

Hepatitis B, acute

Organism:	Hepadnavirus, a DNA virus
Incubation period:	45-180 days (average 60-90)
Infectious period:	Maximum infectivity during latter half of incubation period (14 days before onset of symptoms), continuing for a few days after onset of jaundice. Most people are non-infectious after first week of jaundice.
Transmission routes:	Percutaneous and mucosal exposure to infective body substances (blood, saliva, CSF, peritoneal, pleural, pericardial, synovial, amniotic fluid, semen, vaginal secretions, and any other body fluid containing blood). Since hepatitis B virus (HBV) is stable on environmental surfaces for at least 7 days, indirect inoculation of HBV can occur via inanimate objects.
Treatment:	No specific treatment is available for acute hepatitis B. There are several antiviral medications for persons with chronic infection. American Association for the Study of Liver Disease Practice guidelines are available for the treatment of chronic hepatitis B and can be found at http://www.aasld.org/publications/practice-guidelines-0

Information Needed for the Investigation

It is important to distinguish between acute cases of hepatitis B and newly identified chronic carriers. Only cases of acute illness involving a single HBcAb-IgM positive with discrete onset of viral hepatitis signs or symptoms are investigated. The SOE Infectious Disease Program staff works with public health nursing entities to collect clinical and epidemiological information by completing the [Viral Hepatitis Case Report form](#).

Verify the Diagnosis

Hepatitis B, acute

- HBsAg positive **AND** Immunoglobulin M (IgM) antibody to hepatitis B core antigen (IgM anti-HBc) positive.
- Clinical criteria: an acute illness with discrete onset of any sign or symptom consistent with acute viral hepatitis (e.g. fever, fatigue, headache, malaise, anorexia, nausea, vomiting, and abdominal pain), **AND** either a) jaundice, or b) elevated serum alanine aminotransferase (ALT) levels > 100 IU/L.
- Confirmed: a case that meets the clinical case definition, is laboratory confirmed, and is not known to have chronic hepatitis

Hepatitis B, chronic

- Immunoglobulin M (IgM) antibodies to hepatitis B core antigen (IgM anti-HBc) negative **AND** a positive result on one of the following tests: hepatitis B surface

- antigen (HBsAg), hepatitis B e antigen (HBeAg), or nucleic acid test for hepatitis B virus DNA (including qualitative, quantitative and genotype testing), **OR**
- HBsAg positive or nucleic acid test for HBV DNA positive (including qualitative, quantitative and genotype testing) or HBeAg positive two times at least 6 months apart (Any combination of these tests performed 6 months apart is acceptable)
 - Clinical criteria: no symptoms are required. Persons with chronic hepatitis B virus (HBV) infection may have no evidence of liver disease or may have a spectrum of disease ranging from chronic hepatitis to cirrhosis or liver cancer.

Case Classification

Probable

A person with a single HBsAg positive or HBV DNA positive (including qualitative, quantitative and genotype testing) or HBeAg positive lab result and does not meet the case definition for acute hepatitis B.

Confirmed

A person who meets either of the above laboratory criteria for diagnosis.

Comments: Multiple laboratory tests indicative of chronic HBV infection may be performed simultaneously on the same patient specimen as part of a "hepatitis panel." Testing performed in this manner may lead to seemingly discordant results, e.g., HBsAg-negative and HBV DNA-positive. **For the purposes of this case definition, any positive result among the three laboratory tests mentioned above is acceptable, regardless of other testing results.** Negative HBeAg results and HBV DNA levels below positive cutoff level do not confirm the absence of HBV infection.

Determine the Extent of Illness

Interview the case-patient using the patient history section of the [Viral Hepatitis Case Report form](#) to try to identify the source of infection and other potentially exposed persons

- Persons with whom the case has had sexual contact with from 6 weeks before onset of symptoms to present.
- Persons who may have been exposed within past six weeks to potentially infectious body fluid by percutaneous or permucosal means.
- If the case is a dentist, surgeon, or other health care worker, evaluate the potential for exposing patients.
- If the case has donated blood or plasma in the 8 weeks before onset
- If the patient is pregnant.

Laboratory Specimens

- Clinical: Obtain serum sample by collecting blood in 1 red top tube from suspect case(s). Centrifuge and draw off serum for testing. Perform the following hepatitis B virus serology tests HBsAg, HBcAb, HBcAb-IgM, and HBsAb. If contacts are ill, obtain serum sample from each as described above. Samples may be sent to State Virology

Lab-Fairbanks for testing using the following lab requisition form.

<http://dhss.alaska.gov/dph/Labs/Documents/publications/FbxSupplyReq.pdf>

- A repeat test for HBV DNA or HBsAg should be obtained after six months to determine the clearance or continued presence of viremia. Those still HBV DNA-positive or HBsAg-positive and HBcAb-IgM negative are considered confirmed chronic carriers, and should be counseled accordingly.

Contact and Control Measures

- Use standard precautions to prevent exposure to blood and body fluids.
- Hepatitis B vaccination is the best method to prevent disease. In certain circumstances, Hepatitis B immune globulin (HBIG) is recommended in addition to vaccine for added protection (see post-exposure prophylaxis and perinatal exposure sections below).
 - Pediarix and Recombivax HB pediatric vaccines are included in the Alaska state-supplied vaccine formulary. State-supplied hepatitis B vaccine is not routinely available for adults. Refer to the state-supplied vaccine eligibility criteria for additional information:
<http://dhss.alaska.gov/dph/Epi/iz/Pages/vaxpacket/default.aspx>
 - The Section of Epidemiology does not provide HBIG.
- Vaccination Program for Volunteer Emergency Personnel.
 - Alaska law (AS 18.15.250) specifies that hepatitis B vaccine be made reasonably accessible at no charge to all volunteer emergency medical and rescue personnel in the state who provide an emergency medical or rescue service primarily within an unincorporated community or within a municipality that does not provide funding for the emergency medical service. "Emergency medical and rescue personnel" means a trauma technician, emergency medical technician, rescuer, or mobile intensive care paramedic; and "volunteer" means that the person is an active volunteer of a first responder service, a rescue service, an ambulance service, or a fire department that provides emergency medical or rescue services as part of its duties.
 - For more information about this program visit
http://dhss.alaska.gov/dph/Emergency/Pages/ems/programs/hepatitis_b.aspx
- Household members of persons infected with hepatitis B should receive Hepatitis B vaccine.

Post-exposure Prophylaxis (PEP)

Consult the [CDC Hepatitis B PEP webpage](#) for updated post-exposure recommendations.

HBsAg-Positive Exposure Source

- Persons who have written documentation of a complete hepatitis B vaccine series and who did not receive post-vaccination testing should receive a single vaccine booster dose.
- Persons who are in the process of being vaccinated but who have not completed the vaccine series should receive the appropriate dose of hepatitis B immune globulin (HBIG) and should complete the vaccine series.
- Unvaccinated persons should receive both HBIG and hepatitis B vaccine as soon as possible after exposure (preferably within 24 hours). Hepatitis B vaccine may

be administered simultaneously with HBIG in a separate injection site. The hepatitis B vaccine series should be completed in accordance with the age-appropriate vaccine dose and schedule.

Exposure Source with Unknown HBsAg Status

- Persons with written documentation of a complete hepatitis B vaccine series require no further treatment.
- Persons who are not fully vaccinated should complete the vaccine series.
- Unvaccinated persons should receive the hepatitis B vaccine series with the first dose administered as soon as possible after exposure, preferably within 24 hours. The vaccine series should be completed in accordance with the age-appropriate dose and schedule.

Exposed person	Source HBsAg-positive	Source HBsAg-negative	Source not tested or unknown
Unvaccinated	HBIG 0.06 ml/kg IM one dose and initiate Hep B vaccine	Initiate Hep B vaccine	Initiate Hep B vaccine
Previously vaccinated			
Known responder	No treatment	No treatment	No treatment
Known Non-responder	HBIG x1 and initiate revaccination or HBIG x 2	No treatment	If known high-risk source, treat as if source were HBsAg-positive.
Response unknown	Test exposed for anti-HBs 1. If inadequate, HBIG x 1 plus Hep B vaccine booster dose. 2. If adequate, no treatment.	No treatment	Test exposed for anti-HBs 1. If inadequate, administer vaccine booster and recheck titer in 1-2 months 2. If adequate, no treatment

Perinatal Exposure

- Infants born to HBV-infected mothers should receive hepatitis B vaccine and HBIG within 12 hours of birth.
- See the CDC Perinatal Transmission webpage for complete guidelines on post-exposure prophylaxis for newborns.
<http://www.cdc.gov/hepatitis/hbv/perinatalxmtn.htm>
- See the Alaska Perinatal Hepatitis B Manual for case management information, available at: <http://dhss.alaska.gov/dph/Epi/iz/Pages/hbv/default.aspx>

Exposure	HBIG		Vaccine	
	Dose	Recommended timing	Dose	Recommended timing
Perinatal*	0.5 ml IM	Within 12 hours of birth	0.5 ml IM	Within 12 hours of birth

*The first dose of vaccine can be given at the same time as the HBIG dose but at a different site of administration.

Hospital Considerations

- Use standard precautions. <http://www.cdc.gov/hicpac/pdf/isolation/isolation2007.pdf>

Reporting Requirements

- NBS: enter all *probable* and *confirmed* cases.
- CSTE Case Definition is used to define *confirmed* cases

Section of Epidemiology Hepatitis B webpage

<http://dhss.alaska.gov/dph/Epi/id/Pages/hepatitis/b.aspx>

References

- Centers for Disease Control and Prevention, Hepatitis B Information webpage. <http://www.cdc.gov/hepatitis/hbv/index.htm>
- Interpretation of Hepatitis B Serologic Test Results available at: <http://www.cdc.gov/hepatitis/hbv/pdfs/serologicchartv8.pdf>
- Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. Available at <http://www.cdc.gov/hicpac/pdf/isolation/isolation2007.pdf>
- CSTE Position Statement 11-ID-03, Hepatitis B acute, 2012 Case Definition <https://wwwn.cdc.gov/nndss/conditions/hepatitis-b-acute/case-definition/2012/>
- CSTE Position Statement 11-ID-04, Hepatitis B chronic, 2012 Case Definition <https://wwwn.cdc.gov/nndss/conditions/hepatitis-b-chronic/>

Interpretation of Hepatitis B Serologic Test Results

Hepatitis B serologic testing involves measurement of several hepatitis B virus (HBV)-specific antigens and antibodies. Different serologic “markers” or combinations of markers are used to identify different phases of HBV infection and to determine whether a patient has acute or chronic HBV infection, is immune to HBV as a result of prior infection or vaccination, or is susceptible to infection.

HBsAg anti-HBc anti-HBs	negative negative negative	Susceptible
HBsAg anti-HBc anti-HBs	negative positive positive	Immune due to natural infection
HBsAg anti-HBc anti-HBs	negative negative positive	Immune due to hepatitis B vaccination
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive positive negative	Acutely infected
HBsAg anti-HBc IgM anti-HBc anti-HBs	positive positive negative negative	Chronically infected
HBsAg anti-HBc anti-HBs	negative positive negative	Interpretation unclear; four possibilities: 1. Resolved infection (most common) 2. False-positive anti-HBc, thus susceptible 3. “Low level” chronic infection 4. Resolving acute infection

Adapted from: A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States: Recommendations of the Advisory Committee on Immunization Practices. Part I: Immunization of Infants, Children, and Adolescents. MMWR 2005;54(No. RR-16).

■ **Hepatitis B surface antigen (HBsAg):**
A protein on the surface of hepatitis B virus; it can be detected in high levels in serum during acute or chronic hepatitis B virus infection. The presence of HBsAg indicates that the person is infectious. The body normally produces antibodies to HBsAg as part of the normal immune response to infection. HBsAg is the antigen used to make hepatitis B vaccine.

■ **Hepatitis B surface antibody (anti-HBs):**
The presence of anti-HBs is generally interpreted as indicating recovery and immunity from hepatitis B virus infection. Anti-HBs also develops in a person who has been successfully vaccinated against hepatitis B.

■ **Total hepatitis B core antibody (anti-HBc):**
Appears at the onset of symptoms in acute hepatitis B and persists for life. The presence of anti-HBc indicates previous or ongoing infection with hepatitis B virus in an undefined time frame.

■ **IgM antibody to hepatitis B core antigen (IgM anti-HBc):**
Positivity indicates recent infection with hepatitis B virus (≤ 6 mos). Its presence indicates acute infection.



DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Disease Control and Prevention

Division of Viral Hepatitis

