

Hepatitis B, Acute & Perinatal rev Apr 2015

BASIC EPIDEMIOLOGY

Infectious Agent

Hepatitis B virus (HBV) is the causative agent.

Transmission

- Sexual activity with an infected person
- Transfusion of contaminated blood or blood products
- Perinatally (either in utero or at delivery)
- Sharing or reusing non-sterilized needles, syringes, razors, toothbrushes, manicure equipment, or any other items which may contain the blood or body fluid of an infected person
- Percutaneous or mucous membrane exposure to blood or body fluids of an infected person
- Tattooing and/or body piercing

Incubation Period

The incubation period is 45–180 days with an average of 60–90 days

Communicability

The blood of infected persons is infective many weeks before the onset of symptoms and remains infective through the acute clinical course of the disease and during the chronic carrier state, which may persist for life. The younger a person is when infected, the more likely it is he or she will become chronic disease carriers. Additionally, persons who are hepatitis Be virus antigen (HBeAg, also referred to as “little e antigen”) positive are highly infectious.

Clinical Illness

The clinical course of acute hepatitis B is indistinguishable from that of other types of acute viral hepatitis. Clinical signs and symptoms occur more often in adults than in infants or children, who usually have an asymptomatic acute course. However, approximately 50% of adults who have acute infections are asymptomatic.

The prodromal phase from initial symptoms to onset of jaundice usually lasts from 3 to 10 days. It is non-specific and is characterized by a slow onset of malaise, anorexia, nausea, vomiting, right upper quadrant abdominal pain, fever, headache, myalgia, skin rashes, arthralgia and arthritis, and dark urine. The icteric phase is variable but usually lasts from 1 to 3 weeks and is characterized by jaundice, light or gray stools, hepatic tenderness and hepatomegaly (splenomegaly is less common). During convalescence, malaise and fatigue may persist for weeks or months, while jaundice, anorexia, and other symptoms disappear.

Most acute HBV infections in adults result in complete recovery with elimination of hepatitis B surface antigen (HBsAg) from the blood and the production of hepatitis B surface antibody (anti-HBs), creating immunity to future infection.

DEFINITIONS

Note: Refer to Table 1 for hepatitis B diagnostic test definitions and abbreviations and Table 2 for interpretation of hepatitis B serological tests.

Clinical Case Definition

- **Acute:** An acute illness with at least one of the following:
 - Discrete onset of symptoms* (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, and abdominal pain), or
 - Jaundice, or
 - Elevated serum alanine aminotransferase levels (ALT) >100 IU/L.
- **Perinatal:** Perinatal hepatitis B in the newborn may range from asymptomatic to fulminant hepatitis.
- **Chronic:** 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. Persons with chronic infection may be asymptomatic. **Please note that chronic hepatitis B is not a reportable condition in Texas.**

*A documented negative hepatitis B surface antigen (HBsAg) laboratory test result within 6 months prior to a positive test (either HBsAg, hepatitis B “e” antigen (HBeAg), or hepatitis B virus nucleic acid testing (HBV NAT) including genotype) result does not require an acute clinical presentation to meet the surveillance case definition.

Case Classifications and Laboratory Confirmation

- **Confirmed Acute:**
 - A case that meets the clinical case definition, is known not to have chronic hepatitis B** and also meets one of the following laboratory criteria:
 - IgM antibody to hepatitis B core antigen (anti-HBc IgM) positive, or
 - Hepatitis B surface antigen (HBsAg) positive.
- **Confirmed Perinatal:** HBsAg positivity in any infant >1 through 24 months of age who was born in the United States or in U.S. territories to an HBsAg-positive mother
- **Probable:** There is no probable case definition for acute or perinatal hepatitis B.

**A person should be considered chronically infected if the hepatitis B surface antigen (HBsAg) has been positive for 6 months or longer or if the patient has a history of chronic hepatitis B diagnosis.

Note: A pregnant woman with hepatitis B should NOT be entered into NBS as a perinatal case. Perinatal cases must be 24 months of age or younger. Positive pregnant women with acute hepatitis B should be entered as acute cases. If a pregnant woman has chronic hepatitis B, she can be entered as a chronic case of hepatitis B, if the jurisdiction chooses to maintain a database of chronic hepatitis B patients. She should be case managed through the Perinatal Hepatitis B Prevention Program.

SURVEILLANCE AND CASE INVESTIGATION

Acute hepatitis B surveillance is used to 1) identify contacts of case-patients who may require testing or prophylaxis; 2) detect outbreaks; 3) identify infected persons who need counseling and referral for medical management; 4) monitor disease incidence and prevalence; and 5) determine

the epidemiologic characteristics of infected persons, including the source of their infection, to assess and reduce missed opportunities for vaccination. See *Getting the Most Out of Surveillance* below for more information on conducting hepatitis B surveillance activities.

Case Investigation Checklist

- Confirm that laboratory results meet the case definition.
 - See *Evaluating Suspected Cases* below.
 - If the case is pregnant, refer to the Perinatal Hepatitis B Program regardless of acute or chronic infection. See *Perinatal Hepatitis B Investigations in the Managing Special Situations* section for more information.
- Review medical records or speak to an infection preventionist or physician to verify case definition, underlying health conditions, course of illness, vaccination status and travel history.
 - Use the *Viral Hepatitis Case Tracking Form* to record information.
 - See *Information to Collect for Acute Hepatitis B* below.
- Interview the case (See *Interviewing the Patient* below).
- Determine vaccination status of the case. Sources of vaccination status that should be checked include:
 - Case (or parent), ImmTrac, school nurse records, primary care provider, etc.
- Identify and follow-up with all close contacts. See *Contact Investigations* below.
 - Provide education on hepatitis B.
 - Recommend testing.
 - Evaluate susceptibility status.
 - Offer or recommend vaccination as appropriate.
- If an acute case is a healthcare worker, a recent blood donor, a transplant recipient, suspected to have been infected in a healthcare setting, less than 2 years old or pregnant see the *Managing Special Situations*.
- Send the completed the *Viral Hepatitis Case Tracking Form* to DSHS.
- All confirmed case investigations must be entered and submitted for notification in the NEDSS Base System (NBS). Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

Information to Collect For Acute Hepatitis B

The following information is epidemiologically important to collect in a case investigation for acute hepatitis B. The *Viral Hepatitis Case Tracking Form* includes spaces to record most of this information. All information collected during investigation should be entered into NBS.

- Demographic information
- Clinical details
 - Date of illness onset
 - Symptoms, including jaundice
 - Hospitalization
 - Provider information
- Laboratory results
- Vaccination status
- Risk behaviors and exposures
 - Sexual
 - Drug use
 - Tattoos/piercings
 - Healthcare
 - Receipt of organs/blood products

- Accidental needle stick
 - Medical/dental procedures
 - Hospitalization/residents in long term care facilities
 - Other blood exposure
 - Occupational
 - Incarceration
- Contact investigation and prophylaxis
 - Sexual contacts
 - Household contacts
 - Pregnancy status
 - Bloodborne exposures (e.g., recently donated blood or an organ)

Evaluating Suspected Cases of Acute Hepatitis B

- Evaluate the diagnosis
 - Review laboratory tests
 - Identify all HBsAg+ and/or anti-Hep B IgM+ results in NBS or received via fax.
 - Check patient's name in NBS to see if patient has already been identified as a hepatitis B case or has previous (> 6 mos) positive lab results for hepatitis B.
 - If patient has a previous positive hep lab result or a hep B investigation, mark lab as reviewed. **HBsAg+ lab results that were not submitted via NBS should be shared with the perinatal program for women 13-50.**
 - Contact provider
 - If patient is not identified as previously reported acute or chronic case, contact the healthcare provider for additional laboratory and clinical information, and pregnancy status if age/gender appropriate.
 - If patient is pregnant, refer to perinatal program.
 - If patient is not pregnant and the provider indicates the patient is a known chronic case OR the patient's clinical information is not consistent with acute hepatitis B, investigation can be closed.
 - Mark lab as reviewed in NBS OR
 - If an acute investigation was opened in NBS, close as "not a case" (and do not send a notification) OR
 - If desired and appropriate, enter the case in NBS as a chronic hep B case. Do not submit a notification.
 - If patient is identified as acute by provider or has a clinical presentation consistent with acute hepatitis B, continue investigation.
 - Contacting the provider can be done by fax, phone, e-mail or mail.
 - Some health departments find it useful to initiate contact with a form letter that the provider completes with information on pregnancy status, clinical information, chronic status, and any additional liver test results.

Interviewing the patient

- Identify the source of infection.
 - Obtain information on high risk behaviors, medical/dental/commercial procedures in 45-180 days prior to onset.
 - Close contact with any household or sexual contact with acute or chronic hepatitis B infection
 - Receipt of blood transfusion or other blood products
 - History of dental or surgical care including renal dialysis
 - Blood exposure through needles, tattooing, piercing or acupuncture
 - Accidental exposure of skin, eyes, mucous membranes, or a wound to blood of another person
 - Work in occupational settings with elevated risk of exposures (e.g., medical, dental, or clinical laboratory work, or employment in facilities for mentally disabled persons)
 - Sexual contact with multiple sex partners or a sex partner with a risk factor
 - Possible sources should be pursued if additional exposures may be prevented (e.g., illegal tattooing, likely healthcare transmission, etc.).
- Identify potentially exposed persons.
 - Household members
 - Sexual contacts
 - Needle-sharing contacts
 - Others potentially exposed to blood/sexual fluids
 - Evaluation special situations (see Managing Special Situations below)
 - If patient is a healthcare worker, evaluate potential for exposing patients.
 - If patient has recently donated blood/plasma, notify the blood bank.
 - If patient is pregnant, refer patient to perinatal program.

Contact Investigations

- Evaluate immunization and disease history of household and sexual contacts.
 - **Susceptible:** persons who are not immune to HBV or who have not been appropriately vaccinated against HBV.
 - **Protected:** persons with adequate antibody response (anti-HBs \geq 10 milli-IUs/mL) due to vaccination or natural infection.
 - **Primary non-responder:** persons who do not demonstrate adequate antibody response after three doses of hepatitis B vaccine.
 - **Non-responder:** persons who have received two complete series of the hepatitis B vaccine but still do not demonstrate adequate antibody response.
 - **Unknown:** persons whose anti-HBs status is unknown are always considered susceptible.
- Test or refer for testing as appropriate.
- Offer vaccine or refer to provider for vaccine, if susceptible (see the Red Book for current recommendations).
- Offer education on preventing hep B.
- Refer to prevention and/or treatment resources.
- Refer acute cases to provider for follow-up testing to establish resolution or carrier status.
 - Offer education on reducing risk of further transmission.
 - Refer to treatment.

MANAGING SPECIAL SITUATIONS

Perinatal Hepatitis B Investigations

Any woman that has a positive hepatitis B laboratory result AND is known to be pregnant must be referred to the Perinatal Hepatitis B Prevention Program for case management. Any woman age 13-50 that has an unknown pregnancy status and a positive hepatitis B lab result should also be referred to the Perinatal Hepatitis B Prevention Program for further investigation of pregnancy status.

- Currently all positive hepatitis B surface antigen results for women aged 13-50 that are reported electronically to NBS are reviewed for pregnancy status by EAIDB each week.
- Labs that are connected to prenatal or obstetric care are shared with the Perinatal Hepatitis B Prevention Program for review and case management.
- EAIDB contacts the ordering provider for all labs that belong to women aged 13-50 with unclear pregnancy status. Those that are for pregnant women are referred to the Peri Program.

Preventing perinatal transmission is perhaps the most important part of hep B surveillance, and for this reason DSHS has an official Perinatal Hepatitis B Prevention Program for Texas. The program has extensive information on diagnosis, case management, and follow-up of pregnant women with hepatitis B and their infants. Their program can be accessed at:

http://www.dshs.state.tx.us/idcu/disease/hepatitis/hepatitis_b/perinatal/ or at 512-776-6634

Even though pregnant HBsAg + women and their infants are case managed by the perinatal program, infants infected perinatally with hep B are reported to the CDC through NBS.

The information provided below is the information that is needed for perinatal hepatitis B surveillance information that is shared with the CDC via NBS. This information should be available on the perinatal hepatitis B prevention program's case management forms, a separate investigation/reporting form is not needed.

- Demographic information
 - Infant
 - Mother
- Clinical details
 - Laboratory results and dates for mother
 - Laboratory results and dates for infant
- Vaccination
 - Dates
 - HBIG information including date and time
 - Was series given more than once

All information collected for confirmed perinatal hepatitis B investigations should be entered into NBS within 30 days of the report of a positive hepatitis B lab on the infant. Investigation forms (or a copy of the infant and mother's perinatal program case management forms) should be submitted to EAIDB.

Positive Lab Results Received on a Child Under 2 years old

All positive laboratory results indicative of hepatitis B infection in children under 2 should be investigated to ensure the child is not a case of perinatal hepatitis B.

1. Ascertain if additional laboratory results exist in NBS.
2. Contact the submitting laboratory or provider to find additional laboratory results and information on the mother's hepatitis B status.
3. If mother is positive and child has acute or chronic infection, investigate as a potential missed perinatal case.

Case is a Health Care Worker (HCW)

If the case is a dentist, physician, nurse, or other health care worker (HCW) with potential for exposing patients by blood or other body fluids:

1. The HCW should be discouraged from working until the acute clinical illness has resolved.
2. Upon returning to work, special precautions should be practiced until the HCW is no longer infectious, including:
 - a. Wearing gloves for all procedures during which the hands will be in contact with the patients' mucosal surfaces or broken skin
 - b. Avoiding situations involving sharps that could lead to exposures of susceptible individuals to blood or objects contaminated with blood of the case
 - c. Careful and frequent hand washing

Health Care Associated Infection is Suspected

If two or more iatrogenic (health care associated) cases occur in patients of the same dental or health care provider, residential care facility, or non-hospital health care facility (e.g., dialysis center); and the cases have no other identified plausible source of infection; or if other circumstances suggest the possibility of iatrogenic infection, notify EAIDB at **(800) 252-8239** or **(512) 776-7676**.

Case is a Recent Blood Donor

If the case has donated blood or plasma within the eight weeks prior to onset of symptoms, the agency that received the blood or plasma should be notified so that any unused product can be recalled.

Case is a Recent Transfusion Recipient

If transfused blood or blood products are suspected as the possible source of infection, the blood bank or other agency that provided the implicated lot should be notified so that aliquots of the blood still on hand (or the donors themselves) can be retested for HBsAg or tested for anti-HBc. Lot numbers for tracking are usually available through the blood bank at the hospital where the units were transfused.

Possible Common-Source Outbreaks

Report immediately to EAIDB at **(800) 252-8239** or **(512) 776-7676**.

Getting the Most Out of Surveillance

- Provider education
 - Providers should be educated about the importance of performing appropriate serologic tests to determine the etiology of viral hepatitis and reporting all cases of acute and perinatal HBV. Providers are required by Texas law to test pregnant women for hepatitis B.

- Hospitals and infection control practitioners should be encouraged to report all persons with acute viral hepatitis (ICD-10 code B16), and all births to HBsAg-positive women. This is required by Texas Administrative Code (TAC).
- Case investigation
 - Case investigation is essential for determining contacts who are eligible for prophylaxis and for collection of risk factor data.
 - Analysis of risk factor data can identify populations where targeted interventions may be needed.
- Laboratory reporting
 - Laboratories should be encouraged to report all persons with serologic markers of acute or chronic hepatitis to the state or local health department.
 - Currently Texas receives over 50,000 hepatitis B laboratory results through NBS. At this time, only IgM anti-HBc and HBsAg results populate the “Documents Requiring Review” queue (where all electronic laboratory results first appear). All other hepatitis B laboratory results are automatically “swept” off that queue by the system. They are still stored in NBS and can be located by searching for a specific patient or by running a report for one or more specific laboratory results.
 - All IgM anti-HBc and HBsAg positive results should be reported.
 - To facilitate reporting, these laboratory results are included in the state’s list of laboratory-reportable conditions.
- Monitoring surveillance indicators
 - Regular monitoring of surveillance indicators, including date of report, timeliness, and completeness of reporting, may identify specific areas of the surveillance and reporting system that need improvement. Important program indicators that can be monitored through the surveillance, reporting and case investigation system include the following:
 - Characteristics of cases of acute hepatitis B that occur in children and adolescents younger than 20 years of age and missed opportunities for vaccination
 - Characteristics of cases of acute hepatitis in which death has occurred
 - Characteristics of cases of acute hepatitis B in persons reporting a history of vaccination
 - Characteristics of cases of acute hepatitis B in persons over 70 years of age
 - Characteristics of cases of acute hepatitis B associated with healthcare transmission
- Registries/databases for HBsAg-positive persons
 - NBS can serve as a de facto chronic B registry and the positive hepatitis B results can be used to distinguish newly reported cases of infection from previously identified cases.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School, Child-Care Facility, and General Public Reporting Requirements

Perinatal hepatitis B cases are required to be reported **within one work day**. Confirmed acute hepatitis B cases are required to be reported **within 1 week** to the local or regional health department or to DSHS EAIDB at **(800) 252-8239** or **(512) 776-7676**.

Local and Regional Reporting and Follow-up Responsibilities

Local and regional health departments should:

- Enter the case into NBS and submit an NBS notification on all **confirmed perinatal hepatitis B or acute hepatitis B** cases to DSHS within 30 days of receiving a report of a confirmed case.
 - Please refer to the *NBS Data Entry Guidelines* for disease-specific entry rules.
 - A notification can be sent as soon as the case criteria have been met. Additional information from the investigation may be entered upon completing the investigation.
 - Please do not send a notification on chronic hepatitis B cases entered into NBS.
- Fax (or mail) a completed investigation form within 30 days of completing the investigation.
 - **In the event of a death, copies of the hospital discharge summary, death certificate, autopsy report and death investigation form should also be sent to DSHS EAIDB.**
 - Investigation forms may be faxed to **512-776-7616** or mailed to:
 - Infectious Disease Control Unit
 - Texas Department of State Health Services
 - Mail Code: 1960
 - PO Box 149347
 - Austin, TX 78714-9347
- HBsAg-positive pregnant women (acute and chronic infections) should also be reported to the DSHS Perinatal Hepatitis B Prevention Program at **(512) 776-6634**.
 - For information on perinatal hepatitis B prevention activities, please refer to the Perinatal Hepatitis B Prevention Program Manual at www.dshs.state.tx.us/idcu/disease/hepatitis/hepatitis%5Fb/perinatal/manual/.

When an outbreak is investigated, local and regional health departments should:

- Report outbreaks within 24 hours of identification to the regional DSHS office or to EAIDB at 512-776-7676.

LABORATORY PROCEDURES

Testing for hepatitis B is widely available from most hospital and commercial laboratories. If hepatitis B testing is needed through the DSHS State Laboratory, please contact the EAIDB VPD Team at **(800) 252-8239** or **(512) 776-7676**.

For testing in regard to a possible perinatal case, please contact the Perinatal Hepatitis B Prevention Program at **(512) 776-6634**.

TABLES

Table 1. Diagnostic Tests for Hepatitis B Virus (HBV) Antigens and Antibodies

| Abbreviation | HBV Antigen or Antibody | Use |
|------------------|-----------------------------|---|
| HBsAg | Hepatitis B surface antigen | Detection of acutely or chronically infected people; antigen used in hepatitis B vaccine |
| Anti-HBs | Antibody to HBsAg | Identification of people who have resolved infections with HBV; determination of immunity after immunization |
| HBeAg | Hepatitis B e antigen | Identification of infected people at increased risk of transmitting HBV |
| Anti-HBe | Antibody to HBeAg | Identification of infected people with lower risk of transmitting HBV |
| Anti-HBc (total) | Antibody to HBcAg | Identification of people with acute, resolved, or chronic HBV infection (not present after immunization); passively transferred maternal anti-HBc is detectable for as long as 24 months among infants born to HBsAg-positive women |
| IgM anti-HBc | IgM antibody to HBcAg | Identification of people with acute or recent HBV infections (including HBsAg-negative people during the "window" phase of infection) |

Source: American Academy of Pediatrics. Hepatitis B. In: Pickering LK, Baker CJ, Long SS, McMillan JA, eds. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012: 373.

Table 2. Interpretation of Hepatitis B Serological Tests and Health Department Response

| Tests | Results | Interpretation | Health Department Response |
|--|--|---|---|
| HBsAg Anti-HBc Anti-HBs | Negative Negative Negative | Susceptible (Never infected or vaccinated) | Vaccinate or refer for vaccine if appropriate |
| HBsAg Anti-HBc Anti-HBs | Negative Negative Positive | Immune due to vaccination | No further action needed |
| HBsAg Anti-HBc Anti-HBs | Negative Positive Positive | Immune due to past infection | No further action needed |
| HBsAg Anti-HBc IgM anti-HBc Anti-HBs | Positive Positive Positive Negative | Acutely Infected | Initiate case investigation. If case is pregnant, refer to Perinatal Hepatitis B program. Enter case into NBS if meets confirmed case status (no probable case status for acute hepatitis b). |
| HBsAg Anti-HBc IgM anti-HBc Anti-HBs | Positive Positive Negative Negative | Chronically Infected | Follow-up to determine if patient may be pregnant. If pregnant, refer case to Perinatal hepatitis B program. If case is chronic, it is not required to be reported. No NBS entry required. If entry is made, please do not submit notification. |
| HBsAg Anti-HBc Anti-HBs | Negative Positive Negative | Four interpretations possible* | Recommend patient follow-up with physician and/or recommend more testing be completed if applicable. |
| <p>* 1. May be recovering from acute HBV infection. 2. May be distantly immune and test not sensitive enough to detect very low level of anti-HBs in serum 3. May be susceptible with a false positive anti-HBc. 4. May be undetectable level of HBsAg present in the serum and the person is actually a carrier.</p> | | | |

Source: Adapted from Centers for Disease Control and Prevention (CDC).

FLOW CHARTS

Acute Hepatitis B (HBV): Case Status Classification

