-viral treatment is the combination of pegylated interferon (injection) and ribavirin. If the treatment is started as early as possible, then the chances of recovery are 50–90%; however, the chances of recovery are more certain prior to the onset of cirrhosis. Treatment success depends mostly on the type of virus (genotype): Patients with genotype 1 and 4 are cured by the 48 week treatment in approx. 50% of cases. Patients with genotype 2 or 3 only need 24 weeks of treatment and can expect the likelihood of their recovery to be approx. 85%. The most significant side effects of the treatment are fatigue, fever, muscle and joint ache, blood count changes and depressive mood swings. Therefore, the treatment requires continuous meticulous monitoring. As with hepatitis B, patients with hepatitis C in the advanced stages of liver failure should also be evaluated with respect to a possible liver transplant procedure. This usually takes place at a medical centre associated with a university.

**Prevention through hygiene**

Infections through potentially contaminated utensils (syringes, needles, spoons, filters, water), which have been shared while using drugs, must be avoided; the same is true for infections due to cuts, punctures, and scrapes with sharp instruments. This is especially applicable during drug use, but also in the case of receiving a tattoo, a piercing, and especially in the case of health treatments under insufficient hygienic conditions involving the injection of substances.

The most important measures include 24 hour access to free sterile injection materials for drug users, as well as compliance with all safer use rules while using drugs.

The hepatitis C virus is estimated to survive in the environment for up to several days. Therefore, when in doubt, all objects should be considered contaminated and handled accordingly (→ Chapter II.2, Rules of Use).

### 1.10 Hepatitis D

The hepatitis D virus can only reproduce by using the viral envelope of the hepatitis B virus. In other words, any time there is a hepatitis D infection, there is a pre-existing hepatitis B infection as well.

The incubation period is 1–6 months. The vaccination against hepatitis B also protects against hepatitis D. The disease is rare in Switzerland, but it does play a role in association with coinfections.
1.11 Hepatitis E

The hepatitis E virus (HEV) is transmitted via the fecal-oral route. The incubation period is 2 to 8 weeks. The virus behaves roughly the same way as the hepatitis A virus and can lead to similar clinical symptoms and an acute illness; but the infection never becomes chronic. The disease can have grave consequences for pregnant women. Hepatitis E epidemics have occurred in recent years primarily in countries with low standards of hygiene. Hardly any cases of illness have occurred to date in Switzerland.

COINFECTIONS

1.12 What are coinfections?

A coinfection is a case in which several pathogens are simultaneously active. In the case of an HIV/HBV and/or HIV/HCV and/or HIV/HDV coinfection, the person has become infected with HIV as well as HBV and/or HCV and/or HDV, respectively. HIV/HCV coinfections are quite common among drug users, while the other combinations are rare. Basically, any diseases accompanied by a weakening of the immune system can adversely influence the progression of an infectious disease.

1.13 Coinfections with HIV

HIV is the virus that can cause AIDS. The CD4 value is the number of certain helper cells in the blood. During the progression of an untreated HIV infection the number of CD4 helper cells in the blood is constantly reduced. The fewer CD4 cells there are in the blood, the more severe the damage is to the immune system.

An HIV infection is incurable. However, the infection can be kept under control for a very long time with antiretroviral treatments and it is possible to inhibit the progression of the immunodeficiency caused by the HIV. This has resulted in a pronounced improvement in the quality of life and life expectancy among those affected. The HIV virus itself and the medications used for HIV treatment place an enormous burden on the liver over time. One consequence of this has been that liver failure is currently one of the most common causes of death among HIV patients. Such cases often involve viral hepatitides as well.

A question of considerable importance for persons with HIV infections concerns which vaccinations are necessary. Fundamentally, they should build up and maintain the protection provided by vaccinations early on. In cases where the results of blood serum tests show no HAV and HBV infection, vaccinations against hepatitis A and/or hepatitis B are indicated. If the immune system is compromised due to the HIV infection, then the success of a vaccination will be less certain than it otherwise would have been; in other words, under these conditions the immune system is often no longer able to produce enough protective antibodies. For this reason any patient with an existing HIV illness should be vaccinated as soon as possible before the immune system is further compromised. The inactive vaccinations against hepatitis A and B are safe even if the
immune system is compromised because both the active vaccination against hepatitis A as well as the vaccination against hepatitis B are created using killed microorganisms, consisting of inactivated HAV or genetically engineered components of HBV (HBs antigens).

The side effects caused by the vaccinations are no stronger than normal and the progression of the HIV infection is not adversely influenced, although a short-term increase in the HIV viral load will be observed in the blood plasma.

The HIV/HCV coinfection is important for drug users because both infections can occur due to contaminated blood. Approx. 90% of all HIV-positive drug users are also carriers of the hepatitis C virus. The two infectious diseases influence each other during progression and have a negative reciprocal effect on the chances of successful treatment. From the prognostic standpoint any coinfection with chronic hepatitis is unfavourable. If the chronic hepatitis is unable to be treated, then it can have a very negative effect on the quality of life.

Chronic hepatitis C in people with an HIV infection can be treated with pegylated interferon and ribivarin. Some of the same anti-viral medications are effective in the treatment of HIV/HBV coinfections.

1.14 HIV and hepatitis A

Hepatitis A does not progress as a chronic infection and is therefore only significant as a coinfection with HIV in people with pre-existing liver damage. Here, there is a risk of a progression to fulminant hepatitis. In addition, unlike hepatitis B and C, the route of infection for hepatitis A (mostly via the fecal-oral route) is not the same as with HIV. Hepatitis A is not treatable; the only measure for HIV patients is to get vaccinated for hepatitis A.

1.15 HIV and hepatitis B

Like chronic hepatitis B, this coinfection is much less commonly observed among drug users than chronic hepatitis C. In the case of patients with an HIV infection and advanced immunocompromised status hepatitis B commonly becomes chronic (in approx. 25% of those affected).

A coinfection with HIV worsens the progression of a hepatitis B infection by speeding up the progression of the liver disease and raising the risk of liver failure to a level higher than the one associated with an HBV infection alone. The long-term intake of HIV medications (triple therapy) is a heavier burden on the liver of HBV/HIV coinfected persons, such that a suppression of the hepatitis B virus using medications is especially indicated for such persons.

Individual substances used in a combination treatment against HIV are also effective against the hepatitis B virus. An HIV/HBV coinfection is treated with anti-viral medications (3TC, FTC, tenofovir), which are effective against both viruses. Thus, lamivudine (3TC) is used for both treatments and especially for coinfections as well. But both viruses are also able to develop resistances to these substances. Tenofovir is also effective
against HBV and HIV, but is currently approved for HIV treatment only. If there are no resistances to these two substances, then they are preferable for use in the treatment of HIV in HIV/HBV coinfected persons.

The goal of HIV and HBV treatments is to suppress the viruses as much as possible. This results in treatments lasting many years. The main problem with such treatments is the development of resistances, especially in the case of hepatitis B therapy. HIV-infected persons, who have never successfully recovered from an acute hepatitis B infection or are not suffering from chronic hepatitis B, are urgently recommended to get an active immunization against the hepatitis B virus.

1.16 HIV and hepatitis B/D

The progression of hepatitis B determines the progression of hepatitis D. For this reason, HIV-infected persons, especially those with advanced immunocompromised status, are more likely to suffer from chronic progressions of hepatitis D. Hepatitis D seems to progress more severely when there is a simultaneous HIV infection present.

1.17 HIV and hepatitis C

This is the most common coinfection among drug users and should be treated as early as possible.

Chronic hepatitis C in people with an HIV infection can be treated with pegylated interferon and ribavirin. The treatment of hepatitis C in persons with HIV is made difficult by the unfavourable reciprocal influence of both infections. In HIV-infected persons chronic hepatitis C progresses more rapidly and is more likely to result in liver failure than in persons not infected with HIV.

In the age of modern HIV treatments few people die of an HIV infection in the industrialized countries; among this small number of people one of the most common causes of death is liver failure as the result of an HCV infection. The more advanced the scarring of the liver is, the worse the prospects are that the hepatitis C will be treated successfully.

Therefore, every effort should be made to begin hepatitis C treatment as soon as possible.

The prospects for the successful treatment of hepatitis C in HIV-infected persons are between 40 and 80 %, depending on the hepatitis C genotype. This is slightly lower than the chances of recovery for persons not infected with HIV.

Persons with an advanced HIV infection have a higher HC viral load than persons not infected with HIV. Therefore, a higher infectivity must be assumed with respect to the hepatitis C virus. This is also expressed, among other things, by the fact that HCV is more commonly transmitted from an HIV-infected mother to her newborn, than from a mother not infected with HIV.

In the case of HIV-infected drug users a single negative test for antibodies is not sufficient to rule out hepatitis C due to the fact that in approx. 10 % of cases there is a lack of antibodies against the virus. Thus, it becomes more pressing to perform an assay to quantify the hepatitis C virus RNA (PCR) (Chapter I.2.4).
1.18 Hepatitis A and hepatitis C

The risk of a coinfection can be countered with an active vaccination against the hepatitis A virus. An HAV/HCV coinfection occurs when there is a hepatitis A infection on top of a pre-existing case of chronic hepatitis C. The inverse situation is not possible because hepatitis A does not progress chronically. Such a "super-infection" with hepatitis A and chronic hepatitis C can lead to an acute and dangerous progression of the hepatitis accompanied by liver failure. No specific treatment options exist. As a preventive measure, all patients with hepatitis C are urgently recommended to get vaccinated against hepatitis A and B.

1.19 Hepatitis B and hepatitis C

This coinfection is rare. Sometimes it is not possible to find the component of the envelope of the hepatitis B virus (HBs antigen) in persons with chronic hepatitis C, even with existing chronic hepatitis B. It is suspected that the HCV inhibits HBV replication.
2. TESTS, COUNSELING & VACCINATION

GET TESTED

2.1 General information about hepatitis tests

The infection rates for hepatitis are high among drug users. The initial infection often goes unnoticed and there are no visible signs of the disease. Therefore, each drug user should be tested for hepatitis A, B and C, and in the case of negative results and ongoing risky behaviour, each drug user should be screened once annually (screening for antibodies). The tests can be used to detect the various categories of antibodies.

The test results provide information as to whether:
- there is an existing infection or the person has successfully recovered from an infection
- there is a cured infection or
- the person has been vaccinated (vaccination immunity)

There are basically two test methods in use:
- Detection of specific antibodies against the corresponding viruses
- Detection of viruses or their components (proteins or genetic material)

A hepatitis test should be conducted approx. 3 weeks at the earliest following exposure (at-risk situation). The results of tests conducted too early are unreliable. In addition to these tests, liver function tests should also be performed on a regular basis. If the test results are above normal, then non-infectious causes need to be ruled out, such as damage due to alcohol or medications.

Viral hepatitis often progresses asymptomatically, such that a person can be infected without ever feeling ill. If viral components are found in the blood itself, this means that the virus is active in the body. In such a case it is possible to infect other persons. If the tests for the detection of antibodies and viral components are combined, then it is possible to reach the following conclusions:
- The infection has been cured or there is a chronic infection.

An immunity is assumed based on the presence of certain forms of antibodies in the case of hepatitis A and B for the following reasons: The person became infected in the past and the disease was cured or the person got vaccinated and is protected against new infections as a result. In the case of fully cured hepatitis C, however, the antibodies provide no protection against reinfection!
2.2 Who should get tested for hepatitis?

The following symptoms and situations require a complete medical examination, including hepatitis tests:

**Hepatitis A**

In the case of:
- Yellowing of the skin, fatigue, nausea

The test for HCA antibodies is recommended for:
- Persons employed in the fields of wastewater handling and treatment
- Persons with high-risk sexual practices (especially oral-anal)
- Drug users who are hepatitis B carriers
- Patients with chronic liver diseases (especially hepatitis B) following serological testing.

**Hepatitis B**

In the case of:
- Yellowing of the skin, fatigue, nausea
- High-risk sexual practices
- Non-specific complaints, skin problems, kidney- and joint-related complaints

The screening for hepatitis B antibodies is recommended for:
- Pregnant women
- Family members, including children, who live in the same household with an HBV-infected person
- Sexual partners of HBsAg-positive persons
- Employees of institutions, in which they have contact with drug users
- Persons from areas with a high prevalence of hepatitis B
- Intravenous drug users (including ex-users as well)
- Persons with seropositive HIV status

**Hepatitis C**

In the case of:
- Yellowing of the skin
- Fatigue, nausea, joint-related complaints

The test for HCV antibodies is recommended for:
- Intravenous drug users, persons who snort or smoke drugs (including ex-users as well)
- Persons who received a blood transfusion prior to 1992
- Persons who received stored blood prior to 1987 (e.g. hemophiliacs)
- Persons with kidney insufficiency undergoing blood dialysis (artificial kidney)
- Sexual partners of persons infected with the hepatitis C virus
- Children of mothers infected with the hepatitis C virus
- Persons with seropositive HIV status
- Health care personnel following contact with blood (injury with contaminated sharps or other contaminated materials)
2.3 What do the test results show?

**Hepatitis A**
- Positive for IgM and IgG antibodies:
  Acute or very recent infection (IgM are only detectable for 4-6 months following an infection).
- Negative for IgM and positive for IgG antibodies:
  Cured infection or presence of protection provided by vaccination.
- Negative for IgM and IgG antibodies:
  No contact with the virus to date and no protection provided by vaccination. Such persons should get vaccinated.

**Hepatitis B**
- Positive for HBs antigen (viral protein):
  The virus is active in the body (acute or chronic infection). In such a case, a viral load determination (HBV DNA) and an HBe antigen test are performed to further clarify the diagnosis. If the results are positive for HBe antigen, then the patient has highly active chronic hepatitis B. It is worth noting here that there are also patients with hepatitis B viruses in their blood, but who show no signs of any inflammation of the liver. These patients do not have chronic hepatitis B, but instead are considered to be inactive hepatitis B surface antigen-positive (HBsAg+) carriers, who usually require no medicinal treatment.
- Positive for HBe antibodies (screening test):
  Current (or past) infection with the virus.
- Positive for HBs antibodies:
  Cured infection (even if positive for anti-HBc antibodies) or immune response to the corresponding vaccination (if negative for anti-HBc antibodies).
- Negative for HBe and HBs antibodies:
  No contact with the virus to date and no protection provided by vaccination; such persons should get vaccinated.

**Hepatitis C**
- Positive for anti-HCV antibodies:
  Current (or past) infection with the virus (acute, chronic or cured).
- Positive for HCV RNA (genetic material of the virus):
  The virus is present in the body, i.e. there is an acute or chronic infection.

2.4 Labouratory analyses and microscopic examinations

**Blood levels for the measurement of inflammation and function of the liver**

In addition to measuring the reaction of the body to the viruses (antibodies) and measuring for viral components themselves (antigens), liver function tests and other tests are performed.

On the one hand, this enables the activity of the inflammation to be assessed. The rise in liver enzymes (transaminases/transferases) indicate the degree of cellular destruction due to the inflammation. These tests primarily include ALT (alanine aminotransferase, formerly GPT: glutamate pyruvate transaminase) and AST (aspartate aminotransferase; formerly GOT: glutamate oxalacetate transaminase).
On the other hand, the function of the liver is able to be evaluated based on the following measurements:

- If the synthesizing capacity of the liver is reduced, then the blood plasma will contain reduced levels of ChE (cholinesterase) coagulation factors and in the case of severe impairment it will contain reduced levels of albumin (an important blood protein). Bilirubin will increase with impaired liver function because the liver is no longer able to break it down normally (\textit{\textsuperscript{\textcopyright} Chapter 1.5})
- The functional capacity of the coagulation system is determined based on the prothrombin time or the INR value (determination of the effect of blood-thinning medications). Bile flow disorders are expressed by an increase in AP (alkaline phosphatase), among other things. A reduction in detoxification capacity in the case of well advanced cirrhosis of the liver is expressed as an increase in ammonia levels in the blood.

**Viral load**

The measurement of the viral load in the blood plasma, i.e. the number of copies of viral DNA per milliliter of blood plasma, is performed using the polymerase chain reaction technique (PCR). Here DNA building blocks are copied. The sequence of their amino acids or their chemical reactions are characteristic of a certain pathogen.

The PCR diagnostic test is also of importance for monitoring treatment. If interferon is used (possibly in combination with another substance), the viral load is determined in order to monitor the efficacy of the treatment. The viral load can be negative due to a spontaneous recovery or within the framework of a favourable course of treatment.

**Liver biopsy**

In cases of suspected chronic hepatitis a liver biopsy is sometimes performed. Here, a small piece of tissue is removed from the liver using a very thin needle. The analysis under the microscope enables the degree of severity of the inflammatory reaction to be determined, as well as the extent of the fibrous scar tissue surrounding the organ, among other things. In addition, it is also possible to detect any other adverse influences (e.g. due to alcohol).

Prior to the biopsy appointment the physician explains the procedure to the patient and an ultrasound scan is made of the liver. On the morning of the day of the biopsy appointment the patient does not eat anything. Using the ultrasound monitor for visualization, the physician determines the insertion path for the needle prior to performing the procedure. The skin is then disinfected and the insertion channel is anaesthetized with local anesthesia. During insertion the patient must not breathe so that the liver does not move. The biopsy is performed with a thin cannula, which is inserted into the liver to a depth of 4-5 cm. Using suction, a small sample of liver tissue is removed through the cannula and sent to the Labouratory for further analysis. The procedure usually does not hurt. In some cases the patient may experience a rapidly dissipating pain in the area of the insertion site or in the right shoulder.

The entire procedure lasts 5 to 10 minutes. Following the biopsy the patient is typically kept under observation for approx. 4 hours in order to ensure that any possible bleeding, a rare complication, is not overlooked.

After approx. 5-8 business days the test report from the lab becomes available; it provides information about the degree of severity of the liver damage and the cause of the damage.

**Fibroscan\textsuperscript{\textregistered}**

As an alternative to liver biopsy, the Fibroscan\textsuperscript{\textregistered} technique is available for measuring the stiffness or elasticity of the liver. The device it uses looks like an ultrasound scanner. This totally non-invasive examination procedure measures the fibrosis of the liver.
through the placement of a probe between the costal arches on the right flank. The measuring principle of the Fibroscan® is based on a histological fact: The stiffer the liver, the more severe the fibrosis (abnormal increase in connective tissue). Therefore, the degree of severity of the fibrosis is able to be determined based on the stiffness of the liver. Here, a small vibration is generated on the surface of the skin which penetrates the liver. The speed at which this audible vibration travels under the skin at a distance of 2 to 4 centimeters is tracked using ultrasound. The faster the vibration travels, the stiffer the liver and the more advanced the fibrosis. This measurement technique is non-invasive (i.e. it is not necessary to perform a surgical procedure or take a blood sample), involves no pain to the patient, and takes only about five minutes to complete. The Fibroscan® technique cannot be used in cases of fluid accumulation in the abdominal cavity (ascites) or morbid obesity, which make it impossible to measure elasticity. In practice the results of a high-quality liver biopsy do not always correlate with those of a Fibroscan. Specialists currently tend to recommend liver biopsies more than Fibroscan® procedures. Therefore, the latter should be performed on patients who refuse to have a liver biopsy and who are not contraindicated for a Fibroscan® (obesity with a BMI > 26, ascites, small and abnormally shaped liver).

2.5 Test results: comments and additional analyses

**Hepatitis B**

In suspected cases of hepatitis B patients should always be tested for HBs antigen (HBsAg) and for anti-HBs and anti-HBc antibodies. If the results are HBsAg-positive, then the patient has acute or chronic hepatitis B. It should be mentioned here that there are also patients who have been shown to have hepatitis B in the blood, but who demonstrate no signs of inflammation of the liver. These patients do not have chronic hepatitis B, but instead are considered to be inactive hepatitis B surface antigen-positive (HBsAg+) carriers.

If the results are HBsAg-positive, then the patient has acute or chronic hepatitis B. The presence of anti-HBs antibodies suggests an earlier case of hepatitis B that was cured. The anti-HBs antibodies are always present in cases of hepatitis B. Following vaccination patients are negative for anti-HBc antibodies and positive for anti-HBs antibodies. The values make it possible to reach a conclusion about how the person has responded to the vaccination.

**Hepatitis C**

If the HCV-Ab test turns out positive, then the HCV RNA (the genetic information of the HCV) must be qualitatively determined. The HCV occurs in four different genotypes (families of viruses). It is important to know the genotype and the viral count in order to provide skilled counseling and treatment. If the HCV RNA test turns out positive, then the genotype must be assayed and an HCV RNA quantitative assay must be performed. In accordance with our current state of knowledge, treatment success rates are 70-90 % for genotypes 2 and 3, and 50-70 % for genotype 1, and somewhat higher for the rare genotype 4.

**Chronic hepatitis**

In cases of chronic hepatitis B or C, in which no treatment has been required (yet) or requested, annual liver function tests are recommended, as well as a liver biopsy every 5 years or, alternatively, an annual Fibroscan procedure.
2.6 Obligation to notify the authorities

Various contagious diseases are subject to the obligation to notify the authorities, in accordance with the Swiss Federal Law on the Control of Communicable Diseases. Notifications enable the outbreak of diseases to be detected early and provide for the ongoing review of the necessity and/or efficacy of preventive measures. Hepatitis A, B, and C are among the diseases subject to the obligation to notify the authorities. Test Laboratories are obligated to simultaneously report any positive tests to the Swiss Federal Office of Public Health (FOPH) and the competent Cantonal Surgeon General (Kantonsarzt); these authorities will then request more information with respect to possible routes of transmission from the physician(s) that ordered the test(s). Such information is considered to be a supplementary notification and is passed along from the Cantonal Surgeon General to the FOPH.

In the case of hepatitis A, B, and C these notifications also contain information on the names and addresses of the affected persons so that the Laboratories, physician(s), and hospitals can take any further necessary measures (such as a search for infected and exposed persons, etc.) This involves the following procedures:

1. In the case of hepatitis B and C the additional information is provided by the treating physician in order to determine whether the infection involved in the respective case is old or new. The information provided by the Laboratories do not enable such a determination.
2. In cases of suspected infections through blood transfusions a review is ordered to be performed in order to discover any contagious blood donor(s) and to destroy any related donated blood or blood products that may remain.
3. In the case of hepatitis B and C further tests are also ordered to be performed in suspected cases of transmission within a hospital or through hospital personnel.
   The same applies for hepatitis A in suspected cases of an infection due to contaminated water or foodstuffs.
4. Possible vaccination errors must be ruled out.
5. Possible post-exposure prophylactic measures can be ordered.

By providing the name of each patient it is also possible to avoid multiple listings of chronically ill people, who have sought treatment from different physicians.

All of this information is protected by medical confidentiality and the Swiss Data Protection Act. The corresponding documents are destroyed once the cases have been cleared up.

2.7 Vaccination against hepatitis

There is both an active and a passive immunization against hepatitis A and B. There is no vaccination against hepatitis C to date. For more detailed information on the other aspects, see →Chapter II.3.1.
**Passive immunization**

Rarely used, passive immunization involves the administration of antibodies against the hepatitis A or the hepatitis B virus.

The advantage of passive immunization is the immediate protective effect. An immunization can even be effective following high-risk behaviours associated with a possible infection.

The disadvantage is the short duration of the protective effect, which lasts only a few months. The immune system of the immunized person has not learned how to produce its own antibodies to be delivered as needed. There is no vaccination against hepatitis C and no post-exposure prophylaxis.

**Active immunization**

Active immunization involves the injection of antigens. Here, inactivated pathogens or genetically engineered viral components are used to stimulate the immune system to produce antibodies against the virus. Active immunization can be used in most cases.

The advantage lies in the fact that the immune system of the immunized person can continue to produce its own antibodies, whenever necessary.

The disadvantages include: The protection provided by the immunization does not take effect immediately because the body needs two to three weeks in order to produce antibodies.

However, in the case of hepatitis A, the incubation period (time from the infection to the onset of the disease) is longer than the time required by the body to build up the protection provided by the immunization, which is why it is still possible to administer an active immunization following high-risk situations in such cases.

In the case of hepatitis B the vaccination must be administered early enough prior to a high-risk situation (many people do not anticipate subjecting themselves to risk) and repeated at certain intervals in order to ensure long-term protection (twice for hepatitis A, three times for hepatitis B).

Combined hepatitis A and hepatitis B vaccinations do exist. They are usually administered at zero time, after one month, and after six months and have been shown to be highly effective (≥ 90 %) and well tolerated. Although the vaccinations are recommended to be administered twice or three times, respectively, and at the intervals mentioned above, even a single vaccination reduces the risk of infection considerably.

In some cases individuals do not produce antibodies (in approx. 5-10 % of those receiving active immunizations) in response to the three-time application of the active hepatitis B immunization. These individuals are called non-responders. Nevertheless, almost 70 % of non-responders do begin producing antibodies when the immunization regimen is extended (by a maximum of 3 additional doses at intervals of 3-4 months).

In some cases the only way for these persons to acquire a certain amount of protection is through passive immunization. The vaccination is injected into the upper arm and, in the case of children, into the thigh. If active and passive immunizations are being administered simultaneously, then the left and right upper arms are used, or the right and left thighs, respectively. Anyone undergoing post-exposure prophylaxis (PEP), such as a person who has been stabbed with a potentially infected needle, will receive both the passive and the active immunizations against hepatitis B.

In addition to the immunizations there are also recommendations with respect to behaviour, which will considerably reduce the risk of transmission (→Chapter II.2 Rules of Use).

In the interest of full disclosure it should be pointed out here that certain objections have been raised against vaccinations. Some of the arguments and responses include:
“Non responders” live with a false sense of security by thinking that they are not infected.

In the case of persons with high-risk behaviours it is possible to verify the development of antibodies following vaccination; should it be determined that antibodies are not being produced, then it is possible to establish whether or not the person is already infected (a chronic hepatitis B infection can be a reason for the lack of antibody production following vaccination).

Vaccinations can mislead people into failing to protect themselves using other protective measures (protective measures against infection with the hepatitis viruses are also effective against HIV).

In the case of the hepatitis B vaccination it is important to emphasize that this vaccination does not provide protection against any other viruses, especially HIV. The rules of safer use are always applicable! Compared with HIV, the hepatitis B virus is more widespread within the population and thus the risk of becoming infected is significantly greater. Therefore, it is worth it to get vaccinated, even when the normal preventive measures against HIV are being taken.

There have been cases of multiple sclerosis following a hepatitis B vaccination.

Cases of multiple sclerosis have in fact been identified at the same time as a hepatitis B vaccination. However, detailed studies were unable to prove a causal connection between the vaccination and the disease.

### 2.8 Vaccination against hepatitis A

The vaccination is recommended for:

- Drug users
- Any personnel coming into close contact with drug users or with persons from at-risk regions
- Travellers to endemic zones (←visit www.safetravel.ch for a list of corresponding countries)
- Children residing in Switzerland and originally from endemic areas, who are travelling to their home countries
- Men who have sex with men
- Persons with chronic hepatitis, especially hepatitis C
- HIV/HCV coinfected persons

This vaccination has been covered by obligatory health insurance since 01 January 2008 for persons subject to higher risk; travellers are excluded from this coverage. In most cases the employee’s costs are covered by the employer. It is recommended to check the list of medications covered by the health insurance funds.

### 2.9 Vaccination against hepatitis B

The vaccination has been recommended for all 11- to 15-year-olds in Switzerland since 1998. The vaccination is preventive in nature in order to minimize the risk of infection with the onset of sexual activity. According to the data collected from obligatory notifications, sexual activity is highest between the ages of 20 and 24. The strategy has been
The latest data show that considerably fewer cases of acute hepatitis B have been reported in 15- to 19-year-olds. The vaccination is recommended for the other age groups in the following situations:

- Health care personnel coming into contact with blood or possibly infected bodily fluids, soiled or contaminated objects, and infectious materials
- Social workers, prison and police personnel, coming into frequent contact with drug users
- Drug users
- Persons who frequently change sexual partners
- Persons living in the same household with or having sexual contact with virus carriers (HBs antigen)
- Persons originally from at-risk areas (Africa, Asia, Oceania, certain regions of South America) (→ visit www.safetravel.ch for a list of corresponding countries)
- Travellers to endemic zones who will come into close contact with the local population (extended stay or risky behaviours)
- Persons with reduced immunofunction (immunocompromised persons), patients with artificial kidneys (patients with hemolytic anaemia), hemophiliacs
- Persons with chronic hepatitis C
- Persons with HIV and HCV coinfections

This vaccination is covered by obligatory health insurance. The vaccination is also covered by most employers for qualified professionals working in the fields of medicine and social work.

HEPATITIS AND PREGNANCY

2.10 Hepatitis B and pregnancy

The transmission of the virus from a pregnant women with an acute or chronic infection to her unborn child usually takes place in most cases during the last trimester, especially during childbirth. There is a suspected risk of transmission through breast milk, but the results from the current research are still incomplete; however, this risk is low compared with the risk during the process of childbirth, even if HBs antigens are present in the breast milk.

Whether the child will indeed become infected depends on the concentration of the virus in the mother and the amount of the virus that is transmitted. If no immunoprophylactic measures are taken during childbirth, then the risk of transmission is 70-90 % in the case of HBeAg-positive mothers.

In the case of HBsAg-positive mothers the risk of transmission is 10-40 %. In the case of acute hepatitis B the risk of transmission is 60-70 % at the end of the pregnancy.

The biggest problem for infected children is the high rate of chronic hepatitis, which can later lead to cirrhosis of the liver or hepatocellular carcinoma.
Through the determination of HBs antigen in the mother during the final trimester of pregnancy it is possible to ascertain which women could potentially transmit the virus to their newborns. Within the first 12 hours directly following delivery the children of HBsAg-positive women receive a passive and an active hepatitis B immunization, which is repeated after four and six months. These immunizations provide the newborn with a 95% chance of not becoming infected by its mother. The immunization of the child also enables it to be breastfed.

The risk of transmission to the child is considerably higher in the case of hepatitis B than with hepatitis C. However, by taking the measures described above it is possible to give birth to a child without infecting it.

2.11 Hepatitis C and pregnancy

While a transmission of the hepatitis C viruses within the womb cannot be fully ruled out, it occurs only very rarely (in approx. 5% of cases). However, hepatitis C is not a reason to dissuade a woman from getting pregnant or from taking extraordinary measures beyond the normal rules of hygiene during pregnancy and birth. A women infected with hepatitis C can breastfeed her child as long as she has no open wounds on her nipples. There is no empirical proof of a connection between viral load during the process of childbirth and the risk of transmission. The same applies for both Caesarean section and vaginal birth.

One exception is an HIV/HCV coinfection. In such cases the risk of transmission of hepatitis C from the mother to the child is 8-30% higher. The child is delivered by Caesarean section due to the HIV infection.
II. Prevention
1. HYGIENE

HAND HYGIENE

1.1 Wash your hands

Pathogens are often spread through unwashed hands. Therefore, special attention should be paid to hand hygiene especially in the milieu of illegal drugs. This applies equally to personnel and clientele. The rules of hygiene described below are based on the Fact Sheets for employees and clientele in the milieu of illegal drugs, which have been compiled by Fixpunkt, a non-profit organisation for drug users in Berlin (www.fixpunkt.org).

Why should you wash your hands?

Pathogens (viruses and bacteria) are very small and are often not visible to the naked eye. Some of these pathogens can cause diarrhoea or the common cold, for example; but there are also more serious ones and some of these can lead to life-threatening illnesses. When you wash your hands thoroughly with soap and water you will remove most germs.

Pathogens can get into your body when you touch your nose, mouth or open wounds with unwashed hands.

Employees of the health care system (private practices, hospitals, etc.) are professionally obligated to pay special attention to washing their hands.

You should make washing your hands a high priority!

When should you wash your hands?

- Before and after each intravenous drug use
- After each time you come into contact with your own blood, someone else’s blood or any blood-contaminated surfaces
- When you get home
- Before you prepare or eat any meal
- Before you put in or take out your contact lenses
- After touching uncooked foods (especially fish, meat or poultry)
- After each time you use the toilet and/or any time you come into contact with your own stool or someone else’s
- After intensive contact with animals (petting)

Use alkali-free soap with a pH value of 5.5 in order to avoid damaging the protective acid mantle of the skin.

How do you wash your hands properly?

How you wash your hands is just as important as when you wash your hands. Just letting the water run quickly over your hands does not count!

- Use soap and warm, running water.
- Wash the entire surface of your hand, the palm of your hand, and the back side of your hand; wash your fingers and also under your finger nails, if necessary.
- Rub your hands together for at least 10 to 15 seconds.
- When drying your hands, use only a clean towel; use only disposable paper towels when using a public toilet. Instead of rubbing down your hands, it is better to dab them dry in order to avoid placing too much stress on the skin.
- After washing your hands do not use your clean hands to touch the tap (which is covered with germs). Instead, use a paper towel to cover it and turn it off.
- Take care of your hands regularly with hand lotion in order to prevent them from getting too dry.
HOW CAN AN INFECTION BE PREVENTED?

1.2 How different pathogens are spread

The table below provides information about the possible ways in which hepatitis and HIV viruses are spread and by which routes:

<table>
<thead>
<tr>
<th></th>
<th>Hepatitis</th>
<th>HIV</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Contact and smear infection (passing stools)</td>
<td>■</td>
<td>-</td>
</tr>
<tr>
<td>Droplet infection (coughing, sneezing)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Via foodstuffs and water</td>
<td>■</td>
<td>-</td>
</tr>
<tr>
<td>Via blood</td>
<td>■</td>
<td>■</td>
</tr>
<tr>
<td>Via sperm and vaginal fluid</td>
<td>-</td>
<td>■</td>
</tr>
<tr>
<td>Via saliva</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Via the hands and intermediate hosts</td>
<td>■</td>
<td>-</td>
</tr>
<tr>
<td>Via objects (injection materials, inhalation pipes)</td>
<td>■</td>
<td>■</td>
</tr>
</tbody>
</table>

* contaminated (=infected) objects coming into contact with injured skin or injured mucosa can transmit hepatitis B, C and D (syringes, spoons, filters, etc.). Hepatitis B and C viruses can survive for several days in the open air in the smallest amounts of dried blood!
** especially needles!

(→Fact Sheet on First Aid/Treating Wounds in the Appendix)

1.3 Blood awareness

In addition to the known routes of infection and at-risk situations and the main messages on how to avoid them (using your own sterile injection materials, safer sex, etc.), it is also of extreme importance to encourage drug users, their loved ones and partners, as well as all institutional personnel to develop blood awareness.

Due to the fact that even the smallest amounts of invisible blood are enough for an infection with certain viruses it is not sufficient to merely recite lists of individual at-risk situations and the corresponding preventive measures. The primary issue here is paying attention to any and all day-to-day situations in which we may come into contact with blood or with objects that could have blood or blood residue on them – even dried blood.

Situations that require special awareness include:

- Cuts and scrapes from sharp objects in the kitchen, while doing handcrafts, etc.
- Cuts, scrapes, and puncture wounds from foreign objects, needles, knives, etc.
- First aid: direct contact with open wounds (always wear gloves!)  
- Sexual practices involving cuts, scrapes or wounds (even tiny ones)
- Ventilation of people with nosebleeds or mouth wounds without a respiratory mask
- Bites from people with mouth wounds
- Toothbrushes, razors and razor blades, nail clippers, nail files
- Piercing or tattooing instruments (which have not been cleaned and sterilized or not completely cleaned and sterilized)
- Counter tops, shelves, surfaces, and documents, on which previously soiled materials have been placed (tables, paper documents)
- Blood residue on fingers, e.g. due to scratched open wounds, insect bites, eczema, etc.
- Touching veins that have already been tapped with soiled, blood-smeared fingers (when helping someone else inject)
- Pressing down on the injection site with soiled fingers after pulling out the needle (use a dry swab or wipe)
- Inhalation tubes/straws or pipes while snorting or freebasing
- Filters (touched by soiled hands with residual blood on the fingers)
- Spoons (which have not been cleaned and sterilized or not completely cleaned and sterilized)
- Residual blood (even dried blood) on lighters, tourniquets, water containers or knives (used to divide up the drugs, etc.)
- Water containers in which a used syringe was immersed to withdraw water
- Syringes (used) to divide up the drugs

This is not a complete list. It is merely intended to highlight the fact that many situations involve the possibility of blood contact and a risk of infection.

A whole host of diseases are transmitted through blood. The biggest risks involved in day-to-day dealings or living together with drug users include HIV, hepatitis B and hepatitis C.

Safe handling of materials and a clean technique are the highest priority in order to prevent an infection.

Day-to-day dealings and living together with hepatitis B- and/or hepatitis C-infected persons

Avoiding exposure to blood

- Wear latex gloves for any and all tasks, which can be anticipated to involve contact with blood or bodily fluids containing blood.
- Following contact with blood: Change gloves
- After wearing gloves: Disinfect your hands

Reserve any potentially blood-soiled utensils that could cut or scrape you (razors, nail clippers, toothbrushes, etc.) for your own exclusive personal use and write your name on them as an extra precaution.
Within the protected/supervised space (consumption room) the rules of medical settings are in effect for syringes and cannulas (needles):
Do not place the plastic cap back on the needle (no recapping) but instead dispose of the used syringe and the needle by placing them directly in the container set up for this purpose.

Rules outside the consumption room include:
Always replace the plastic cap on your own used needle and place the syringe and the needle in a puncture-proof, unbreakable container (such as an empty aluminum can); then dispose of the whole thing in the normal manner with the other refuse.

Avoiding puncture wounds from needles

Do not stuff garbage bags using your hands, but instead use the broom, for example.

When carrying garbage bags hold them at a distance from your legs.

1.4 Safer sex

During sexual intercourse involving penetration – whether vaginal or anal – always use a good-quality condom; always use lubrication for anal penetration.
Do not take any sperm into your mouth, do not swallow any sperm.
Do not take any menstrual blood into your mouth, do not swallow any menstrual blood.
Sex workers: Always use a condom, even during oral sex (to avoid sexually transmitted diseases).

1.5 Risks

HIV, hepatitis B, and hepatitis C are especially transmissible through needle puncture wounds and contact with blood, for example on the mucosa or on previously damaged skin (eczema, wounds, etc.).
Risk factors for an infection following a puncture wound with a needle contaminated with one of the corresponding viruses in hospital settings are as follows:

- for an HIV infection: approx. 0.3 %
- for an HBV infection: 30-40 %
- for an HCV infection: approx. 3 %
HOW SHOULD YOU REACT TO AN AT-RISK SITUATION?

1.6 Immediate action

**Needle puncture wound**
- Completely remove the foreign body.
- Thoroughly wash the wound with soap and water. Allow the wound to bleed, disinfect the wound generously with Betadine 70% alcohol or isopropanol (for at least 1 minute).

**Skin contact with blood**
- Thoroughly wash the skin with soap and water.
- Disinfect the skin generously with Betadine 70% alcohol or isopropanol (for at least 1 minute).

**Blood contact with oral or nasal mucosa**
- Blow your nose and disinfect for at least 1 minute with cotton swabs and aqueous Betadine solution.
- Rinse your mouth with aqueous Betadine solution for at least 1 minute.

**Blood to the eyes**
- Flush the eyes thoroughly with copious amounts of saline solution, tap water or any other clean liquid (beverage). This works best while lying down with the assistance of another person.

**Cuts and scrapes**
(`Fact Sheet on First Aid/Treating Wounds in the Appendix`)

1.7 Further treatment/preventive treatment

Persons whose work involves a lot of contact with infected blood should get vaccinated for hepatitis A and B; and an HBsAb titer test should be run to prove that the protection provided by the vaccination is sufficient. All institutions should be able to quickly access the corresponding information about their employees so that no time is lost for the administration of post-exposure prophylaxis.

Nowadays there are highly effective medications available for the prevention of an infection with the HIV virus. This so-called post-exposure prophylaxis must be applied as soon as possible following the contact with blood. Persons without sufficient vaccination protection against hepatitis B can be protected even more against this disease by receiving hepatitis B immunoglobulins.

In the case of:
- any puncture wound with a needle
- any wound involving a bite
- any time injured skin (eczema, wound, etc.) comes into contact with blood
- any time the mucosa comes into contact with blood the general practitioner or emergency physician or specialized HIV hotline must be contacted right away in order to discuss how to proceed.
Even if a person refuses the post-exposure prophylaxis, a physician must be sought as soon as possible to take a blood sample for insurance-related and legal reasons. Blood tests must be repeated after 3 months and after 6 months. In the meantime the person affected is to be treated as possibly infected and therefore possibly contagious (−Chapter III).
In addition, the rules of safer sex must be strictly observed.
2. RULES OF USE

BASIC RULES

2.1. General information

The hepatitis A, B, and C viruses are much more easily transmitted and more widespread than the HI virus, for example. This explains the extremely high rate of infection among drug users.

In order to prevent an infection the rules of use described below are of fundamental importance for drug users. Following the rules puts a considerable curb on the spread of hepatitis and other infections through drug use and goes a long way in ensuring the prevention of infections (Illustrated Fact Sheets in the Appendix).

2.2. Rules of use for intravenous drug users

The following basic rules must be followed during intravenous drug use:

- Use drugs only with your own, new, sterile syringes, needles, and filters, and thoroughly washed materials (water containers and spoons). Never share injection materials!
- Thoroughly wash your hands before and after each time you use drugs.
- Transferring by either frontloading or backloading should always be performed with your own, new, sterile syringes, needles, and filters.
- Water containers and spoons must be washed very thoroughly. Pathogens, which can remain infectious for a long time, can get stuck on them following multiple uses. Spoons and water containers can be disinfected with alcohol swabs, bleach or eau de Javel as follows: Soak swab or wipe (or similar) with copious amounts of disinfectant and apply the liquid to the items. Leave the liquid on for at least 5 minutes. Dry the items off with a dry swab or pad. Then rinse well with cold water. Finally, dry the items off.

**Warning:** Eau de Javel or bleach residues in syringes or needles can have fatal consequences! Therefore, be sure to rinse them thoroughly (Fact Sheet on Disinfection in the Appendix).

- Any type of filter should only be used once. This also applies to cases where there may still be some of the drug left in the filter (no “cotton shots”). Used filters contain blood residue, which are often home to viruses and large cultures of bacteria, which reproduce rapidly especially at body temperature (e.g. when the filter is carried in a trouser pocket).

Drug users must also become sensitized to so-called blood awareness. Blood – even dried blood, even in the tiniest amounts – can be fundamentally contaminated and must therefore always be treated as infectious.

**Prior to intravenous drug use**

- Use a cleared and cleaned surface.
- Prepare containers for disposing of used swabs, pads, tissues, etc.
- Wash hands thoroughly.
- 1 injection = 1 sterile filter syringe. A cigarette filter can be used, if necessary. Then always wash your hands first and remove the filter with clean hands. Never use your teeth!
Never share or loan your own filter – not even just to be helpful.
Use your own personal spoon; clean thoroughly with water and a disinfecting pad prior to use.
Use sterile water or – if not available – use fresh water directly from the tap.
Prior to injection always use fresh disinfectant (alcohol swab or pad).
When using heroin: use sterile ascorbic acid instead of lemon juice. Make sure that the water in the syringe is clear and contains no contaminants.

**During use**
- Place the tourniquet (causes the veins to bulge out).
- Disinfect the skin with an alcohol swab or pad prior to injection.
- If light red blood enters the syringe on its own, then an artery has been tapped. In such a case withdraw the needle and place pressure on the injection site for at least 5 minutes.
- Once the needle has been placed correctly, release the tourniquet prior to pushing down on the plunger.

**Following use**
- Squeeze the vein and wipe up any blood droplets with a clean dry swab or pad.
- Place an adhesive bandage.
- Discard the syringe in a receptacle intended for this purpose in order to prevent any reuse of the syringe.
- Discard used swabs or pads in a trash receptacle or other receptacle intended for this purpose.
- Clean the surface (or discard it) and clean the spoon. Wash hands thoroughly.
- When injecting a second time do not use the same vein you used the first time.

> Never forget: Always use your own, sterile injection materials!

### 2.3 Rules of use for smoking and snorting drug users

**Basic rules**
- Wash hands thoroughly before and after each time you use drugs.
- Do not share inhalation tubes or straws (risk of injury).
- Do not share pipes when freebasing or attach a new mouthpiece.
- Use your own tube or straw when snorting.

**Smoking**
- Never forget: Always use freebase cocaine instead of crack!

"Freebasing" is a term to describe the procedure by which cocaine hydrochloride (cocaine) is converted back into base cocaine (smokeable cocaine). The two distinct methods are as follows:

1. **Freebase method**
   Baking soda (sodium bicarbonate, NaBic) or ammonia and ether are mixed with cocaine hydrochloride and water. The mixture is heated and the ether vapourizes. After the mixture cools and crystallizes it is washed with ether or chloroform. The result: freebase cocaine. Heating the ether during production creates a highly flammable mixture, which is capable of igniting itself and causing powerful explosions! The manufacturing process takes about 24 hours.
2. Crack method
Ammonia is mixed with cocaine hydrochloride and water. The mixture is heated and cooled. Then the crystals are filtered out. The result: base cocaine (crack). Crack contains ammonia residues that cause further damage to the lungs, which are already strained by the smoking. Therefore, preference should be given to freebase cocaine - which is "washed" to remove any ammonia residues. However, people often choose to smoke crack because the process of manufacturing freebase cocaine is so elaborate and dangerous.
Definition: In Switzerland crack is often referred to as base or even freebase.

**Snorting**
- Disinfect the surface on which the lines will be prepared.
- Make sure to use your own tube or straw when inhaling or snorting drugs and do not share it.
- Never use rolled up bank notes.

If a snorting person has injured nasal mucosa, then the tube or straw (even rolled up bank note) that he or she uses can become contaminated with blood, which could contain the hepatitis B or C viruses. These viruses can be transmitted to anyone sharing the tube, straw or bank note.

Cocaine use weakens the body's defences. Thus, even a tiny number of viruses can be contagious.

→ Never forget: Hepatitis C can be transmitted through smoking and snorting drugs!

**2.4 Disposal of the materials for drug use**

All materials used for drug use must be disposed of quickly and in the safest possible manner.

**Non-sharps**
- Used swabs or pads, filters, etc. must be disposed of in a container intended for this purpose.
- Outside the consumption room: place the materials in an empty aluminum can, for example, and then dispose of the whole thing in the normal manner with the other refuse.
2.5 Less risky injection

Fundamentally it should be ensured that the clientele have 24-hour-a-day access to suitable quantities of injection materials. Intravenous cocaine users have an especially substantial need for injection materials. This basic principle applies not only to the consumption rooms, but also generally. This is the only way to ensure that used injection materials are not reused or shared.

Sterile needles and syringes remain the preferred option above all others. It is urgently recommended that all institutions, including prisons, provide their drug-using clientele with 24-hour-a-day access to suitable quantities of sterile injection materials. Drug use should not take place if there are no sterile injection materials available.

Accessing syringes

Syringes can be accessed anonymously at the following places:

- pharmacies
- mobile syringe dispensaries
- contact and drop-in centres
- syringe dispensing machines (in larger cities)
- prisons (rare)

The clientele are to receive suitable and urgent instruction about these rules of use. It is especially necessary to ensure that these rules are also followed by the drug users outside the consumption rooms (Fact Sheet on Injection in the Appendix).
2.6 Alternatives to injection

In addition to injection, inhalation or snorting, there are other less risky forms of drug use: If there is only one syringe available or the drug user has very poor veins, then the drug can also be injected into the anus using the syringe without the needle. It should be applied while lying down. The syringe is inserted 1-2 cm. Following use, the person should remain in the lying down position for 2-3 minutes. The rules of hygiene apply here as well (wash your hands, use your own, sterile syringe!)

2.7 Specific information for consumption rooms

**Spatial requirements**

Consumption rooms serve an important purpose in preventing infections, thereby ensuring public safety as well. The specific information included below is based on the 2001 standards for contact and drop-in centres compiled by the professional association Sucht [Addiction].

**Facilities**

The following internal and external facilities must be provided:

- Staff offices/staff rooms
- Wet rooms (toilet, shower, laundry)
- Lounge
- Kitchen/bar
- Consumption room
- Medical room (health services room)
- Courtyard and/or entry area

The size of the individual spaces must be suitable to accommodate the number of visitors to be expected based on the area to be served.

**Purpose and arrangement of the individual spaces**

- Staff offices/staff rooms:
  - Staff must have access to an office or a staff room with the infrastructure necessary to operate the centre.
- Wet rooms:
  - Toilets (separate for men and women), a shower, a washing machine and a dryer are required to take care of personal necessities.
  - The staff must have a separate toilet.
- Lounge:
  - The lounge offers users a place to go to get off the streets.
  - The room must be sensibly arranged and low-maintenance.
  - Games, books, periodicals, etc. should be available.
  - A small sitting area outside (inner courtyard) can be beneficial, depending on the area (e.g. in rural areas).
- Kitchen/bar:
  - These must make it possible to prepare and serve food under hygienic conditions.
Consumption room:
- The consumption room must correspond to the general conditions for drug consumption rooms permitted by law (Dr. iur. Hans Schultz, FOPH, June 1989).
- The consumption room must include a suitable waiting room or area within the lounge or the courtyard/entry area of the drop-in centre.
- The consumption room must be clearly separated from the other rooms.
- Running water must be available in the consumption room.

Medical room/health services room:
- Medical services should be performed in a separate room from the other rooms.
- The necessary infrastructure (including running water) must be available.

Courtyard/entry area
- The courtyard and/or entry area of the contact and drop-in centre must be staffed.
- Any surveillance of the public space around the centre (e.g. by security guards) is the responsibility of the local authorities.

Cleaning and disinfection

Skin disinfectant (follow the instructions for use)
used for hygienic and surgical disinfection of the hands.
Placement of the dispenser:
- near the sink
- in the consumption room
- in the medical room
- behind the bar
- at the sink in the staff office

Liquid soap (for washing hands; follow the instructions for use)
Placement of the dispenser: same as for skin disinfectant (see above)

Alcohol 70 % (do not dilute!)
- for the disinfection of the respiratory mask (after each use)
- for cleaning the syringe exchange area
- in the consumption room: at each seat, in a spray bottle
  - for disinfecting spoons (leave it on for at least 15 minutes)
  - for disinfecting the skin prior to injection
  - for cleaning the table following injection
- in the medical room:
  - for disinfecting the instruments
  - for cleaning the table and chair (after each client)
  - for cleaning equipment (telephone, etc.)

Surface disinfectant (do not dilute! Follow the instructions for use)
- in the consumption room: for comprehensive disinfection (immediately after daily closing)
  - of the user spots
  - of the sink
  - of the doors
- in the wet rooms (complete coverage)
3. LEGAL REGULATIONS AND WORKPLACE PRECAUTIONS

LABOUR LAW

3.1 Legal regulations

In accordance with Art. 82 of the Swiss Federal Act on Accident Insurance (UVG; SR 832.20), and in order to prevent occupational accidents and illnesses, the employer is obligated to take all the necessary measures which are feasible in accordance with the most current state-of-the-art technology and appropriate to the given conditions. Any associated costs are to be covered by the employer. The employer is obligated to cooperate.

The following statements are based on the current knowledge about hepatitis: All employees who are exposed to blood or potentially infectious bodily fluids within the framework of their work tasks should be vaccinated against hepatitis B. The costs of these vaccinations are to be covered by the employer. The employees are required to observe the rules of the institution with respect to occupational safety. Due to the invasive nature of vaccinations (injection), they are only permitted to be recommended; they are not required. If an employee refuses the vaccination, then it is recommended that the employer:

- inform the person again about the utility of the vaccination.
- use the person for tasks that do not involve a risk of infection.
- make a record in writing of the refusal to get vaccinated despite multiple requests.

Persons who have not been vaccinated must go for regular medical check-ups, as needed, in order to determine whether they have become infected with a transmissible disease.

Suspected cases of work-related infections must be reported to the occupational accident insurance provider. The case is covered by this insurance provider, unless the infection was deliberately brought about by the insured employee.

Each workplace must designate a physician to whom the employees can report in cases in which they have been exposed to potentially infected materials or any other risk of infection (puncture wounds or bites). The immediate administration of a post-exposure prophylaxis (e.g. active and passive immunization) may be indicated.

PRECAUTIONS

3.2 Post-exposure prophylaxis (PEP)

Persons whose work involves a lot of contact with infected blood should get vaccinated for hepatitis B and an HBsAb titer test should be run in order to prove that the protection provided by the vaccination is sufficient. All institutions should be able to quickly access the corresponding information about their employees so that no time is lost for the administration of post-exposure prophylaxis.

In addition to the hepatitis B vaccination, persons whose work involves contact with
intravenous drug users should also be vaccinated against hepatitis A. Nowadays there are highly effective medications available for the prevention of an infection with the HIV and hepatitis B viruses. PEP must be applied as soon as possible following the contact with blood. There is no PEP for hepatitis C. An active immunization is possible for hepatitis A.

3.3 At-risk situations

In cases of
- needle puncture wounds
- bites
- injured skin (eczema, wound, etc.) coming into contact with blood
- the mucosa coming into contact with blood
the general practitioner or emergency physician or specialized HIV hotline must be contacted right away in order to discuss how to proceed.

Wherever possible, a blood sample should be taken from the index patient that may have infected the exposed person in order to perform HIV, hepatitis C, and hepatitis B tests. His/her personal details should also be recorded.

Even if a person refuses the post-exposure prophylaxis, a physician must be sought as soon as possible to take a blood sample for insurance-related and legal reasons. Blood tests must be repeated after 3 months and after 6 months. In the meantime the person affected is to be treated as possibly infected and therefore possibly contagious.

3.4 PEP for HIV

Every institution that provides services to at-risk patients should always have a one-day supply of tablets and capsules readily accessible in case of emergency (Viracept 2 x 5 tablets at 250 mg per day and Combivir 2 x 1 capsule per day).

In the case of a known HIV-infected index patient the first dose should be taken by the affected person right away (within two hours at most!) following the exposure event (5 Viracept tablets and 1 Combivir capsule). In a case in which an institution does not have access to these medications, it must be ensured that these medications can be ordered (e.g. through the emergency hotline at university hospitals), procured, and administered to the affected person within two hours (24 hours a day!).

These measures should be coordinated with the general practitioner, the emergency physician or the HIV specialist, wherever possible. Even if the HIV status of the index patient is unknown or has been negative to date the evaluation by a physician is imperative in order to assess the risk of infection.
**For emergencies the following applies**

When in doubt, take the first dose of medication in order to buy more time for further clarification. The possibility of becoming infected with HIV far outweighs the harm of any brief side effects associated with the emergency medications.

### 3.5 PEP and hepatitis B

An at-risk patient is any index patient that has tested HBsAb-positive or whose status is not known and who is probably addicted to drugs.

**How to proceed**

If the exposed person has not been vaccinated or is insufficiently vaccinated (HBsAb < 10), then hepatitis B immunoglobulins must be administered within 48 hours of exposure in addition to an active immunization regimen. This will buy time to determine the vaccination status (HBsAb) if it is not known. If the HBsAb value is between 10 and 100, then an active immunization is sufficient. If the hepatitis B value is above 100, then no further measures are necessary. The protection provided by the immunization is sufficient for the long term.

*If the index patient is known, but the HBsAb value is not:*

**How to proceed**

There are 48 hours following the event to run the necessary tests to determine the HBsAb value of the index patient.

### 3.6 Insurance coverage

Each needle puncture wound and each exposure of the mucosa or injured skin to contact with blood must be reported to the occupational accident insurance provider. The costs for blood samples and medical consultations are covered by this provider. In the case of an infection, the services provided by the occupational accident insurance are better than those provided by the health insurance funds. However, it is imperative to maintain careful documentation and proof based on blood samples taken immediately following the injury, as well as 3 and 6 months later.
III. Treatment
1. DIFFERENT HEPATITIDES – DIFFERENT TREATMENTS

GET TREATED

1.1 Treating viral hepatitides

Experience to date has shown that the chances of successfully treating viral hepatitis in drug users are similar to those for patients with no addictive disorders. However, treatment should be provided by physicians and/or medical institutions with the necessary experience and expertise with respect to addictive disorders and the specific problems associated with viral hepatitis infections. Psychic and/or somatic concomitant diseases, which commonly occur in patients with an addictive disorder must be taken into consideration and treated.

An important precondition for the medicinal treatment of viral hepatitis in drug users is the attainment of the greatest possible physical, psychological, and social stability. This makes it possible to prevent interruptions in or premature discontinuation of treatment. In addition, the risk of coming into contact with the virus again (re-exposure to the hepatitis C virus) and/or substances that cause liver damage (especially alcohol) is also greater among unstable patients. Withdrawal treatments and the months immediately following withdrawal are usually to be viewed as an unstable phase, which is why the risks and benefits of hepatitis treatment during such a phase should be carefully considered. Conversely, treatment is often highly feasible while the person is undergoing a well-established out-patient opiate replacement therapy regimen or within the framework of a longer stay at an institution – even while serving time at a correctional institution.

Among all of the various types of viral hepatitides, chronic hepatitis C is clearly the most important form of hepatitis requiring treatment among drug users. The chances of success depend on individual factors and the genotype of the hepatitis C virus, as well as proper treatment (→ Chapter III.1.5). The chances of success are between 50 and 90%. In addition, the genotype mainly determines the duration of the medicinal treatment (24 or 48 weeks).

Because hepatitis B is significantly less prone to chronic progression than hepatitis C, and because it is possible to get vaccinated against hepatitis B, the need for medicinal treatment is much less common. The indication should be established at a specialized centre by taking all of the possible contraindications into consideration.

Because hepatitis D only occurs in conjunction with hepatitis B, this disease does not need to be taken into consideration and treated except in cases of existing chronic hepatitis B.

Hepatitis A and E never become chronic and are always able to be cured. Thus, a medicinal treatment is not necessary.

1.2 Hepatitis A and E

Hepatitis A and hepatitis E never become chronic. In the case of an acute illness it is not necessary to administer any medicinal, anti-viral treatment. Any symptoms, such as nausea, can be treated. However, it is urgently recommended to conduct a thorough medical examination beforehand. It may be that treatment influences blood coagulation. In a case in which the patient bleeds more readily during the acute phase (e.g. while brushing teeth) it is recommended to test the patient’s blood coagulation; an
increased bleeding tendency may be an expression of an acute hepatic event. It is not necessary to change basic eating habits; however, heavy and fatty foods should be avoided.

1.3 Hepatitis B (and D)

In the case of most patients with an acute hepatitis B infection acquired as an adult the disease usually heals without any complications, such that medicinal treatment is not necessary. Hepatitis B becomes acute only rarely, usually in association with diminished liver function. In such cases, early admission to an organ transplant centre is recommended in order to make it possible for the patient to receive a life-saving liver transplant.

1.4 Chronic hepatitis B (and D)

Due to the fact that the hepatitis D virus only occurs in conjunction with the hepatitis B virus, the same treatment guidelines are applicable for both of these types of hepatitis.

In determining whether it is necessary to treat a chronic case of hepatitis B, the following aspects must be taken into consideration and careful testing must be performed:

- the activity of the viral infection
- the extent of the liver damage
- the age of the patient
- the foreseeable response to treatment
- the possible side effects associated with the treatment

Patients with significantly impaired liver function (more than twice the norm) and advancing or advanced liver damage (fibrosis/cirrhosis) will benefit from anti-viral therapy.

There are two types of chronic hepatitis B:

- severe viral replication: HBs and HBe antigens are detectable in the blood > HBe antigen-positive hepatitis B. The risk of long-term damage and infection is high in such a case.
- slight viral replication: HBs antigen-positive, HBe antigen-negative, HBe antibody-positive > HBe antigen-negative hepatitis B.

(→ Chapter III.1.7)

With respect to contraindications and treatment of patients with addictive disorders the same basic rules for chronic hepatitis C apply (see below). At all events a medically qualified professional should be contacted. The treatment usually involves anti-viral medications (nucleoside and nucleotide analogs) or pegylated interferon. The goal is a sustained suppression of the viruses, as well as a reduction in the impairment of liver function. The duration of therapy is between 6 months and several years, depending on the progression. Resistances can occur during treatment with nucleoside and nucleotide analogs, making it necessary to use additional substances from this class of active
substances. Virus elimination with the formation of HBs antibodies (HBs seroconversion) is more commonly achieved with interferon therapy (in approx. 7% of cases).

**Liver transplant**

In the case of advanced cirrhosis, a successful liver transplant is now possible. In order to prevent the recurrence of the disease (relapse) lifelong medicinal prophylactic measures with an anti-viral medication and periodic passive immunization with hepatitis B antibodies will be necessary.

**Lifestyle**

Balanced nutrition and limited alcohol consumption are important. There are no fundamental restrictions with respect to physical activity on the job and during leisure time. Athletic activity has been shown to have a positive influence on disease progression in obese patients with fatty liver disease (hepatosteatosis).

### 1.5 Chronic hepatitis C

Deaths associated with liver damage are higher among drug users. Hepatitis C plays an important role here. Thorough counseling and awareness among all hepatitis C-positive drug users is vital.

The central treatment goal is the elimination of hepatitis C viruses in order to prevent and/or stop any possible after-effects of the infection, especially chronic liver damage. There are four subgroups of the hepatitis C virus in Western Europe (genotypes 1 through 4). In addition to the amount of virus in the blood, the type of subgroup has a significant influence on the success of the treatment and plays an important role in the selection of the treatment regimen and the follow-up examination schedule. Based on the known data available to date, it is possible to assume that the success rate for the treatment of genotypes 2 and 3 is between 70% and 90%. In the case of genotype 1 it can be assumed that approx. 50% of cases will be cured; in the case of genotype 4 the percentage of cases will be somewhat higher.

### 1.6 Adherence among drug users

Good adherence is of utmost importance for the successful treatment of hepatitis (as well as HIV). Adherence means the ability to comply with the therapeutic steps, which the physician and the patient have determined together.

In the case of hepatitis C these include:

- showing up for periodic follow-up appointments during and following treatment
- weekly injections as well as
- taking the prescribed medications

Adherence among drug users may be limited due to psychic concomitant diseases and the influence of psychotropic substances. If it is possible to provide the most comprehensive psychosocial and somatic treatment and counseling in one place, this will have positive effects on adherence and not only in association with hepatitis C therapy. The greater the number of different institutions and private practices that the patient has to visit, the greater the risk that appointments will be missed or that the therapy will be discontinued altogether.
An intensive counseling setting can also have a positive influence on adherence among drug users. The ideal setting for hepatitis C therapy offers opiate replacement therapy. Thus, hepatitis C treatment should be conducted within the framework of opiate replacement therapy and/or heroin-assisted treatment, wherever possible.

A coinfection with hepatitis B or HI viruses does not rule out treatment, not even among opiate replacement therapy patients. Just the opposite: Every effort should be made to start these patients on a hepatitis C therapy regimen as soon as possible. At all events, the establishment of the indication and the treatment decisions for coinfected persons are best left to specialized centres and physicians.

**MEDICINAL TREATMENT & SIDE EFFECTS**

1.7 Chronic hepatitis B (and D)

The indication for the treatment of chronic hepatitis B should only be established by specially qualified medical personnel because there is a variety of factors to be considered. The goal of anti-viral treatment is a sustained suppression of the HBV DNA together with a normalization of the transaminases. The levels of the latter are decisive in choosing a medication. A liver biopsy is not absolutely necessary.

The following substances are available: Lamivudine (Zeffix), telbivudine (Sebivo), entecavir (Baraclude) (all nucleoside analogs); adefovir (Hepsera) a nucleotide analog, and pegylated interferon (Pegasys, Pegintron).

The therapies can be roughly classified based on the form of progression:

**HBe antigen-positive chronic hepatitis B**

The presence of HBe antigens points to a high replication rate of the virus in the body. The transaminase level is decisive for the selection of the medication.

Variations include:

- If the transaminase level is over five times above the upper normal value, there is no contraindication (→ Chapter III.1.4), and the prospects are good for adherence on the part of the patient, then therapy with pegylated interferon for a period of 6 months is the top choice. Alternatives include: adefovir or entecavir.
- If the transaminase level is two to five times above the upper normal level, then therapy with lamivudine is indicated. The therapy lasts up to 6 months following HBe antigen seroconversion or until the appearance of a lamivudine resistance. Alternatives include: adefovir, entecavir and pegylated interferon.
- If transaminase values are within twice the upper normal level, then the patient usually receives no therapy.

**HBe antigen-negative chronic hepatitis B**

If a hepatitis B patient’s transaminase level is higher than twice the upper normal level, then long-term treatment with lamivudine is recommended until the patient develops resistances and/or up to 1 year after HBV DNA loss. Patients with lower values usually receive no treatment. Alternatives include: adefovir, entecavir and pegylated interferon.

**Inactive HBs antigen**

The prognosis for these patients is usually good. Treatment is therefore unnecessary.
Generally, the chances of therapeutic success are increased if the patient is consistent in following the treatment. A high degree of consistency on the part of the patient is also highly conducive to the prevention of the premature formation of resistances.

**Pegylated interferon**

Interferon is a natural protein produced by the body that activates the body's own defences, thereby inhibiting the replication of viruses. Thus, the body's immune system is enhanced. Pegylated interferon is a modified interferon, in which a polyethylene glycol side chain is attached to the original interferon molecule. This causes the medication to be absorbed and eliminated more slowly by the body, such that only one injection per week is necessary. Pegylated interferon has a higher rate of therapeutic success and fewer side effects than conventional interferon. In the most favourable cases treatment with pegylated interferon leads to “immunoclearance” (HBsAg/Anti-HBs seroconversion) and thus a serological cure. However, the therapy must be initiated prior to the appearance of cirrhosis. Pegylated interferon alpha-2a is the only medication approved for the treatment of hepatitis B.

**Lamivudine/adefovir/telbivudine/entecavir/tenofovir**

Nucleoside analogs (lamivudine, telbivudine, entecavir) and nucleotide analogs (adefovir, tenofovir) are chemical substances which are very similar in structure to the building blocks of the viral DNA. As a result, the virus recognises them as its own normal building blocks. Unlike with normal building blocks, however, once the nucleoside analogs or nucleotide analogs are integrated, the DNA can no longer continue to be produced and production is discontinued. This stops the replication of the virus. These medications are highly effective and well tolerated and can be taken in tablet form, unlike interferon. Unfortunately, these medications, which are usually required to be taken for several years, lose their efficacy over time (due to the development of resistances, which occurs at different times, depending on the medication and individual factors). In such cases combination therapies become necessary. The primary use of combination therapies, similar to those used for the treatment of HIV, is currently a highly controversial topic of debate.

**Side effects**

Lamivudine (nucleoside analog) is usually very well tolerated; special attention should be paid to kidney function with entecavir. Adefovir can cause gastrointestinal side effects (nausea, diarrhoea). The side effects of interferon are described in the chapter below on the treatment of chronic hepatitis C.

**Tests during therapy**

Periodic laboratory tests are necessary during ongoing hepatitis B therapy. In the case of therapies with nucleoside/nucleotide analogs, a quarterly control of transaminase levels is recommended, as well as a semiannual virological test (HBs antigen, HBe antigen, anti-HBe, HBV DNA quantitative). In the case of treatment with pegylated interferon periodic blood work and liver function tests should also be performed. Tests are recommended to be performed every two weeks during the first month and then every four weeks thereafter. In addition, a test for TSH (thyroid-stimulating hormone) is also recommended every quarter.
1.8 Chronic hepatitis C

**Indications**

The specialists are still not in agreement about the question as to when hepatitis C therapy should be initiated. According to the current state of knowledge, the decision on when to initiate hepatitis C therapy is based on the following criteria:

1. The virus (HCV RNA) is detectable in the blood
   - and there is a histological indication, in other words portal fibrosis and septa are detectable regardless of the degree of inflammation (Metavir score = F2)
   - or the virus is genotype 2 or 3 with elevated transaminases
   - or the patient wants to be treated no matter what
   - and/or the indication is based on extrahepatic manifestations, i.e. symptoms of hepatitis C are occurring outside the liver.
   - *In all of these cases it is not necessary to perform a liver biopsy.*

2. There are no contraindications, such as depression or psychosis, uncontrolled alcohol or intravenous drug use, advanced heart, lung or neurological diseases, autoimmune disease, previous malignant disease (except in cases of long-term remission), severe anaemia (<10 g/dl, but possible with administration of erythropoetin), poorly controlled diabetes mellitus.
   - *Note with respect to decompensated liver disease: Treatment in such cases at hepatology centres only.*

3. The consent of the patient, who has been informed in detail about the chances of success for the therapy, the potential side effects, and the risks of a progression of the disease if the therapy is not carefully followed.

4. The ability of the patient to adhere to the therapy and the follow-up appointments, and/or creation of a setting that promotes adherence for the administration of the therapy (→ Chapter III.1.6).

It is recommended to combine a hepatitis C therapy with an opiate replacement therapy and corresponding counseling, wherever possible. It is often useful to temporarily increase the methadone or heroin dosage during therapy. Hepatitis C therapy, while undergoing drug withdrawal treatment or less than 6 months thereafter, is contraindicated due to the high rate of relapse.

Hepatitis C therapy is feasible for prison inmates and long-term in-patient situations. Adherence to therapy and follow-up appointments is especially well ensured in such settings.

**Treatment**

Chronic hepatitis C is currently treated with a combination of pegylated interferon and ribavirin. The pegylated interferon is injected subcutaneously once every week. The injection can be performed by the patient or a qualified person after receiving the corresponding training. The second medication, ribavirin, is taken in tablet form twice daily.

The recommended therapeutic regimens are distinguished by the selection between two types of pegylated interferon (peg. interferon alpha-2a and peg. interferon alpha-2b). Both medications are equal in their efficacy. Thus, the decision as to which medication to use should be made on an individual basis. Possible criteria include the method of application (various types of syringes for the two medications) as well as cost.
**Dosage**

*Pegylated interferon alpha-2a*

- **Genotype 1 and 4:**
  180 µg peg. interferon alpha-2a sc 1x/week plus ribavirin 5 or 6 x 200 mg (depending on body weight, < or >75 kg), orally, in two doses per day for 48 weeks.

- **Genotype 2 and 3:**
  180 µg peg. interferon alpha-2a sc 1x/week plus ribavirin 4 x 200 mg orally in 2 doses per day for 24 weeks.

*Pegylated interferon alpha-2b*

Here the interferon dosage is also based on body weight:

- 1.5 µg/kg once weekly for 48 weeks.
- Plus ribavirin:
  - <65 kg: 800 mg/day (2 capsules each morning and 2 each evening)
  - 65-85 kg: 1,000 mg/day (2 capsules each morning, 3 each evening)
  - <85 kg: 1,200 mg/day (3 each morning, 3 each evening)

**Genotype 1 and 4:** 48 weeks

**Genotype 2 and 3:** 24 weeks

The genotype and the viral load before and after the therapy determine the length of the therapy. The therapy usually lasts 24 to 48 weeks.

- **Genotype 1 + 4:** Usually 48 weeks. In cases in which the viral load after 3 months is not negative or is not decreased by at least 2 log (100 x) the treatment is discontinued because the chances of success are too small in relation to the side effects.
- **Genotype 2 + 3:** Usually 24 weeks. (→ shortened therapies).

A negative viral load after one month of treatment (rapid virological response, RVR) has been shown to have great chances of success with good patient response to the medication and proper compliance on behalf of the patient with respect to the administration of the therapy. This can increase the motivation among drug users, especially in the case of severe side effects. In addition, RVR therapy can also be shortened, as necessary.

**Therapy follow-up**

- Blood sampling 1x weekly for 8 weeks, then blood work every month.
- ALT (liver function test): every 2 weeks for the first month, then monthly.
- TSH (thyroid-stimulating hormone): every 3 months.
- HCV RNA test: at 4 and 12 weeks, and additionally after 24 weeks of therapy in the case of genotypes 1 and 4.
- Week 4: If the viral load is already no longer detectable, then a shortened therapy can be considered (rapid virological response, RVR).
- Week 12: The therapy can be stopped if the viral load has decreased by less than 2 log because there is barely any chance of therapeutic success.
- Week 24: Therapy is not continued in the case of genotypes 1 and 4 unless HCV RNA is no longer detectable.

**Post-treatment follow-up**

A liver function test (ALT) and viral load test (HCV RNA) are performed every 6 months following successful therapy. If abnormalities are detected in the blood work performed during the therapy, then those values are checked again at 3 and 6 months.
**Chances of success**

Therapeutic success is defined as a negative HCV RNA result and normal transaminase levels at 6 months after the conclusion of therapy (sustained virological response, SVR).

The chances of successful therapy are between 50 and 90 %, depending on genotype, whereby genotypes 2 and 3 respond best to therapy.

Following successful therapy (sustained virological response 6 months after the conclusion of therapy), the relapse rate is 1-2 % for the next 2 years (late relapse). The patient can attempt therapy more than once following discontinuation of therapy; the chances of success remain the same.

**Shortened therapies**

In cases in which there are no more viruses detectable in the blood after 4 weeks of therapy it is possible under certain circumstances to shorten the therapy to 16 weeks for genotypes 2 and 3, and 24 weeks for genotype 1. The presence of further prognostically favourable factors, such as low viral load at the start of therapy (<600,000 IU/ml), as well as good adherence during therapy are important preconditions in reaching such a decision. Therapies lasting the entire scheduled duration without any difficulties are recommended; the chances of success are best under these conditions. A shortened therapy should only be considered under the conditions described above and with the appearance of severe side effects.

**Adverse reactions**

The appearance and extent of side effects vary widely depending on the individual. Most side effects occur during the first four weeks and often clear up gradually during the course of treatment.

**Somatic side effects**

- Flu-like symptoms most commonly occur within several hours of the interferon injections, including fever, headache, fatigue, sore muscles, joints, and limbs. These can be readily treated preventively by administering a cold remedy (paracetamol, 500 mg, 30-60 minutes prior to the interferon injection).
- Fatigue, which will decrease during the course of the therapy and will not completely disappear until the conclusion of treatment.
- Nausea, often occurring when first taking ribavirin, can be handled with medicinal treatment.
- Loss of appetite associated with weight loss.
- Hair loss, thinning hair.
- Dry skin, which can be prevented by using skin cream from the outset of treatment.
- Impaired thyroid function or other autoimmune diseases (rare).

The adverse reactions described above will decrease if the dosage is reduced or the medications are discontinued, with the exception of impaired thyroid function (and other autoimmune diseases), which never disappears completely.

Because the treatment can be stressful on the body (but does not necessarily have to be) it is important that the patient have access to a qualified medical expert to provide a detailed explanation beforehand of the effects of the treatment on the quality of life and to discuss any problems that might occur during treatment.

**Pregnancy**

Ribavirin is detrimental to the developing fetus in the womb and the quality of sperm. Therefore, women are not permitted to become pregnant and men are not permitted to sire children during treatment and up to six months after the conclusion of treatment. As a result, suitable birth control is indispensable throughout the entire duration
The hepatitis C treatment also has side effects on the blood cells (white and red blood cells, blood platelets); therefore, regular blood tests are very important.

**Side effects on the blood count**

Interferon lowers the number of white blood corpuscles (leukopenia) and/or the blood platelets (thrombopenia).
The extent of these side effects on the blood varies depending on the individual and can lead to the reduction of the interferon dosage or the discontinuation of therapy in a worst case scenario.

**Side effects of ribavirin**

The hemoglobin level (red blood pigment) drops to anaemic levels often accompanied by tiredness or rapid fatigue. Even some patients with normal blood values complain about increased fatigue during the first months of treatment.

**Psychic/psychiatric issues involved with hepatitis C infections and treatment**

The risk of psychiatric illnesses exists for both an infection with hepatitis C, as well as for its treatment.

Various studies have shown an increased prevalence in depressive disorders (in 22-28 % of infected persons) and anxiety (in 10-25 %) in cases of untreated illness. The infection is often observed to have occurred due to higher risk behaviour based on pre-existing personality disorders.

The various psychiatric disorders can have a considerable influence on the development and treatment of hepatitis C. Therefore, it is important to take into account the psychiatric comorbidity of the patient.

The administration of interferon can have neuro-psychiatric side effects, which can lead to a reduction in the dosage or even discontinuation of the therapy.

**Psychic side effects of interferon**

- Irritability
- Mood swings
- Depression
- Sleep disorders
- Anxiety
- Manic behaviour (rare)
- Cognitive disorders (memory, concentration)
- Confusion

Therapies often take a negative course in the case of drug users, especially due to these complications. Thus, a physician-patient relationship based on trust is important.

Special attention should always be paid to the following points during the treatment:

- The patient and his/her loved ones must also be informed about the possible confusion that may occur and any questions should be answered thoroughly.
- In the case of depression it may be necessary to initiate a corresponding medicinal treatment.
- The patients must be made aware that the hepatitis C treatment is a long-term treatment that will last for several months beyond the anti-viral therapy period. They should attend at least one meeting per month.
- In certain cases, such as a history of depression with or without suicidality, it is recommended that the patient undergo preventive anti-depression treatment.
The therapy of patients with unstable psychiatric illnesses should always be managed by specialized and experienced centres or private practices.

1.9 Special characteristics of drug users

Persistent, uncontrolled drug use increases the risk of a reinfection during therapy, regardless of whether the substances are used intravenously, inhaled or snorted. Therapy is not recommended in such cases.

This does not apply to drug users with controlled use. Sporadic use is possible under hygienic conditions and in quantities that do not adversely affect cognition and does not represent a risk of reinfection or a danger to the ongoing therapy.

It is recommended to combine a hepatitis C therapy with an opiate replacement therapy and corresponding counseling, wherever possible.

**Alcohol and hepatitis C therapy**

Wherever possible alcohol should not be consumed during hepatitis C therapy. Alcohol has no direct negative influence on the efficacy of the therapy. However, consumption can have an adverse effect on a patient's ability to adhere to the regimen and thereby complicate the course of the therapy. Thus, in the case of persons who are not able to do without alcohol completely prior to treatment, special attention should be paid to the ability of such persons to adhere to the regimen and steps should be taken to improve this ability, as necessary.
1.10 Preconceived notions about hepatitis C therapy

**Assertion**

“If you are addicted to drugs and/or living on the streets, you can’t participate in any therapy.”

“You can only participate in a therapy if you are in a methadone or heroin programme.”

**Response**

Regular drug use and/or homelessness do not disqualify you for hepatitis treatment. The decisive factor is whether the patient is willing and able to undergo treatment, which requires a great deal of discipline and tenacity. The chances of success for each individual case must be assessed in consultations between patients, physicians, and other caregivers and based on prior experience.

**Assertion**

“The side effects are so terrible that it’s better not to undergo therapy.”

**Response**

The side effects vary widely depending on the individual and are almost impossible to predict in individual cases. For example, time and again there are cases of patients who appear very frail but who complete their therapy with no side effects whatsoever. On the other hand, there are patients who appear healthy, but who experience such severe side effects that they have to discontinue therapy. The great majority of patients falls somewhere in between these extremes. While adverse effects do occur, they are often not severe and can also be relieved by means of medicinal treatment. The side effects last as long as the treatment, while the symptoms of a chronic illness can often last for many years.

**Assertion**

“You get very depressed.”

**Response**

Only a small group actually experiences depression. Experience has shown that some patients will go through mood swings, which are often mistaken for a very depressed state of mind. However, very few patients are actually affected by serious depression in the psychiatric sense of the word. In these types of cases it is useful to initiate treatment with anti-depressive medications, which are often highly effective.

**Assertion**

“The therapy only works on a few people.”

**Response**

Depending on the type of hepatitis and the genotype, as well as the medications used, the success rate for therapy is between 50 and 90 %. It can truthfully be asserted that the treatment is successful for many.

**Assertion**

“Nobody will cover the treatment.”

**Response**

Doctors’ visits and most of the medications used are required to be covered by the health insurance funds. In other words, coverage for hepatitis C treatment is mandatory under basic insurance.
IV. Appendix
# 1. GLOSSARY

<table>
<thead>
<tr>
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<tr>
<td>Adherence</td>
<td>Compliance with the therapeutic goals set by the physician and the patient.</td>
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<tr>
<td>Ab</td>
<td>Antibody</td>
</tr>
<tr>
<td>ALT</td>
<td>Alanine aminotransferase, formerly GPT. Liver enzyme, indicates liver damage.</td>
</tr>
<tr>
<td>Antigen</td>
<td>Substance that results in the formation of antibodies.</td>
</tr>
<tr>
<td>Anti-HBs</td>
<td>Antibody against the HBs antigen.</td>
</tr>
<tr>
<td>Anti-HBc</td>
<td>Antibody against the HBC antigen.</td>
</tr>
<tr>
<td>At-risk situation</td>
<td>Immediate measures following an at-risk situation.</td>
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<tr>
<td>Asymptomatic</td>
<td>Not corresponding to the anticipated symptoms.</td>
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<tr>
<td>Base</td>
<td>Actually: base cocaine = crack.</td>
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<tr>
<td>Bilirubin</td>
<td>Normal byproduct of the breakdown of the blood pigment (hemoglobin).</td>
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<tr>
<td>Blood awareness</td>
<td>With respect to contact with blood or with objects that could have blood or blood residue on them – even dried blood</td>
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<tr>
<td>CD4 value</td>
<td>Indicates the number of certain helper cells in the blood.</td>
</tr>
<tr>
<td>Cirrhosis of the liver</td>
<td>Severe disruption in liver function.</td>
</tr>
<tr>
<td>Crack</td>
<td>Base cocaine, manufactured from cocaine hydrochloride (cocaine), able to be smoked, contains ammonia residues</td>
</tr>
<tr>
<td>Coinfection</td>
<td>When more than one pathogen is simultaneously active.</td>
</tr>
<tr>
<td>Contaminated</td>
<td>Infected</td>
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<tbody>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic acid, a very large molecule that acts as a carrier of genetic information. Proteins are produced based on this information, which is written into the DNA in the form of a certain genetic code.</td>
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<thead>
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<tr>
<td>Exposure</td>
<td>Medical: contact</td>
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<tr>
<td>Fecal, feces</td>
<td>(Excrement), eliminated wastes (dung and urine) which the human or animal organism can no longer use</td>
</tr>
<tr>
<td>Fecal-oral</td>
<td>(Used to describe routes of transmission) human excrement in the mouth</td>
</tr>
<tr>
<td>Free Base</td>
<td>Actually: freebase cocaine, manufactured from cocaine hydrochloride (cocaine) with an elaborate process, able to be smoked</td>
</tr>
<tr>
<td>Fibroscan</td>
<td>A technique for measuring the stiffness or elasticity of the liver; an alternative to liver biopsy</td>
</tr>
<tr>
<td>Frontloading</td>
<td>A method of dividing a portion of a drug that has been heated and prepared for use into a syringe and transferring portions into one or more other syringes through the top opening (the cone)</td>
</tr>
<tr>
<td>Fulminant</td>
<td>In the medical sense of the word: severe, rapid progression.</td>
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<tr>
<td>Genital secretion</td>
<td>Fluid from the genitals: sperm or vaginal mucous</td>
</tr>
<tr>
<td>Genotype</td>
<td>Subgroups of the hepatitis C virus</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Hand hygiene</td>
<td>Washing of the hands</td>
</tr>
<tr>
<td>HAV</td>
<td>Hepatitis A virus</td>
</tr>
<tr>
<td>HAV-Ab</td>
<td>Hepatitis A antibodies</td>
</tr>
<tr>
<td>HBe</td>
<td>Hepatitis B envelope (antigen)</td>
</tr>
<tr>
<td>HBSAg-positive</td>
<td>Presence of acute hepatitis B</td>
</tr>
<tr>
<td>HBeAg</td>
<td>Hepatitis Be antigen; formed during virus replication, function unknown</td>
</tr>
<tr>
<td>HBsAg</td>
<td>Hepatitis B surface antigen, is usually the first detectable marker of a hepatitis B infection; part of the surface of the hepatitis B virus; also formerly referred to as Australia (Au) antigen or HAA (hepatitis-associated antigen)</td>
</tr>
<tr>
<td>HBV</td>
<td>Hepatitis B virus</td>
</tr>
<tr>
<td>HBV-DNA</td>
<td>Deoxyribonucleic acid of the hepatitis B virus, the genetic information of the virus, in other words a part of the virus</td>
</tr>
<tr>
<td>HCV</td>
<td>Hepatitis C virus</td>
</tr>
<tr>
<td>HDV</td>
<td>Hepatitis D virus</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>Inflammation of the liver</td>
</tr>
<tr>
<td>HEV</td>
<td>Hepatitis E virus</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus, the virus that causes AIDS</td>
</tr>
<tr>
<td>IgG or IGG</td>
<td>Class G immunoglobulins (antibodies)</td>
</tr>
<tr>
<td>IgM or IGM</td>
<td>Class M immunoglobulins (antibodies)</td>
</tr>
<tr>
<td>Immunity</td>
<td>Non-responsiveness to pathogenic germs due to:</td>
</tr>
<tr>
<td></td>
<td>1. Formation of antibodies following past exposure to an infectious disease;</td>
</tr>
<tr>
<td></td>
<td>2. Formation of antibodies following vaccination</td>
</tr>
<tr>
<td>Illness</td>
<td>Is an emergency situation in which the body shows symptoms (of disease)</td>
</tr>
<tr>
<td>Index patient</td>
<td>Person who may have infected an exposed person</td>
</tr>
<tr>
<td>Infection</td>
<td>Colonization of a host organism by pathogens; provides no information about symptoms</td>
</tr>
<tr>
<td>Infertility</td>
<td>Sterility, barrenness</td>
</tr>
<tr>
<td>Incubation time</td>
<td>Period between an infection and the appearance of clinical signs of the infectious disease</td>
</tr>
<tr>
<td>INR value</td>
<td>In order to verify the efficacy of blood-thinning medications the so-called international normalized ratio is determined in blood work performed by a Laboratory</td>
</tr>
<tr>
<td><strong>L, M, N, O, P</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
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<tr>
<td>Labour Law</td>
<td>Legal regulations</td>
</tr>
<tr>
<td>Liver biopsy</td>
<td>Removal of a tissue sample in suspected cases of chronic hepatitis</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Possible routes of transmission</td>
</tr>
<tr>
<td>Post-expositions-prophylaxis</td>
<td>Measures taken following possible contact with the pathogens of an infectious disease</td>
</tr>
<tr>
<td>PCR method</td>
<td>Polymerase chain reaction; a method of making copies of DNA without a living organism, using Escherichia coli or yeast, for example</td>
</tr>
<tr>
<td>Pegylated interferon</td>
<td>Interferon with delayed release of the active substance</td>
</tr>
<tr>
<td><strong>Q, R</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>Relapse</td>
<td>Recurrence of a disease</td>
</tr>
<tr>
<td>Rules of use</td>
<td>Rules of use for drug users</td>
</tr>
<tr>
<td>RNA</td>
<td>Ribonucleic acid; RNA is a nucleic acid, which sometimes serves as a carrier of genetic information in living cells instead of DNA</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>Side effects</td>
<td>Side effects in the treatment of hepatitis C</td>
</tr>
<tr>
<td>Screening</td>
<td>Series of tests for antibodies</td>
</tr>
<tr>
<td><strong>T, U</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>Testing</td>
<td>Testing in cases of suspected infection</td>
</tr>
<tr>
<td>Treatment</td>
<td>Treatment for hepatitides</td>
</tr>
<tr>
<td>Transaminases</td>
<td>Liver enzyme levels that are determined through liver function tests</td>
</tr>
<tr>
<td><strong>V, W, X, Y, Z</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>Vaccination</td>
<td>Vaccination against hepatitis</td>
</tr>
<tr>
<td>Viral</td>
<td>Related to or caused by a virus</td>
</tr>
<tr>
<td>Viral load</td>
<td>Used to refer to the amount of the virus in the blood</td>
</tr>
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</table>
INJECTION

1. Wash hands thoroughly.

2. Prepare a clean surface. Always use your own new injection materials: syringe, needle, water container, water, spoon, filter, ascorbic acid, alcohol and dry swab or wipe, tourniquet, adhesive bandage. Never share injection materials! Don’t share filters either – not even just to “help out”!

3. Use a sterile syringe with a filter (use a piece of your own cigarette filter, if necessary). Do not remove the filter with your teeth. The liquid in the syringe must be clear and clean.

4. Place the tourniquet (causes the veins to “bulge out”). Disinfect the insertion site with an alcohol swab or wipe.

5. If light red blood enters the syringe on its own, then an artery has been tapped. Remove the needle and press down on the insertion site for at least 5 minutes.

6. Once the needle has been placed correctly (dark blood): release the tourniquet prior to pushing down on the plunger.

7. Following injection: Squeeze the vein and wipe up any blood droplets with a clean dry swab or wipe. Then place an adhesive bandage.

8. Within the consumption room: dispose of used syringes without the plastic cap on the needle in special containers intended for this purpose.

9. Everywhere else: place the used syringe with the plastic cap on the needle in a sturdy container (e.g. empty aluminum can) and dispose of the whole thing with the normal refuse.

10. Clean the surface. Discard the used syringe (without the needle), the swabs or wipes, the filter, etc. with the refuse.

Wash hands thoroughly.

Wash hands thoroughly.
Disinfect the spoon and water container

1. Disinfect the spoon and water container with alcohol wipes or with bleaching agent (e.g. eau de Javel).
2. Apply copious amounts of disinfectant to the spoon and water container with the wipes or a paper tissue.
3. Leave the liquid on for at least 5 minutes.
4. Dry with a fresh wipe or paper tissue.
5. Thoroughly rinse with fresh water.
6. Finally, dry with a fresh wipe or paper tissue.
FIRST AID/TREATING WOUNDS

Patients

1. Allow the wound to bleed for a moment.

2. Disinfect the wound.

3. Place adhesive bandages on smaller wounds; wrap larger wounds with a bandage.

Health care personnel

1. Wash hands thoroughly.

2. ...rub with disinfecting solution.

3. ...rub with disinfecting solution.

4. Put on latex gloves (following contact with blood: discard gloves and put on new ones).

5. Remove blood droplets on work surfaces with disinfecting solution. Immediately dispose of used, blood-stained cloths, wipes, gloves, etc.

6. Wash hands thoroughly...

7. ...rub with disinfecting solution.
BLOOD AWARENESS

In the case of certain viruses even tiny invisible amounts of blood are enough to spread infection. Even in day-to-day situations it is possible to come into contact with blood or with objects that could have blood or blood residue on them – even dried blood:

- Cuts and scrapes from sharp objects in the kitchen, while doing handcrafts, etc.
- Cuts, scrapes, and puncture wounds from foreign objects, needles, knives, etc.
- First aid: direct contact with open wounds (always wear gloves!)

- Counter tops, shelves, surfaces, and documents, on which previously soiled materials have been placed (tables, paper documents)

- Blood residue on fingers, e.g. due to scratched open wounds, insect bites, eczema, etc.
- Touching veins that have already been tapped with soiled, blood-smeared fingers (when helping someone else inject)
- Pressing down on the injection site with soiled fingers after pulling out the needle (use a dry swab!)

- Water containers in which a used syringe was immersed to withdraw water
- Syringes (used) to divide up the drugs

- Toothbrushes, razors and razor blades, nail clippers, nail files, piercing and tattooing instruments (which have not been completely sterilized)

- Inhalation tubes/straws or pipes while snorting or freebasing
- Filters (touched by soiled hands with residual blood on the fingers)
- Spoons (which have not been cleaned and sterilized or not completely cleaned and sterilized)
- Residual blood (even dried blood) on lighters, tourniquets, water containers or knives (used to divide up the drugs, etc.)
4. AUTHORS & EXPERTS

Dr. med. Philip Bruggmann
ARUD Zurich Polyclinic for Methadone-Supported Treatments ZOKL 1
Sihihallenstrasse 30
8026 Zurich
p.bruggmann@arud-zh.ch

Dr. med. Virginie Masserey
Swiss Federal Office of Public Health (FOPH)
Transmissible Diseases, Vaccinations Department
Postfach
3003 Bern
virginie.masserey@bag.admin.ch

Dr. med. Martine Monnat
Centre Saint-Martin DUPA, DUMSC
Rue Saint-Martin 7
1003 Lausanne
martine.monnat@inst.hospvd.ch

Dr. med. Catherine Ritter
Chemin du Vignoble 38
1232 Conflignon
info@catherineritter.ch

Dr. Samuel Erny
Swiss Federal Office of Public Health (FOPH)
Transmissible Diseases, AIDS Department
Postfach
3003 Bern
samuel.erny@bag.admin.ch

Prof. Dr. med. Andreas Cerny
Department of Internal Medicine, Infectology, and Pharmaceutical Medicine (FMH)
Lugano Clinic - Moncucco
Centre for Hepatology
Via Moncucco 10
6900 Lugano
andreas.cerny@bluewin.ch
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