HEPATITIS TYPE B (HBV)

(Serum hepatitis; Australia antigen hepatitis [both terms are obsolete].
See also **HEPATITIS TYPE B, PERINATAL**)

1. **Agent**: Hepatitis B virus (HBV), 10 genotypes (A–J).

2. **Identification**:

   a. **Symptoms**: Onset is often insidious. Symptoms include fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, jaundice, and abdominal pain. Many cases are asymptomatic.

   b. **Differential Diagnosis**: Other causes of viral and non-viral hepatitis.

   c. **Diagnosis**

   CSTE case classification criteria

   - Refer to classification table in the appendix of this document.
   - First evaluate if case meets acute HBV case definition (i.e., new or first time report of a HBV test).
   - If confirmed or probable acute case definition not met, then classify according to the chronic HBV case definition.

   Confirmed acute HBV if one of the following 3 sets of criteria is met:

   1) Detection of anti-HBc IgM AND detection of one of the following: HBsAg, HBeAg, or HBV DNA;
      OR
   2) If anti-HBc IgM not done or unavailable, then
      a. New detection of either HBsAg or HBV DNA, AND
      b. Presence of one of the following clinical symptoms: jaundice, total bilirubin ≥3 mg/dL, serum alanine aminotransferase (ALT) >200 IU/L, AND
      c. Absence of more likely, alternative diagnosis;
      OR
   3) HBsAg seroconversion (Detection of HBsAg, HBeAg, or HBV DNA within 365 days of a negative HBsAg test) result).

   Probable acute HBV if the following criteria is met:

   a. Only anti-HBc IgM detected (i.e., HBsAg, HBeAg, or HBV DNA not done or unavailable) AND
   b. Presence of one of the following clinical symptoms: jaundice, total bilirubin ≥3 mg/dL, serum alanine aminotransferase (ALT) >200 IU/L, AND
   c. Absence of more likely, alternative diagnosis.

   Note: No additional information needs to be gathered or requested for determining if a case meets probable acute HBV criteria beyond what is routinely collected to determine if a case meets the confirmed acute criteria (i.e., acute hepatitis panel results, medical records, and any available laboratory tests for liver function tests [LFTs]). If LFTs are not available in the medical records, it is not necessary to request additional medical records and the case can be closed as false acute.

   Confirmed chronic HBV if one of the following 4 sets of criteria is met:

   1) Detection of HBV DNA;
      OR
   2) Detection of HBsAg or HBeAg in two clinical specimen taken ≥6 months apart;
      OR
   3) Detection of anti-HBc Total AND either HBsAg or HBeAg;
      OR
   4) Detection of HBsAg and HBeAg.

   Probable chronic HBV if the following criteria are met:

   a. Anti-HBc Total positive, AND
   b. Anti-HBc IgM not done or unavailable AND

c. Detection of either HBsAg or HBeAg

Note: Anti-HBc IgM can become positive reactivation of chronic HBV infection.

3. **Incubation**: The average incubation period is
   - 60 days (range: 40–90 days) from exposure to onset of abnormal serum ALT levels, and
   - 90 days (range: 60–150 days) from exposure to onset of jaundice.

4. **Reservoir**: Human.

5. **Source**: Primarily blood to blood and sexual contact.

6. **Transmission**: HBV is transmitted through percutaneous, mucosal, or nonintact skin exposure to infectious blood or body fluids. HBV is concentrated most highly in blood, and percutaneous exposure is an efficient mode of transmission. Semen and vaginal secretions are infectious, and HBV also can be detected in saliva, tears, and bile. Cerebrospinal fluid, synovial fluid, pleural fluid, peritoneal fluid, pericardial fluid, and amniotic fluid are also considered potentially infectious. Urine, feces, vomitus, nasopharyngeal washings, sputum, and sweat are not efficient vehicles of transmission unless they contain blood because they contain low quantities of infectious HBV. HBsAg found in breast milk is also unlikely to lead to transmission, and hence HBV infection is not a contraindication to breastfeeding. HBV is highly infectious, can be transmitted in the absence of visible blood, and remains infectious on environmental surfaces for at least 7 days.

7. **Communicability**: Blood is potentially infective before and after onset of symptoms. Approximately 2-10 percent of acute adult cases become carriers. Ninety percent of infected infants become carriers. Persons with either acute or chronic HBV infection should be considered infectious any time that HBsAg is present in the blood.

8. **Specific Treatment**: None for acute stage. Antiviral medications may be beneficial for chronic disease.

9. **Immunity**: Lifelong

REPORTING PROCEDURES

1. Reportable, *California Code of Regulations*, Section 2500 and 2505.

2. **Report Form**:
   VIRAL HEPATITIS B CASE REPORT[1]

3. **Epidemiologic Data**:

   a. Record results of laboratory tests: HBsAg, IgM anti-HBc, Total anti-HBc, HBV DNA, HBeAg, anti-HAV IgM, anti- HCV, HCV RNA PCR, ALT, AST, Total bilirubin levels etc.

   b. Reason for medical visit leading to diagnosis. This may be helpful in determining if case is acute or chronic hepatitis B.

   c. Contact with confirmed or suspected acute or chronic hepatitis B infection.

   d. Patient was treated for a sexually transmitted disease.

   e. Patient or employee of a renal dialysis unit.

   f. Resident of a long-term care facility (e.g. nursing home).

   g. Receive finger-sticks.

   h. Contact with or injection of contaminated blood; accidental inoculation by needle (laboratory), accidental splash into the eye.

   i. Transfusions of blood or blood products: places, dates, lot numbers, and manufacturer.

[1] http://publichealth.lacounty.gov/acd/Diseases/EpiForms/HepatitisBRep.pdf

j. Patient has received any IV infusions and/or injections in the outpatient setting.

k. Medical or dental treatment within past 6 months, including types of injections, surgical procedures performed, or any diagnostic medical procedure.

l. Occupational history, especially medical-dental personnel or public safety worker (law enforcement/correctional officer) and those involved in handling blood or blood products.

m. Blood donation, date and location of last donation.

n. Patient has undergone acupuncture.

o. Percutaneous exposure: self-injections (admitted or suspected), tattooing, ear piercing, acupuncture, electrolysis, skin-piercing procedures, etc.

p. Use of injection or non-injection street drugs.

q. For infant or child case, status of mother and other sibling should be evaluated. If pertinent, testing of mother's long-term sexual partner may be considered at the discretion of the mother's physician and child's mother.

r. Number of sexual partners of all genders.

CONTROL OF CASE, CONTACTS & CARRIERS

Investigate acute cases within 3 days. The **VIRAL HEPATITIS B CASE REPORT**[2] is for acute cases only.

CASE:

No restrictions.

CONTACTS:

Persons exposed to blood of an infected person, regular sexual partners and household contacts.

No restrictions.

Hepatitis B immune globulin (HBIG) is recommended for post-exposure prophylaxis (PEP) to hepatitis B virus (HBV) by percutaneous, mucosal, sexual, household or perinatal exposure. HBIG should be given as soon as possible, preferably within 12 hours for perinatal exposure and within 24 hours for percutaneous or mucosal exposure. PEP is unlikely to be beneficial if initiated 7 days after percutaneous exposure or 14 days after sexual exposure. For specific details, refer to *Prevention of Hepatitis B Virus Infection in the United States*[3].

Also refer to B-71, *Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents* (B-71)[4] for HIBIG and vaccination prophylaxis details.

Hepatitis B vaccination is recommended for adults aged 19–59 years and adults aged ≥60 years with risk factors for hepatitis B. Adults aged ≥60 years without known risk factors for hepatitis B may also receive hepatitis B vaccines. Refer to Universal Hepatitis B Vaccination in Adults Aged 19–59 Years: Updated Recommendations of the Advisory Committee on Immunization Practices — United States, 2022 for HBV risk factors and additional information on vaccination recommendations.
Infants and all other persons aged <19 years are already recommended to receive hepatitis B vaccines. Refer to B-71, *Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents*[5], for details.

CHRONIC/CARRIERS:

Defined as any person HBsAg, HBV DNA, or HBeAg positive 2 times at least 6 months apart.

[2] http://publichealth.lacounty.gov/acd/Diseases/EpiForms/HepatitisBRep.pdf

[3] https://www.cdc.gov/mmwr/volumes/67/rr/rr6701a1.htm?s_cid=rr6701a1_e

[4] http://publichealth.lacounty.gov/ip/providers/B71/VHBIG.pdf

[5] http://publichealth.lacounty.gov/ip/providers_resources.htm

1. Pregnant women who test positive for HBsAg should be referred to Perinatal Hepatitis B Prevention Unit.

2. No restrictions. Carriers are not to be excluded from work or school solely on the basis of a positive HBsAg with the exception of health professionals who perform exposure prone procedures. All health professionals should practice standard precautions. For healthcare professionals who perform exposure prone procedures, refer to the following guidance on circumstances for conducting procedures: Recommendations for Preventing Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Patients During Exposure Prone Invasive Procedures.

3. A carrier of HBsAg may or may not be symptomatic.

4. Those with a positive HBsAg test should be informed, evaluated for the presence of liver disease and followed to determine persistence of antigen.

5. Stress routine precautions, such as those applying to prevention of transmission via percutaneous and sexual routes.

6. Recommend evaluation of contacts for immunity and vaccination if needed.

PREVENTION-EDUCATION

1. Advise that disease may be transmitted by shared articles that become contaminated with blood (needles, syringes, razors, toothbrushes).

2. Advise that regular sexual partners may be at increased risk for hepatitis B. Advise of need for screening and vaccination. Use of condoms may reduce the risk to sexual partners.

3. If high risk contacts to acute hepatitis B cases do not have access to the hepatitis B vaccine through their primary care provider or are uninsured, a county sponsored vaccine program will provide hepatitis B vaccine.

   High Risk Contacts Include:
   - Sex partners and household contacts of HBsAg-positive persons,
   - Residents and staff of facilities of developmentally disabled persons who have potential blood or blood contaminated body fluids contact with the case,
   - Healthcare and public safety workers with reasonable anticipated risk of exposure to blood or blood-contaminated body fluids.

4. Vaccines are available as a 2-dose series (Heplisav-B), 3-dose series (Energix-B, Recombivax-HB, PreHevBrio), and a combined HepA and HepB 3-dose series (Twinrix). It is important to know what type of vaccine was received to determine if someone was fully vaccinated. If a contact is unsure if they are fully vaccinated, recommended getting tested for anti-HBs and then receive a dose of vaccine. Contacts should complete the vaccine series if not immune (anti-HBs negative). For recommended vaccine doses, refer to: B-71, Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents[6],

5. Advise high risk hepatitis B contacts (sex partners and household contacts) that a serum should be obtained for HBsAg, anti-HBs, and Total anti-HBc at the same time as administration of the 1st hepatitis B vaccine. This can be obtained through CS clinic if a primary medical care provider is not available.

6. CDC's Advisory Committee on Immunization Practices recommends that all adults aged 19–59 years and adults aged ≥60 years with risk factors for hepatitis B (e.g., occupation, sexual partner) should receive hepatitis B vaccines. See *Recommendations for Use and Storage of Common Immunobiologics and Other Prophylactic Agents* (B-71)[7].

7. Usage of HBIG based on exposure (type and time) and susceptibility.

[6] http://publichealth.lacounty.gov/ip/providers_resources.htm

[7] http://publichealth.lacounty.gov/ip/providers_resources.htm

8. Instruct on sanitary disposal of blood and other body secretions.

9. Advise patient that persons with a history of viral hepatitis are excluded from blood donor programs.

10. Advise case that HBsAg test should be repeated at 3 and 6 months. If still positive after 6 months, then the patient is considered a carrier and should be evaluated for the possibility of active liver disease.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological history is required to aid laboratory in test selection.

Serology:

Container: Serum separator tube (SST, a red-gray top vacutainer tube) and test request form.

Laboratory Form: **TEST REQUISITION FORM (H-3021)**[8]

Examination Requested: PHL performs the following Hepatitis B tests:

- Hepatitis B Surface Antigen w/ Confirmation
- Hepatitis B Core Antibody Total
- Hepatitis B Core IgM
- Hepatitis B Surface Antibody

Material: Whole clotted blood.

Amount 8-10 ml.

Storage: Refrigerate.

[8] http://www.publichealth.lacounty.gov/lab/docs/H-3021%20Test%20Request%20Form.pdf

Interpretation of Hepatitis B Serologic Test Results

HBsAg Anti-HBc Total Anti-HBs	negative negative negative	Susceptible
HBsAg Anti-HBc Total Anti-HBs	negative positive positive	Immune due to natural infection
HBsAg Anti-HBc Total Anti-HBs	Negative Negative positive	Immune due to hepatitis B vaccination
HBsAg Anti-HBc Total Anti-HBc IgM Anti-HBs	positive positive positive negative	Acutely infected
HBsAg Anti-HBc Total Anti-HBc IgM 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

Classification : CSTE Criteria for defining a case of Hepatitis B infection.
Note: This table should be read vertically; classify a case based on whether criteria are met within each column

Criterion	Acute								
	Confirmed			Probable	Confirmed				Probable
Jaundice	O			O					
ALT > 200	O			O					
T. bili ≥ 3.0	O			O					
Acute onset of hepatitis symptoms	O			O					
≥ 24 months of age or no perinatal exposure	N	N	N	N	N	N	N	N	N
Absence of more likely dx	N	N	N	N					
IgM antibody to hepatitis B core antigen (IgM anti-HBc) positive		N		N					
No evidence of an IgM antibody to hepatitis B core antigen (IgM anti-HBc)	N		N						N
IgM antibody to hepatitis B core antigen (IgM anti-HBc) negative						N			
Hepatitis B surface antigen (HBsAg) positive	O	O	O		O	O	N		O
Hepatitis B e antigen (HBeAg) positive		O			O	O	N		O
Hepatitis B DNA (HBV DNA) positive	O	O	O					N	
Viral detection tests negative or not done (HBsAg, HBeAg, and HBV DNA)				N					
Negative HBsAg within 12 months prior to a positive test			N						
2 positive viral detection test results spaced ≥ 6 months apart					N				

Notes:
S = This criterion alone is SUFFICIENT to classify a case.
N = All “N” criteria in the same column are NECESSARY to classify a case.
O = At least one of these “O” (ONE OR MORE) criteria in each category (categories=clinical evidence, laboratory evidence, and epidemiologic evidence) in the same column—in conjunction with all “N” criteria in the same column—is required to classify a case.

Hepatitis B Case Classification Algorithm