

Hepatitis B Fact Sheet

A Publication of the Hepatitis C Support Project

a series of fact sheets written by experts in the field of liver disease

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What Is HBV DNA and How Is It Measured?

Hepatitis B virus DNA (HBV DNA) carries the genetic blueprint of the virus. How many HBV DNA particles or “units” are found in a blood sample indicates how rapidly the virus is reproducing in the liver.

To measure HBV DNA, also called “viral load,” a laboratory measures how many HBV DNA units are found in a milliliter (about one drop) of blood. This result is written in international units per milliliter or IU/mL. High level of HBV DNA, which can range from tens of thousands up to billions, indicate high rates of HBV replication. Moderate HBV DNA rates are around 10,000 IU/mL and low or undetectable levels are less than 2,000 IU/mL and indicate an “inactive” infection.

Keeping track of HBV DNA levels over months and years is an important way to monitor HBV infection and to find out if treatment is needed, or if ongoing antiviral treatment has stopped working due to viral resistance.

The World Health Organization established the international unit to measure HBV DNA, but some labs still use “copies” instead of “units.” There are about 5 to 6 HBV DNA copies in every international unit. It is critical to know viral load when deciding if treatment is needed. While no one knows exactly how much HBV DNA is needed to cause liver damage, researchers suggest that people who test positive for the hepatitis B “e”

antigen (HBeAg) and have a viral load exceeding 20,000 IU/mL may be considered for treatment and frequent monitoring, such as every three to six months. Those who test negative for HBeAg and have a viral load of 2,000 IU/mL or higher, should also be monitored frequently and considered for treatment.

Low levels of HBV DNA do not necessarily mean that a person is not experiencing liver damage from the infection. A doctor must also consider age, gender, how long a person has been infected, and other indications of liver damage, such as alanine transaminase (ALT) levels, which rise above normal when liver cells are damaged.



HBV DNA

When people, especially children, are in the “immune tolerant” stage of hepatitis B, their HBV DNA levels can reach billions because their immune systems haven’t yet recognized or begun to fight the infection. HBV DNA levels can also fluctuate, an HBV DNA test captures viral load only at the time the test is taken.

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Immune Tolerance :

During the “immune tolerant stage” of HBV ALT levels can remain low even when the liver is inflamed or develops scar tissue.

How HBV DNA Is Reported

Because there are so many HBV DNA in a drop of blood, laboratories use a math equation to report viral load. Instead of writing 100,000 IU/mL, labs may report it as one to the fifth power or 10^5 or 5 log. In mathematical jargon, a “log” equals a number multiplied by 10. If you have a viral load of 10^5 copies/mL, it is actually, 10 X 10 X 10 X 10 X 10 or 100,000.

Doctors monitor HBV DNA levels more frequently if liver damage is occurring or if a patient is on treatment. HBV DNA

tests can be conducted as frequently as every month or every three months if liver damage is present or if treatment is occurring, or every six to 12 months if there historically has been no sign of liver damage and there is a low viral load.

A one- or two-log decrease in viral load (from 100,000 to 10,000 or 1,000 IU/mL for example) generally means an antiviral is working. But a one- or two-log increase may mean an antiviral has stopped working and that viral resistance has developed. An undetectable viral load (which means fewer HBV DNA than a lab’s equipment can identify) generally is lower than about 300 IU/mL.

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

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

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