

Interpreting hepatitis B and C infection diagnostic tests

How to test for chronic hepatitis B

Three main serological tests – HBsAg, anti-HBc and anti-HBs – are used to determine a patient's hepatitis B status: susceptible (to infection); immune through vaccination or resolved infection; or chronically infected with hepatitis B. Testing all three avoids missed diagnoses, unnecessary vaccination and recalling patients or adding tests. HBV DNA, or viral load, is a test to quantify the amount of virus in the blood. This is often measured in secondary care as it is an important measure used to determine treatment eligibility. Since, in the case of a newly acquired HBV infection, spontaneous viral clearance is very rare after six months of infection, the diagnosis of chronic hepatitis B can be made after that time period.

Interpretation of Results of Tests for Hepatitis B Virus Infection and Further Actions				
HBsAg	Anti-HBs	Anti-HBc	Serology interpretation	Follow up
-	-	-	Susceptible to infection	Vaccinate
-	+	+	Immune due to past resolved infection	Record result. No further action required.
-	+	-	Immune due to vaccination (if antibody titre >10 IU/L)	Record result. No need for further action.
+	-	+	Chronic infection (unless IgM is present in which case, possible acute infection)	Manage as per local guidelines for chronic hepatitis B
-	-	+	Inconclusive	Consult with local hepatologists or virologists

Serologic markers of Hepatitis B virus infection	
Serologic marker	Description
HBsAg	<ul style="list-style-type: none"> ▶ Protein on the surface of HBV ▶ Can be detected at high levels in serum during acute HBV infection or in CHB ▶ Presence indicates the patient is infected
Anti-HBs	<ul style="list-style-type: none"> ▶ Antibody to HBsAg ▶ Presence may indicate recovery and immunity from HBV infection ▶ Also develops in patients successfully vaccinated against HBV
Total anti-HBc	<ul style="list-style-type: none"> ▶ Antibody to core antigen of HBV (core antigen is not detectable in blood) ▶ Appears at the onset of symptoms in acute HBV infection and remains throughout life ▶ Presence indicates previous or ongoing infection with HBV
IgM anti-HBc	<ul style="list-style-type: none"> ▶ Immunoglobulin M class antibody to the core antigen of HBV ▶ Presence indicates recent acute infection with HBV (≤6 months)
HBeAg	<ul style="list-style-type: none"> ▶ Protein produced by the virus when it is actively replicating ▶ Can be detected in serum during acute HBV infection and CHB ▶ Some strains of HBV do not produce e antigen
Anti-HBe	<ul style="list-style-type: none"> ▶ Antibody to HBeAg ▶ Presence can indicate inactive infection (cf HBeAg) antigen
HBV DNA	<ul style="list-style-type: none"> ▶ Genetic material of HBV ▶ HBV DNA level in the blood is used to detect active HBV infection and to monitor response to antiviral therapy

¹ Adapted from Australasian Society for HIV Medicine (ASHM) 'Hepatitis B and Primary Care Providers' (http://www.ashm.org.au/images/Publications/Booklets/PBB_HepB_PrimaryCare_V11.0_WEB.pdf) and 'B Aware 4 Care: Strategies & Solutions for Hepatitis B Screening, Testing, Linkage to Care, & Treatment' (http://www.hivandhepatitis.com/jump/assets/2012/BAwareMonograph_Final.pdf)

How to test for chronic hepatitis C²

The tests and the interpretation of results for hepatitis C are more straightforward than for hepatitis B. Diagnosis of chronic hepatitis C is based on the detection of both HCV antibodies (anti-HCV) and HCV RNA. Since, in the case of a newly acquired HCV infection, spontaneous viral clearance is very rare beyond four to six months of infection, the diagnosis of chronic hepatitis C can be made after that time period. Anti-HCV antibodies are the first line diagnostic test for HCV infection but if positive should be followed by HCV RNA.

Interpretation of Results of Tests for Hepatitis C Virus Infection and Further Actions			
Anti-HCV	HCV RNA	Serology Interpretation	Follow up
-		No HCV antibody detected	<p>Sample can be reported as nonreactive for HCV antibody. No further action required.</p> <p>For persons who are immuno-compromised, testing for HCV RNA can be considered.</p> <p>If recent exposure in person tested is suspected, test for HCV RNA.</p>
+		Repeated reactivity means current HCV infection, or past HCV infection that has resolved.	Test for HCV RNA to identify current infection.
+	+	Chronic (current) infection	Provide person tested with appropriate counselling and link person tested to care and treatment.
+	-	Resolved infection or early acute	<p>No further action required in most cases.</p> <p>If distinction between true positivity and biologic false positivity for HCV antibody is desired, and if sample is repeatedly reactive in the initial test, test with another HCV antibody assay.</p> <p>In certain situations, follow up with HCV RNA testing and appropriate counselling. If the person tested is suspected of having HCV exposure within the past 6 months, or has clinical evidence of HCV disease, or if there is concern regarding the handling or storage of the test specimen.</p>

² Adapted from Centers for Disease Control (CDC) HCV Testing Graph http://www.cdc.gov/hepatitis/HCV/PDFs/hcv_graph.pdf

