

Hepatitis B virus infection

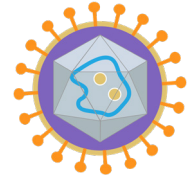
GETTING TO KNOW HBV LAB MARKERS

Laboratory markers of hepatitis B infection

In a basic hepatitis B screening, we measure five markers of hepatitis B infection. We distinguish markers that represent the active, living virus from markers that represent the immune system's response to that virus.

Active Virus

- HBsAg
- HBV DNA



Activated immune system

- Anti-HBc IgM
- Total Anti-HBc
- Anti-HBs



Course of infection

We distinguish acute from chronic infection.

Acute infection

The first detectable marker is the HBs antigen. It appears about 3–4 weeks after infection. The presence of this marker indicates that there is an active virus in the blood of the infected person.

As long as there is an active virus in the blood, we will also detect hepatitis B DNA.

Some weeks later, the immune system works against the virus by producing antibodies against the core antigen, causing both anti-HBc IgM and IgG antibodies to rise.

HBsAg: Hepatitis B surface antigen

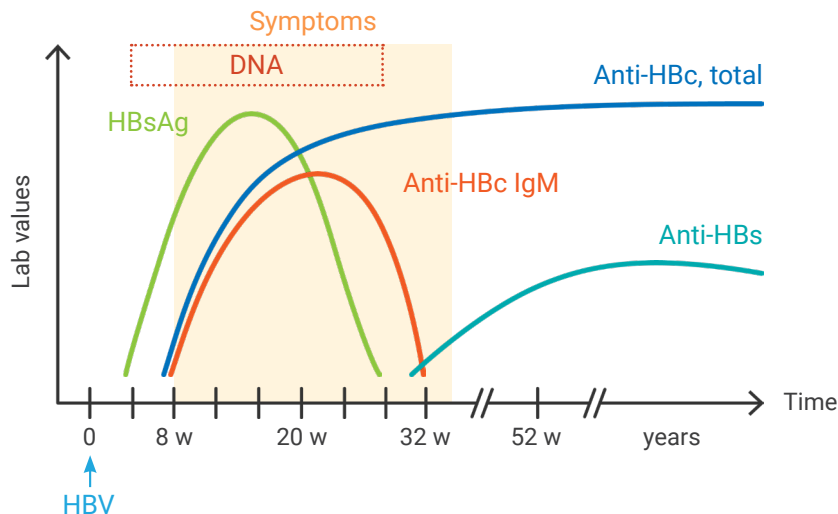
Anti-HBc IgM: Anti-Hepatitis B core antigen IgM antibodies

Total Anti-HBc: Anti-Hepatitis B core antigen IgM and IgG antibodies

Anti-HBs: Anti-Hepatitis B surface antigen antibodies

If the virus is cleared by the immune system and infection resolves, HBs antigen levels and IgM antibodies against the core will drop. However, the levels of IgG antibodies against the core protein remain high.

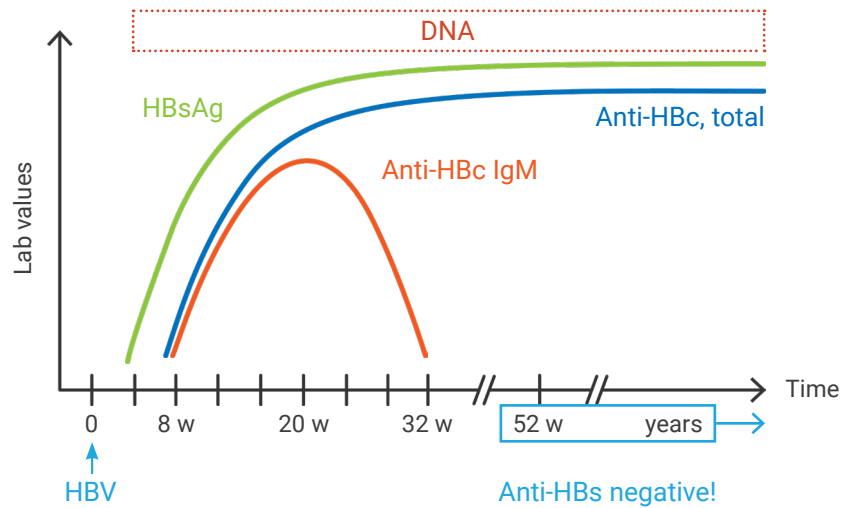
The presence of anti-HBs antibodies signals the removal of HBs antigen and proves virus clearance. The production of anti-HBs antibodies in place of HBsAg is called HBs seroconversion.



Chronic infection

Since the infection starts as an acute infection, first HBs antigen levels rise, followed by the levels of IgM and IgG antibodies against the core antigen. Anti-HBc IgM then drops after several months.

In comparison to a resolved acute infection, the virus is NOT cleared in this case. Thus, HBs antigen and HBV DNA stay detectable. As there is no HBs seroconversion, anti-HBs will be negative.



Further Reading

Huntzinger, A. 2009. AASLD Updates Chronic Hepatitis B Recommendations. *Am Fam Physician*. **79**: 338–343.

Turgeon, ML. 2018. *Immunology and Serology in Laboratory Medicine*. 6th Edition. St. Louis, Missouri: Elsevier.