

# Serological Testing for Suspected Viral Hepatitis

Summary of the Laboratory Guidelines for Serological testing for Suspected Viral Hepatitis, March 1997

## RISK FACTORS FOR VIRAL HEPATITIS

RISK FACTORS FOR HEPATITIS A	RISK FACTORS FOR HEPATITIS B		RISK FACTORS FOR HEPATITIS C
<ul style="list-style-type: none"> <li>- Travel</li> <li>- Family and daycare contact</li> <li>- Poor hygienic circumstances</li> </ul>	<ul style="list-style-type: none"> <li>- Injection drug use</li> <li>- Sexual transmission</li> <li>- Percutaneous/per mucosal exposure (e.g., health care providers)</li> <li>- Perinatal transmission</li> </ul>	<ul style="list-style-type: none"> <li>- Renal dialysis</li> <li>- Immigration from endemic region</li> <li>- Blood transfusions and blood products</li> <li>- Close family contact</li> </ul>	<ul style="list-style-type: none"> <li>- Injection drug use</li> <li>- Percutaneous exposure (e.g., tattooing and needle stick exposure)</li> <li>- Blood transfusions and blood products</li> </ul>

### Acute Viral Hepatitis

(Refer to Algorithm)

- ◆ Serum enzymes, i.e., alanine aminotransferase (ALT), *should be evaluated before* testing for the specific viral serological markers.
  - Dramatic elevations in ALT (5 times or more than the upper limit of normal) are found in patients with acute hepatitis of viral etiology. Therefore, patients with *normal* ALT values are *extremely unlikely* to have acute viral hepatitis.
- ◆ If acute viral hepatitis is suspected, request IgM antibody to hepatitis A virus (anti-HAV IgM) and hepatitis B surface antigen (HbsAg).
  - If hepatitis A infection alone is suspected, request IgM antibody to hepatitis A virus (anti-HAV IgM) only.
  - If hepatitis B infection alone is suspected, request hepatitis B surface antigen (HbsAg) only.

### Chronic Viral Hepatitis

(Refer to Algorithm)

- ◆ If chronic viral hepatitis is suspected, request hepatitis B surface antigen (HbsAg) and antibody to hepatitis C (anti-HCV).
  - If hepatitis B infection alone is suspected, (such as after receipt of a letter of notification from the Red Cross), request hepatitis B surface antigen (HbsAg).
  - If hepatitis C infection alone is suspected, (such as after receipt of a letter of notification from the Red Cross), request antibody to hepatitis C (anti-HCV).

### Immune State Determination

- ◆ Request antibody (Total or IgG) to hepatitis A virus:
  - As a pre-vaccination check for hepatitis A vaccine.
  - If immune serum globulin is required for prophylaxis.
- ◆ Request antibody to hepatitis B surface antigen (anti-HBs) to determine immunity to hepatitis B virus.

### Notification of Positive Cases

- ◆ The attending physician and testing laboratory must notify Communicable Disease Control, Alberta Health and Wellness if patient is found positive for Hepatitis A, B, C, or D.

For complete guideline refer to the TOP Website: [www.topalbertadoctors.org](http://www.topalbertadoctors.org)  
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**Test Abbreviation****Interpretation of Results and Comments**

<b>IgM Antibody to hepatitis A</b> (Anti-HAV IgM or HAV IgM Ab)	<ul style="list-style-type: none"> <li>◆ Positive result <i>defines a recent HAV infection.</i></li> <li>◆ May be negative in early infection (if collected within 5 to 7 days after onset of symptoms.)</li> <li>◆ Present for 3 to 6 months after onset of acute infection.</li> </ul>
<b>Total Antibody to hepatitis A</b> (Anti-HAV or HAV Ab)	<ul style="list-style-type: none"> <li>◆ Of extremely limited value in the diagnosis of acute infection.</li> <li>◆ Positive result indicates past infection and immunity to HAV.</li> <li>◆ Individuals given serum immune globulin for HAV prophylaxis may test as positive for at least six months.</li> </ul>
<b>Hepatitis B surface antigen</b> (HBsAg)	<ul style="list-style-type: none"> <li>◆ Used to diagnose an acute or chronic infection.</li> <li>◆ First marker to appear in an acute infection.</li> <li>◆ Disappearance indicates recovery from infection.</li> <li>◆ Persistence for &gt; 6 months indicates chronic infection (carrier.)</li> <li>◆ Individuals tested within 72 hours after administration of the vaccine may test as positive. (see anti-HBs, anti-HBc IgM and HBeAg.)</li> </ul>
<b>Antibody to hepatitis B surface antigen</b> (Anti-HBs or HBs Ab)	<ul style="list-style-type: none"> <li>◆ Only test which can be used to assess presence of protective immunity after immunization with hepatitis B vaccine.</li> <li>◆ Levels of 10MIU/mL (10IU/L) are usually considered protective. Routine monitoring of levels in individuals who have received the complete course of vaccine is not considered necessary.<sup>1</sup></li> <li>◆ Some individuals, e.g., healthcare workers, who are believed to have been exposed to the virus by a needlestick injury, should have their anti-HBs levels tested to determine whether they require administration of hepatitis B immune globulin (HBIG) and hepatitis B vaccine booster.<sup>1</sup></li> <li>◆ Positive result in individuals with recent acute HBV infection indicates convalescence.</li> <li>◆ Usually NOT detected when HBsAg is also present.</li> <li>◆ In some cases of chronic hepatitis B infection, both HBsAg and anti-HBs can be detected. These antibodies are heterotypic and likely not protective.<sup>2</sup></li> <li>◆ Antibody levels may decline with time.</li> </ul>
<b>IgM antibody to hepatitis B core antigen</b> (Anti-HBc IgM or HBc IgM Ab)	<ul style="list-style-type: none"> <li>◆ This test is expensive and should primarily be used if there is a high index of suspicion to indicate that the patient is in the early convalescence “window period” (2 to 16 weeks post infection) when HBsAg has disappeared and anti-HBs levels are not yet detectable.</li> <li>◆ Positive result in patients who are also HBsAg positive usually indicates acute infection.</li> <li>◆ Usually detectable for 3 to 12 months.</li> <li>◆ <i>Depending upon the threshold level of sensitivity, low levels may be detected in patients with chronic infection and reactivation.</i><sup>3</sup></li> </ul>
<b>Hepatitis B e antigen</b> (HBeAg)	<ul style="list-style-type: none"> <li>◆ Marker of active HBV replication.</li> <li>◆ Also a marker of infectivity. However, <i>the absence of HBeAg</i> in a person who is HBsAg-positive does not imply that the individual is NOT infectious.</li> <li>◆ Can be used to monitor therapy of patients with chronic HBV infection.</li> </ul>

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**Test Abbreviation****Interpretation of Results and Comments**

<b>Total antibody to hepatitis B core antigen</b> (Anti-HBc or HBc Ab)	<ul style="list-style-type: none"> <li>◆ A positive result indicates past infection with hepatitis B virus.</li> <li>◆ Usually persists for life.</li> <li>◆ This antibody is absent in individuals who are immune solely as a result of vaccination.</li> <li>◆ Up to 10% false-positive rate has been described in individuals with no documented infection to HBV. If uncertain, presence of one other marker, e.g., anti-HBs or anti-HBe would confirm previous exposure with HBV. Alternatively a negative repeat test later may indicate an earlier false-positive result.</li> </ul>
<b>Hepatitis B viral DNA</b> (HBV DNA)	<ul style="list-style-type: none"> <li>◆ Available by special request only. Of very limited value in the diagnosis of HBV infection.</li> <li>◆ Used to determine the presence of HBV DNA circulating in the blood which is a measure of virus replication in the liver.</li> <li>◆ Primary use is in monitoring treatment and clarifying some complex situations.</li> </ul>
<b>Antibody to hepatitis C</b> (Anti-HCV or HCV Ab)	<ul style="list-style-type: none"> <li>◆ Enzyme immunoassay (EIA) tests are the most common screening test used to detect antibody.</li> <li>◆ With present EIA tests, a reactive result may be obtained after 8 to 12 weeks to several months following infection with HCV.<sup>4</sup> Earlier generations of EIA tests often gave negative antibody results for up to 1 year.</li> <li>◆ False-positive results are found in patients with autoimmune chronic active hepatitis, alcoholic liver disease and other disorders relating to hypergammaglobulinemia.</li> <li>◆ Presence of antibody can be due to <i>acute or chronic infection</i>. It may represent only evidence of an infection with HCV.</li> <li>◆ Presence of antibody does not imply immunity to HCV.</li> <li>◆ Persistently elevated ALT levels suggest chronic infection. Repeatedly normal levels do not exclude chronic infection, but suggest low grade inflammation.</li> <li>◆ ALT values in some patients with HCV infection are within normal ranges.</li> </ul>
<b>Recombinant immunoblot for antibody to hepatitis C</b> (RIBA)	<ul style="list-style-type: none"> <li>◆ Supplementary test for the verification of EIA reactive results to HCV.</li> <li>◆ Indeterminate results may be found in early seroconversion, immunosuppressed patients or those unable to mount a complete antibody response. Some of the conditions which give false-positives in the EIA may well give an indeterminate or non-specific result in the RIBA.</li> </ul>
<b>Polymerase chain reaction for hepatitis C</b> (PCR for HCV)	<ul style="list-style-type: none"> <li>◆ Available by special request only, as it is a research tool.</li> <li>◆ Used to determine the presence of HCV RNA circulating in the blood which is a measure of virus replication in the liver.</li> <li>◆ Can be used to assess the infectivity of the patient and monitor therapy.</li> <li>◆ May be of use in early infection when antibody to the virus is undetectable, and in immunocompromised patients who may not seroconvert.</li> <li>◆ Can be of use in resolving indeterminate RIBA results.</li> </ul>
<b>Antibody to hepatitis D virus</b> (Anti-HDV or HBV Ab)	<ul style="list-style-type: none"> <li>◆ HDV occurs as a co-infection with HBV or super-infection of a chronic HBsAg carrier.</li> <li>◆ Antibodies appear late during the course of acute infection.</li> <li>◆ HDV is uncommon in Alberta.</li> </ul>
<b>Antibody to hepatitis E virus</b> (Anti-HEV or HEV Ab)	<ul style="list-style-type: none"> <li>◆ Routine tests not presently available for detection of this agent.</li> <li>◆ This test may be available by special request only from reference laboratories.</li> </ul>
<b>ALT</b> (Alanine aminotransferase)	<ul style="list-style-type: none"> <li>◆ Liver enzyme test.</li> <li>◆ Used to assess extent of liver inflammation.</li> <li>◆ Can be used to monitor resolution of inflammation following acute or chronic infection.</li> </ul>