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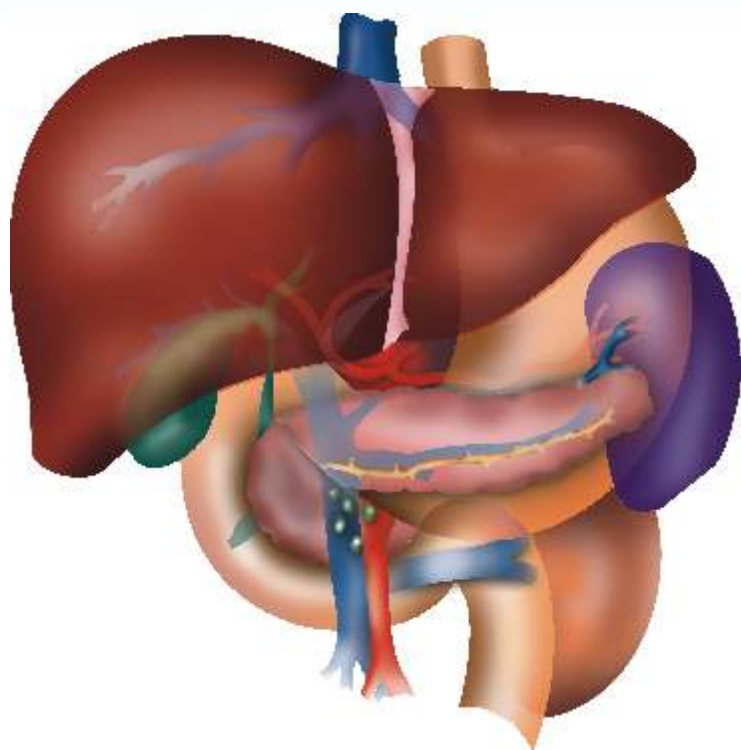


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The information given in this booklet is only intended  
 to guide you and educate you on the disease.  
 Please follow your doctor's advice and treatment.



Welcome to Your Hepatitis Handbook. This book will help give you a head start by explaining everything you need to know about the disease. With information ranging from the basic functions of the liver to the various forms of hepatitis and their prevention and treatment methods, you'll find most of your questions answered within these pages.



### The Liver:

The liver is the largest internal organ of our body and it weighs around 1200-1500 gm approx. The liver is located behind the lower right part of your ribs and below the diaphragm in the abdominal cavity.

The liver's main function is to filter the blood. It helps guard you from infection and removes bacteria and other toxic substances from your blood to help you stay healthy.

### What does the liver do?

Liver plays about 500 different roles, Importantly, it:<sup>1</sup>

- Stores vitamins, sugars, fats and other nutrients from the food that you eat
- Builds chemicals that your body needs to stay healthy
- Breaks down harmful substances, like alcohol and other toxic (poisonous) chemicals
- Removes waste products from your blood
- Control hormone levels in blood
- Helps fight infection

### Hepatitis:

Hepatitis means "inflammation of the liver". Hepatitis can be caused by

<b>Hepatitis Viruses</b>	Several different viruses cause viral Hepatitis. They are named Hepatitis A, B, C, D and E viruses.
<b>Alcohol Consumption</b>	Intake of too much alcohol can cause alcoholic hepatitis
<b>Drugs</b>	Certain drugs can also cause hepatitis
<b>Genetic Disease</b>	Very rare, but autoimmune Hepatitis is a disease in which the body's immune system attacks liver cells.

1. British Liver Trust- <http://www.britishlivertrust.org.uk/home/the-liver.aspx>

**Viral Hepatitis:**

Viral Hepatitis is the most common cause of the Hepatitis. Several different viruses cause viral Hepatitis. They are named Hepatitis A, B, C, D and E viruses. All of these viruses cause acute or short-term viral Hepatitis. The Hepatitis B, C and D viruses can also cause chronic Hepatitis, in which the infection is prolonged, sometimes lifelong.

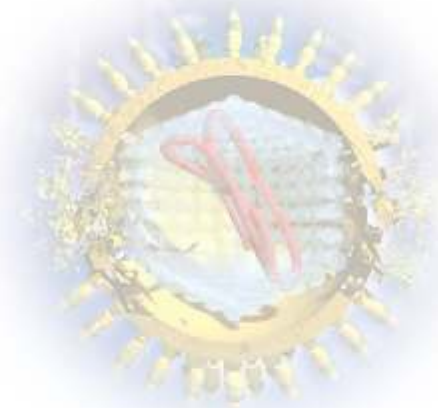
**Mode of Transmission in Hepatitis B & C:**

Hepatitis B and C are blood borne infections, and a tiny amount of blood from someone who has the virus will pass on the infection if it gets into your bloodstream, e.g. through an open wound, cut or scratch, or from a contaminated needle.

All blood donations in the India are tested for Hepatitis B, but before testing was introduced it was possible to become infected by receiving blood or blood products from an infected person. In countries where blood is not tested, blood transfusions may still be a cause of infection.

Hepatitis C virus was formerly called Non-A, Non-B Hepatitis virus and was classified as Hepatitis C virus in 1992. Therefore people who have had blood transfusion or surgery prior to 1992. should consult their Physician. Blood tests are the only possible way to detect the HCV infection.

Most of the time, mode of transmission is same in both Hepatitis B and C. The major differences in chances of infection between these two groups are sexual transmission and vertical transmission (infected mother to child), which are high in case of Hepatitis B as compared to Hepatitis C.



Mode of Transmission	Hepatitis B	Hepatitis C
Blood transfusion	High	High
Needle prick with an infected needle	High	High
Sexually transmitted	High	Low
Dental treatment where equipments are not properly sterilized	High	High
Getting a tattoo or body piercing with unsterilised tools	Low	Low
Sharing razors, toothbrushes, towels with an infected person	Low	Low
Infected mother to child transmission	High	Low
Sharing drug needles	High	High
Haemodialysis in kidney failure patients	High	High
Breast Feeding	Yes	No

**It is important to know that Hepatitis is not spread by:**

- Sneezing
- Coughing
- Food or water
- Sharing drinking glasses or eating utensils
- Handshakes
- Holding hands
- Hugging
- Kissing on the cheek
- Playing with children



## Symptoms of Hepatitis B/C:

### What are the symptoms?

Many people with Hepatitis B/C don't have symptoms. However, some people with Hepatitis C feel like they have the flu. So, you might

- Feel tired
- Have a fever
- Not want to eat
- Have stomach pain
- Have diarrhoea



### Some people have

- Dark yellow urine
- Light-coloured stools
- Yellowish eyes and skin



If you have symptoms or think you might have Hepatitis B/C, go to a doctor. The only way to know if you have it is to get a blood test for Hepatitis B/C.

## Hepatitis B:

Hepatitis B, sometimes called Hep B or HBV, is a liver disease caused by the Hepatitis B virus. You can prevent illness by having a vaccination that will give you protection from the virus.

Hepatitis B is common in south-east Asia, the Middle and Far East, southern Europe and Africa. The World Health Organization estimates that one-third of the world's population has been infected at some time and that there are approximately 350 million people who are infected long term. In Europe, there are estimated to be one million people infected every year. In the UK, approximately 1 in 1000 people are thought to have the virus. In some inner-city areas, where there is a high percentage of people from parts of the world where the virus is common, as many as 1 in 50 pregnant women may be infected.

India has intermediate endemicity of Hepatitis B.<sup>2</sup> The number of HBV carriers in India has been estimated to be over 40 million (4 crore). It has been estimated that, in India of the 25 million infants born every year, over one million run the lifetime risk of developing chronic HBV infection. Every year over 100,000 Indians die due to illnesses related to HBV infection.

The virus is present in body fluids such as blood, saliva, semen and vaginal fluid. In the UK, Europe and North America, Hepatitis B is mainly passed from person to person by having unprotected sex. In the rest of the world the most common way of getting infected is from infected mothers to their children or from child to child.

## Acute Hepatitis B:

In Hepatitis B, 90-95% of the adults clear the virus from their body within 6 months and a few of them go into chronic Hepatitis B (5-10%). But, young children of age of up to 5 years have a 50% chance to clear the virus in acute stage, while 90% of the babies cannot clear the virus if they get it from their infected mother at the time of the birth.

## Chronic Hepatitis B:

Patients who couldn't clear the virus within 6 months progress into the chronic stage of the Hepatitis B. Most of the young children and babies go into the chronic stage of Hepatitis B. When infection becomes chronic, it slowly damages the liver over many years.

This is the reason why many of the patients infected with HBV don't experience symptoms.

2. Data from WHO, India- <http://www.whoindia.org/en/section6/section8.htm>

## How Hepatitis B can be diagnosed?

Tests to be done before treatment:

### 1. Hepatitis B Surface Antigen (HBsAg):

Test confirms that the Hepatitis B virus is present

### 2. Anti- core IgM antibody (IgM anti-HBc)

Appear very early after infection and is the marker of recent infection (Acute Hepatitis B)

### 3. Hepatitis B Surface Antibody (HBsAb or anti-HBs):

To determine if your immune (defence) system has successfully developed a protective antibody against the Hepatitis B virus. YOU ARE PROTECTED AGAINST THE HEP-B INFECTION

### 4. Hepatitis B Envelope Antigen (HBeAg):

Test confirms that there is active replication or multiplication of the virus.

### 5. Hepatitis B Envelope Antibody (Anti-HBe or HBeAb):

Test confirms the seroconversion of HBeAg i.e. decreasing infectivity

### 6. LFT (Liver Function Tests):

Liver function tests (LFTs) are blood tests that measure substances in the bloodstream that indicate that the liver is damaged. The main marker is ALT in the liver function test. However, they are not always good indicators of liver damage and do not detect the presence of the virus. LFT levels can fluctuate throughout the course of the disease. Sometimes they are normal, but this does not prove that liver damage is absent.

### 7. HBV DNA (qualitative + quantitative)

To understand the Hepatitis B virus load

### 8. Liver Biopsy

This is the removal of a small piece of tissue from the liver using a special needle. The tissue is examined under a microscope to look for inflammation or liver damage.

### 9. Ultrasound of Liver:

Ultrasound of the liver allows the doctor to see if there are any abnormalities on the surface of your liver



## Hepatitis C

Hepatitis C is a liver disease caused by Hepatitis C virus. The disease affects about 14 million people in India and about 170 million people worldwide, making it much more common than HIV infection. Each year, there are about 35,000 new cases of Hepatitis C infection and about 8,000 to 10,000 people die from the disease.<sup>3</sup>

When someone gets infected with Viral Hepatitis C (HCV), the virus enters the liver cells and uses them as a factory to replicate itself. These replicated viruses then infect more cells, and the cycle repeats.

In a very small percentage of cases (15%), the infection is acute, meaning it is short term (less than 6 months) and cleared by the body. Unfortunately, in 85% of cases, the infection becomes chronic, meaning the virus remains in the liver for more than six months (sometime lifelong) and slowly damages the liver over many years.

This is the reason why many patients infected with Hepatitis C virus don't experience symptoms.

Over time, this liver damage can lead to serious consequences, including cirrhosis (or scarring) of the liver, end-stage liver disease and some types of liver cancer.

## Genotypes:

Hepatitis C virus is not a single type of virus. There are different genotypes of Hepatitis C with numerous subtypes. How common the different strains are varies from country to country.

The most common in the UK, Europe, Asia and USA are types 1, 2 and 3. Subtypes are labelled A, B and C. It is possible to be infected again with a different genotype, or be infected with two genotypes at the same time. In India genotype 2 & 3 are most common.

## How is Hepatitis C Diagnosed?

### 1. Blood testing:

- **Hepatitis C antibody test (Anti-HCV):**

The test that is freely available, called an anti HCV test, looks for antibodies to Hepatitis C that are produced by the body's immune system in response to the virus.

This test is done by two methods i.e. Anti-HCV ELISA-III (Enzyme Linked Immunosorbent Assay or RIBA (Recombinant Immunoblot Assay).

A positive result shows that a person has been exposed to the virus at some time. It does not detect whether the virus is still present or whether the person is infectious.

- **Hepatitis C PCR test to find virus in blood (HCV RNA):**

There are other blood tests that may be taken to indicate a continuing infection ("PCR" or "viral RNA" test). Polymerase Chain Reaction (PCR) is the technique used for this test. It detects the presence of the HCV in the blood and also determines the quantity of the virus in the blood.

### 2. Genotyping:

Those who test positive for Hepatitis C virus will have a genotyping blood test to determine what type of Hepatitis C virus they have.

There are 6 different genotypes of HCV along with 50 subtypes. The different genotypes do not appear to result in different style of disease, but they do differ in their response to treatment; genotype 1 is the most resistant. Genotype 2 & 3 patients have good response to treatment.

3. Adapted from WHO Fact Sheet Data

**HOW CAN HEPATITIS B AND C VIRUSES DAMAGE THE LIVER, IF NOT TREATED WELL ON TIME ?**

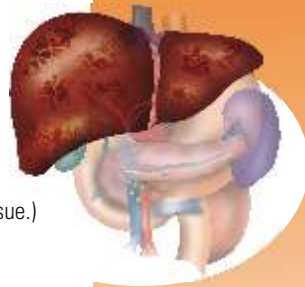
**The Healthy Liver**

- Your liver helps fight infections and cleans your blood.
- It also helps digest food and stores energy for when you need it.
- A healthy liver has the amazing ability to grow back, or regenerate, when it is damaged.
- Anything that keeps your liver from doing its job - or from growing back after injury - may put your life in danger.



**Fibrosis**

- If left untreated, the inflamed liver will start to scar.
- As excess scar tissue grows, it replaces healthy liver tissue.
- This process is called fibrosis. (Scar tissue is a kind of fibrous tissue.)
- Scar tissue cannot do the work that healthy liver tissue can.
- The healthy part of your liver has to work harder to make up for the scarred part.
- If your liver disease is diagnosed and treated successfully at this stage, there's still a chance that your liver can heal itself over time.



**Cirrhosis**

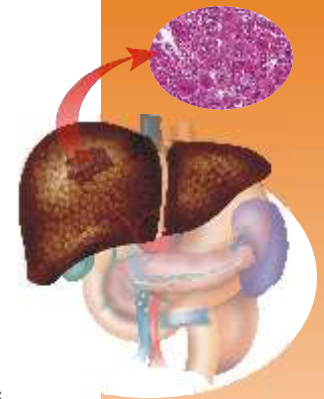
- But if left untreated, your liver may become so seriously scarred that it can no longer heal itself.
- This stage - when the damage cannot be reversed - is called cirrhosis.
- Cirrhosis can lead to a number of complications, including liver cancer.
- In some people, the symptoms of cirrhosis may be the first signs of liver disease.



**Liver Cancer**

Cancer that starts in the liver is called primary liver cancer. Cirrhosis due to Hepatitis B and Hepatitis C is leading risk factor for primary liver cancer.

- Once you've been diagnosed with cirrhosis, treatment will focus on keeping your condition from getting worse.
- It may be possible to stop or slow the liver damage.



- It is important to protect the healthy liver tissue in your body.

### Liver Failure

- Liver failure means that your liver is losing or has lost all of its function.
- It is a life-threatening condition that demands urgent medical care
- When liver failure occurs as a result of cirrhosis, it usually means that the liver has been failing gradually for some time, possibly for years.

### Cirrhosis, Liver Cancer, and Liver Failure are Serious Conditions that can Threaten Life.

- At these stages of liver disease, treatment options may be very limited.
- It's important to catch liver disease early, in the inflammation and fibrosis stages.
- If one is treated successfully at these stages, the liver may have a chance to heal itself and recover.

(Adapted from <http://www.liverfoundation.org/education/info/progression/>)

To prevent complications such as cirrhosis, liver cancer and liver failure, patients suffering from hepatitis B and C should consult their physicians to understand available treatment options.

**Note: Please note that treatment for Hepatitis C & Hepatitis B should be taken only under the supervision of your Registered Medical Practitioner. Please consult your doctor for more information on the available drugs for Hepatitis C or Hepatitis B.**

## TREATMENT

### Hepatitis C

Unless your body has fought off the hepatitis C infection on its own, which happens in about 15% of cases, treatment may be needed to control chronic hepatitis C. Sometimes, the treatment takes a long time to work, and sometimes it may not help. But because this disease can get worse over time, it is very important to seek proper treatment and care from your doctor

The goal of chronic hepatitis C treatment is to reduce the amount of virus in the blood and to slow the progression of the disease to prevent cirrhosis, end-stage liver disease, and other complications

All the currently available therapies for the treatment of chronic hepatitis C are based on the activity of a group of biological agents called alpha interferons

### Interferon

- Interferon is a protein produced naturally by our bodies.
- It can also be man-made and given to people by injection to boost their supply of interferon.
- It is called a "biologic" therapy because it is therapy using a substance made by the body.
- Interferon helps the body's immune system work, increasing the possibility that the virus will be recognized as foreign and be attacked by specialized cells of the immune system.
- Interferon needs to be injected subcutaneously (literally, under the skin).
- The injections need to be given three times a week for up to a year.



### Peg-Interferon

Now pegylated alpha interferon - a modified version of standard interferon alpha that results in a "longer-acting" version, are available. It may work slightly differently in the body as a consequence. Experience now shows that a combination of drugs improves the response rate. For the few people unable to tolerate combination therapy, alpha interferon on its own is sometimes beneficial. However, not everyone is considered suitable for treatment. Some people need only regular assessment to detect if damage to their liver is occurring or progressing.

Factors such as age, gender, genotype of hepatitis C, duration of infection, degree of liver damage and whether cirrhosis has developed are important in deciding if treatment is likely to be effective.



### Ribavirin

Ribavirin is also a man-made drug used against a range of different viruses. For hepatitis C treatment it is used with interferon (standard or pegylated), never on its own. The drug is taken orally twice daily. Almost everyone who undergoes treatment experiences some side effects. There's no way to predict how you'll react to treatment, as side effects can vary from person to person. The most common physical effects of treatment are flu-like symptoms. Your friend may experience fatigue, fever, muscle pains, general body aches, chills, loss of appetite and nausea.

Alpha Interferons or Peg Interferons are known to cause nervousness and patients are known to also get suicidal thoughts. Other problems like trouble breathing, chest pain, severe stomach or lower back pain, bloody diarrhea or bloody bowel movements, high fever, bruising, bleeding, or decreased vision have known to occur in few. This treatment may cause serious birth defects or even death to an unborn child. Pregnant women should not be given treatment or conceive during treatment and for six months after treatment ends.



### TREATMENT

#### Hepatitis B

#### Interferon

- Interferon is a protein produced naturally by our bodies.
- It can also be man-made and given to people by injection to boost their supply of interferon.
- It is called a "biologic" therapy because it is therapy using a substance made by the body.
- Interferon helps the body's immune system work, increasing the possibility that the virus will be recognized as foreign and be attacked by specialized cells of the immune system.
- Interferon needs to be injected subcutaneously (literally, under the skin).
- The injections need to be given daily for up to a year.
- The injections are given either in combination with other nucleoside/nucleotide analogue or as a monotherapy

#### Peg-Interferon

Now pegylated alpha interferon - a modified version of standard interferon alpha that results in a "longer-acting" version, are available. It may work slightly differently in the body and given only once a week unlike non-pegylated interferons. These are the kind of sustained release interferons and concentration of the interferon in the body remains for a longer time than non-pegylated interferons.

### Nucleosides/Nucleotides Analogues:

Nucleosides/Nucleotides analogues are oral, anti-viral medications that act by:

Lowering the virus load in the body initially, as they have higher anti-viral activity. Duration of the treatment is not finite, as patient has to take the therapy from 6 months to lifelong. If patient doesn't respond to the therapy initially then there are chances that virus develop resistance to the other therapies for hepatitis B also.

### SAFETY TIPS:

- Do not share needles or works (cottons, cookers, ties) used to inject drugs, hormones, steroids and vitamins. Do not even share the water. Wash hands before injecting.
- Cover any open cuts or wounds.
- The use of condoms and barriers will help reduce the risks of sexual transmission, however it is very low in Hepatitis C patients as compared to Hepatitis B patients.
- Consult your doctor before getting pregnant as a mother can **transmit** Hepatitis B to her baby during pregnancy or birth, but this **doesn't** happen with Hepatitis C very often.
- Make sure that in healthcare settings standard safety precautions **are** being carefully followed.
- Do not share any personal hygiene items such as razors, toothbrushes, nail clippers or pierced earrings. Cover personal items and keep them separate from other people you live with.
- Make sure tattoo and piercing equipment is sterile. For a tattoo: make sure that a new needle and ink pot is used for each person. For piercing: make sure that a new needle is used and that the package that contains the needle is opened up in front of you. (HCV/HBV Advocate)



**Vaccination:**

A vaccine is a drug that you take when you are healthy that keeps you from getting sick. Vaccines teach your body to attack certain viruses, like the Hepatitis B virus. The Hepatitis B vaccine is given through three shots. All babies should get the vaccine. Infants get the first shot within 12 hours after birth. They get the second shot at age 1 to 2 months and the third shot between ages 6 and 18 months. Older children and adults can get the vaccine, too. They get three shots over 6 months. Children who have not had the vaccine should get it. You need all of the shots to be protected. If you are travelling to other countries, make sure you get all the shots before you go. If you miss a shot, call your doctor or clinic right away to set up a new appointment (NIDDK)

**Hepatitis C:**

There is NO VACCINE for Hepatitis C.

**HEPATITIS AT A GLANCE**

